Contractual Complexity in Debt Agreements: The Case of EBITDA

Adam B. Badawi
UC Berkeley
abadawi@berekely.edu

Scott D. Dyreng
Duke University
scott.dyreng@duke.edu

Elisabeth de Fontenay
Duke University
defontenay@law.duke.edu

Robert W. Hills
Pennsylvania State University
roberthills@psu.edu

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Abstract

We document significant variation in the contractual definition of EBITDA across syndicated loans based on the number of accounting addbacks included in EBITDA definitions. We show that addbacks are associated with tighter covenants but fewer violations. Market responses to covenant violations are more negative when contractual EBITDA contains more addbacks. We also find that addbacks are positively (negatively) related to accrual (cash flow) volatility, suggesting accruals may be less informative about borrowers' underlying ability to meet their obligations. Our findings suggest that addbacks in EBITDA definitions enhance the informativeness of covenant realizations by refining EBITDA to better reflect the borrower's true financial condition.

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1. Introduction

Private bank loans are governed by complex contracts that contain many points of negotiated agreement between borrower and lender. Financial economists, lawyers, and accountants have extensively studied many aspects of these agreements, including substantial work on the ex-post monitoring of borrowers through financial covenants. Many covenants – such as leverage, fixed charge coverage, and interest coverage – use a measure of earnings in either the numerator (coverage covenants) or the denominator (leverage covenants), where earnings is almost universally defined in the contract as some form of accounting earnings adjusted for interest, taxes, depreciation, and amortization (EBITDA).[1]

Recent research suggests that the definition of EBITDA in bank contracts is often significantly different than simply adding interest, taxes, depreciation, and amortization to net income (Demerjian and Owens 2016; Li 2016; Dyreng et al. 2017). For example, Beatty et al. (2019), show that non-recurring items are often excluded from earnings definitions in performance covenants as a mechanism to mitigate agency costs, and in an attempt to develop an accounting metric that is more predictive of future cash flows (see also Dyreng et al., 2017). Despite these studies, little is understood about the forces that drive the lender and borrower to adjust the definition of EBITDA, the number of adjustments in a typical contract, the extent of cross-sectional variation in these adjustments, and the interactions EBITDA definitions have with covenant outcomes, borrowing costs, and the costs of loan renegotiations.

In this study, we systematically analyze contractual EBITDA definitions in conjunction

[1] Even "covenant-lite" loans with no maintenance financial covenants nonetheless routinely condition the borrower's ability to incur additional debt, pay dividends, and make investments on EBITDA-based financial tests (Becker and Ivashina 2016; Berlin et al. 2020). Research suggests that earnings-based covenants are more common than balance sheet covenants, with debt-to-EBITDA ratios often reported as the most common covenant type (Demiroglu and James 2010; Denis and Wang 2014; Adam and Streitz 2016; Dyreng et al. 2021; Griffin et al. 2021).

with actual covenant realizations from a novel hand-collected dataset to empirically examine these questions. We begin by extracting the contractual definition of EBITDA from nearly 4,000 credit agreements for 2000 through 2016 and combine this information with other borrower and loan characteristics. To facilitate our empirical examination of contractual EBITDA, we use machine learning and textual analysis to create a count of "addbacks" ranging from one (fewest addbacks) to eight (most addbacks) to capture the extent of adjustments to net income in the contractual definition of EBITDA.[2] While some contracts define EBITDA in a single sentence that adds interest, taxes, depreciation and amortization back to net income, with no additional addbacks, other EBITDA definitions are thousands of words long and allow significant addbacks, including essentially all non-recurring items that affect either accruals or cash flows, and often grant the borrower significant discretion to increase EBITDA with projections that may never be realized.

In our sample, the mean (standard deviation) of addbacks is 3.61 (1.74), and the level of addbacks is increasing, on average, over the sample period, as shown in Figure 1. Additionally, we find addbacks are increasing in deal size, maturity, and borrower leverage, suggesting that more expansive EBITDA definitions tend to appear in larger, riskier loans. Addbacks are also greater for deals with pledged collateral, a feature associated with riskier loans. These descriptive observations suggest addbacks are a crucial point of negotiation between borrower and lenders for loans where the risks of financial distress and payment default are material, and suggest that tailoring earnings definitions increases contractual surplus.

To understand why such variation in contractual EBITDA definitions exist, we explore an

[2] The term "addback" refers to adding back line items to GAAP definitions of earnings. Addbacks can be both income increasing and income decreasing, depending on the line item added back to GAAP earnings. On average, addbacks are income increasing, as shown by Dyreng et al. (2017). In unreported results, we also find that firms with more addbacks have higher contractually-defined EBITDA, all else equal.

efficient contracting explanation.[3] For example, it is possible addbacks make EBITDA-based contracting elements, including financial covenants, more informative, because addbacks exclude items from GAAP earnings that are not reflective of a borrower's ability to meet future payment obligations (Dyreng et al. 2017). Because covenant violations can be costly to each contractual party (e.g., Chava and Roberts (2008); Gigler et al. (2009); Griffin et al. (2021)), both borrower and lender have incentives to write the contract so violations occur only when realized performance reflects actual deterioration in the borrower's ability to repay the loan, but not when accounting numbers reflect transitory performance that does not affect the borrower's ability to meet financial obligations under the contract. This is particularly true if the contract is arranged so renegotiation costs are expected to be high, such as when there are many parties whose consent is required for significant changes to deal terms, including large syndicates or deals with tranches targeted to institutions (Bolton and Scharfstein 1996; Asquith et al. 2005; Berlin et al. 2020).

We document several empirical regularities consistent with addbacks improving the informativeness of EBITDA for lenders. First, we show that addbacks are negatively related to covenant slack, meaning that numerical covenant thresholds are tighter when there are more addbacks. Based on this finding, one might expect more frequent covenant violations when addbacks are greater because slack is tighter. However, we find that addbacks are negatively related to covenant violations. This suggests addbacks enhance the signal provided to creditors by removing less informative aspects of accounting earnings from contractual EBITDA, thereby allowing for tighter covenants, yet fewer violations.

[3] This understanding is consistent with the way practitioners describe EBITDA adjustments. As one practice note states: "Sponsors and borrowers, certainly, and even lenders, in many cases, have some interest in mitigating loan default risk by creating a leverage calculation that is a market-accepted approximation of the borrower's consistent operating cash flows." *Credit Financing: Adjusted EBITDA Cheat Sheet*, Forest, Brown & Todd, March 9, 2020, available at: https://frostbrowntodd.com/credit-financing-adjusted-ebitda-cheat-sheet/.

If addbacks improve the informativeness of contractual EBITDA, we would expect the consequences of violating EBITDA-based covenants would be more severe when there are more addbacks. That is, if addbacks reduce false positive signals about deterioration in borrower quality, then violations occurring when the number of addbacks included in contractual EBITDA is higher are more likely to be a signal of significant economic concern, and therefore merit a more severe response. Consistent with this theory, we find market reactions to the disclosure of EBITDA-based covenant violations are more negative when contractual EBITDA includes more addbacks.

Next, we decompose accounting earnings into its two primary components, cash flows and accruals, and examine the relationship between the volatility of these components and addbacks. We find that contractual EBITDA includes more addbacks for borrowers with relatively volatile *accruals*. Consistent with evidence that volatile accruals convert poorly to future cash flows (e.g., Dechow and Dichev (2002)), this suggests earnings with volatile accruals may be relatively less informative about the borrower's underlying financial condition insofar as it is relevant for the debt contract. Moreover, volatility in accruals might cause false positive violations, requiring costly investigation, and potentially costlier renegotiation, when this effort is not necessary.[4] On the other hand, we find that contractual EBITDA includes fewer addbacks for borrowers with relatively volatile *cash flows*, consistent with the notion that cash flows are informative to lenders by reflecting information about the borrower's underlying ability to meet its contractual obligations in the short term.

Finally, we show addbacks are increasing in the ex-ante cost of renegotiation, suggesting that borrowers and lenders view adjustments to earnings as an important tool to reduce noise from

[4] By "false positive," we mean any instance where the borrower is in technical violation of one or more financial covenants, but is unlikely to default on its payment obligations under the loan in the foreseeable future.

the accounting signals in debt contracts. Relying on the notion that institutional tranches – tranches sold to non-bank lenders such as securitization vehicles and loan mutual funds – are more costly to renegotiate (e.g., Demiroglu and James (2015)), we show that for loans where contractual EBITDA includes few (many) addbacks institutional tranches are relatively rare (common).

Despite compelling evidence that addbacks are designed to facilitate efficient contracting, an alternative explanation for addbacks in contractual EBITDA could be the general decline in underwriting standards over the last decade, as interest rates have remained at historically low levels (Ivashina and Vallee 2020). Another could be borrower and underwriter agency costs (Ivashina 2009; Bord and Santos 2015), where sophisticated repeat borrowers such as private equity sponsors and fee-driven underwriters may obscure a borrower's true leverage from the lending syndicate through especially expansive and complex EBITDA definitions. We do not find sufficient evidence to support either view (though we do not purport here to rule them out definitively). Notably, we fail to find evidence that more addbacks are obtained "for free": more addbacks are associated with both (i) a higher spread and (ii) reduced covenant slack. While we do find that EBITDA addbacks have generally increased over our sample period, and that private equity sponsored-borrowers are associated with higher levels of addbacks, these findings are consistent with the desire for more informative covenants in riskier loans, which have also increased proportionally over our sample period.

Our findings have significant implications for researchers, regulators, and market participants. The surge in corporate private debt over the past few decades has yielded a large literature on debt covenants, initially focused on their role in mitigating agency conflicts between shareholders and creditors (Jensen and Meckling 1976; Smith and Warner 1979) and in allocating control rights in the firm (Aghion and Bolton 1992; Baird and Rasmussen 2006; Nini et al. 2012). A more recent line of inquiry examines the connection between the types and restrictiveness of

financial covenants that are included in contracts and the ease with which they may be renegotiated (e.g., Gârleanu and Zwiebel (2009); Roberts and Sufi (2009b); Roberts (2015)).

We make three principal contributions to this literature. First, we provide evidence that contractual EBITDA definitions vary widely across contracts which calls into question the assumption that covenants are effectively standardized, once borrower and lender characteristics are held constant (Demerjian and Owens 2016). This suggests EBITDA-based covenant thresholds that are superficially the same across borrowers (for example, a required leverage ratio of 6.0x) cannot be compared without considering the number of EBITDA addbacks. Prior research tends to distill a borrower's entire covenant package into one or more numerical proxies, such as a simple count of the covenants in the agreement (e.g., Demiroglu and James (2010); Matvos (2013); Lou and Otto (2020)). Such simplifications overlook the complexity in contractual terms that ultimately determines covenant restrictiveness, potentially leading researchers to draw incorrect conclusions. In particular, we show the likelihood of overestimating a covenant violation using standardized covenant measures is increasing in the number of addbacks.

Second, we add to the literature studying the design of debt contracts.[5] Our paper focuses on the number of addbacks in contractual EBITDA, a critical measure of borrower performance found in most debt contracts. Thus we add to a relatively small literature that describes adjustments made to definitions of accounting-based performance measures in debt contracts (e.g., El-Gazzar and Pastena (1990); Li (2010, 2016); Dyreng et al. (2017); Beatty et al. (2019)) by showing that EBITDA addbacks are a key point of negotiation in the debt contract. We identify important factors

[5] An extensive literature examines various aspects of debt contracts including: collateral (e.g., Benmelech and Bergman (2008); Vig (2013), covenants (e.g., Berlin and Mester (1992); Roberts and Sufi (2009b); Christensen and Nikolaev (2012); Prilmeier (2017)), maturity (e.g., Barclay and Smith (1995); Fan et al. (2012)) and pricing (e.g., Asquith et al. (2005); Drucker and Puri (2009)).

associated with addbacks including loan maturity, loan amount, covenant slack, a borrower's prior cash flow and accrual volatility, and the likelihood of future covenant violations. Our findings suggest that the contractual definition of EBITDA interacts with other elements of debt contracts in a meaningful way and should not be overlooked as an integral part of contractual design.

Third, our findings complement the literature on the theory of incomplete contracts (Aghion and Bolton 1992; Grossman and Hart 1986; Christensen et al. 2016). This theory suggests that all contracts are inherently incomplete because borrowers and lenders cannot anticipate or effectively articulate all future states of the world that may arise. Thus, financial covenants improve contracting efficiency by allocating control rights conditional on an observable state of the world. Efficient allocation of control rights is especially important when renegotiation costs are high. Our findings suggest addbacks in contractual EBITDA definitions strengthen the relationship between the signal provided by covenant realizations and the borrower's true state of financial health, thus enhancing the contractibility of EBITDA-based covenants by mitigating the unwarranted transfer (or retention) of control rights (Gigler et al. 2009).

Finally, our study extends the literature examining the properties of contractual performance numbers in debt contracts. Li (2010) and Li (2016) descriptively summarize adjustments in debt contracts that cause differences between GAAP performance and contractual performance numbers for a select set of contracts. Beatty et al. (2019) show that nearly 80% of private debt contracts in their sample period (2000-2013) exclude non-recurring items from contractual EBITDA, and investigate the determinants and consequences of doing such. They employ a binary measure and do not consider why there are differences in the extent to which contracts make exclusions. We show that the number of adjustments is correlated with numerous features of debt contracts that suggest careful tailoring of earnings definitions between contracting parties may improve contracting efficiency. We also extend Dyreng et al (2017), who show

contractual EBITDA removes accounting conservatism, contrary to much research that assumed lenders desired conservative accounting (Nikolaev 2010). Dyreng et al (2017) also provide preliminary evidence that contractual EBITDA better predicts future cash flows than traditional earnings numbers, but they do not consider how the properties of contractual EBITDA map into financial covenants, including covenant slack and covenant violations. In contrast, our study shows that addbacks in contractual EBITDA allow for tighter covenant thresholds yet fewer violations, showing directly how adjusted earnings are used to create contracts with less noisy signals.

2. Background

2.1. Financial Covenants in Debt Contracts

Incomplete contract theory suggests it is prohibitively costly to write a contract that covers all possible future states of the world (Christensen et al. 2016). This contractual incompleteness can lead to ex-post holdup problems and opportunistic actions, which can make contracting difficult. To mitigate holdup problems and facilitate contracting, accounting information can provide contractible, verifiable signals that can be used as mechanisms to transfer control rights to the party with better incentives to take efficient actions depending on the state of the world (Grossman and Hart 1986; Hart and Moore 1988; Aghion and Bolton 1992). As such, financial covenants based on accounting measures are a common feature of syndicated loan agreements. These covenants require a borrower to maintain accounting ratios or metrics relative to predetermined thresholds, which facilitates monitoring of the borrower by the lender throughout the term of the loan (Rajan and Winton 1995). If realized accounting performance fails to meet the specified threshold, the lender often has the right to call the balance of the loan immediately, endowing the lender with substantial negotiating power, which could be used to impose changes that are costly to the borrower. Christensen and Nikolaev (2012) suggest earnings-based covenants (i.e., performance covenants), which typically incorporate a measure of EBITDA, provide more

timely signals of borrower performance relative to balance-sheet covenants (i.e., capital covenants) and thus serve as "trip wires" that facilitate the transfer of control rights to lenders conditional on a signal that borrower performance is deteriorating.

Early research on debt covenants argued that violations were not costly because waivers appeared easy to obtain. For example, Duke and Hunt III (1990) suggest that obtaining a waiver was "as simple as making a phone call to the bank." Furthermore, Dichev and Skinner (2002) find violations occur frequently, suggesting the costs of violation are not overly burdensome. Similar conclusions have also been drawn by Roberts and Sufi (2009a) who show that over 25% of publicly traded firms report a financial covenant violation from 1996 to 2005 and Nini et al. (2012), who suggest 10-20% of firms violate a covenant in any given year.

Alternatively, other research suggests violations impose significant costs on the borrower (Roberts and Sufi 2009b; Roberts 2015). For example, research finds consequences of covenant violations include additional collateral requirements (Chava and Roberts 2008), increased likelihood of investment restrictions (Nini et al. 2009), managerial turnover (Nini et al. 2012), reduction in credit availability (DeAngelo et al. 2002; Roberts and Sufi 2009a; Demiroglu and James 2010), and a reduction in jobs at the borrowing firm (Falato and Liang 2016).

Research examining managerial incentives suggests if violations are costly then managers will use accounting discretion to avoid a violation (Watts and Zimmerman (1986, 1978)). Consistent with this prediction, DeFond and Jiambalvo (1994) show accruals are abnormally high for firms in the year prior to a violation. Relatedly, Dichev and Skinner (2002) find an abnormally high density of accounting realizations that just surpass debt covenant thresholds, creating a discontinuity in the distribution of accounting outcomes precisely at the covenant threshold.

2.2. Accounting Information in Financial Covenants

Because covenant violations can induce costly renegotiation, it is in the best interest of

both borrower and lender to avoid renegotiation unless the state of the world has in fact changed (Berlin and Mester 1992; Gârleanu and Zwiebel 2009; Gigler et al. 2009). Accounting information is frequently used in debt contracts to provide a signal about the underlying state of the world since this information is verifiable and contractible (Smith and Warner 1979; Aghion and Bolton 1992). However, accounting signals that suggest a deterioration in borrower's performance or condition, when in fact no deterioration has occurred is costly for both parties (Gigler et al. 2009).[6] These "false positive" violations are especially costly when the number and type of borrowers elicit holdup and free-rider problems in renegotiations (Smith and Warner 1979; Bolton and Scharfstein 1996; Demiroglu and James 2015). For example, Demiroglu and James (2015) suggests that loans with institutional tranches—tranches sold to non-bank lenders such as securitization vehicles and loan mutual funds—are particularly prone to holdup problems, which can increase negotiation costs. Similarly, accounting signals that fail to adequately capture performance deterioration might not provide information to the lender in sufficient time for intervening policies to be effective.

Therefore to enhance contracting efficiency, contracting parties may choose to alter GAAP accounting information to enhance the quality of the underlying accounting signal (Leftwich 1983). Li (2010) and Li (2016) examine the definition of performance measures in debt contracts and generally find that adjustments to net income, net worth, and EBITDA are common, and are presumably designed to make the accounting numbers more useful in the debt contract. Beatty et al. (2019) find firms frequently remove non-recurring items in the contractual definition of EBITDA, and that these items are more likely to be removed when they are not predictive of future

[6] Gigler et al. (2009) show that accounting measures that send a false "negative" signal about a borrower's condition (Type I errors) or that fail to send a true "negative" signal (Type II error) result in suboptimal outcomes. Thus, the objective of accounting signals used in debt contracts should be to minimize Type I and Type II error, thereby enhancing contracting efficiency.

cash flows. This latter finding is consistent with the findings of Dyreng et al (2017), who show that contractual EBITDA predicts future cash flow better than traditional EBITDA and net income.

The observation that accounting definitions are not standardized in debt contracts has been noted in the context of research design. For example, Dichev and Skinner (2002) choose to focus only on current ratio and net worth covenants because they suggest these two covenant types are more homogenously defined in the cross section. Likewise, Demerjian and Owens (2016) recognize that very few contracts define EBITDA literally as adding interest, taxes, depreciation, and amortization to net income. Instead, they argue that EBITDA almost always includes additional adjustments that move it closer to notions of operating earnings. However, they base most of their research on information gathered from tear sheets in the Dealscan database, not on a systematic examination of definitions from debt contracts.

Some research has noted that the informational properties of accounting information can be important for debt contracts. For example, a number of studies suggest that timely loss recognition can enhance the debt contracting value of accounting information (Watts 2003; Wittenberg-Moerman 2008; Zhang 2008; Nikolaev 2010). Ball et al. (2008) show that accounting earnings that reflect losses more quickly are more valuable for debt contracting parties, and borrowers that report earnings with more timely loss recognition receive more favorable lending terms. Similarly, Zhang (2008) shows that borrowers whose accounting information exhibits more timely loss recognition receive lower borrowing rates.

Despite substantial research that suggests the properties of accounting information affect debt contracts, most of that research is conducted on accounting numbers defined according to GAAP, and often ignore the fact that the lender and borrower use accounting information that has been adjusted per contractual negotiations. To this end, Dyreng et al. (2017) examine a small sample of firms that disclose contractual EBITDA. They show that contractual EBITDA does not

exhibit properties of timely loss recognition, but instead includes adjustments to baseline EBITDA, resulting in a more useful predictor of future cash flows than net income or baseline EBITDA. The findings in Dyreng et al. (2017) are consistent with prior arguments that timely loss recognition decreases the informativeness of the accounting signal at the lower tail of the earnings distribution and thus could reduce contracting efficiency (Leuz 2001; Gigler et al. 2009).

2.3. Why modify the definition of accounting earnings used in financial covenants?

Despite the substantial work on the role of accounting information in debt contracts, gaps remain in our understanding of the role of accounting information in debt contracts. One aspect that has received little attention is the various adjustments made to EBITDA, the causes of those adjustments, and the effects of those adjustments on financial covenant realizations based on accounting ratios and defined using EBITDA.

There are at least two reasons why adjusting accounting numbers used in debt contracts away from GAAP is likely to be a mutually beneficial contract feature. First, adjustments from GAAP may enhance the usefulness of accounting information for the contracting parties by excluding some information in GAAP numbers that is not relevant to the contracting parties. For example, net income might be adjusted by adding back interest (because the lender might want to know how much income is available for debt holders), taxes (because interest is paid before taxes), depreciation and amortization (because depreciation and amortization reflect non-cash charges that do not affect the borrower's ability to meet its immediate debt obligations) to compute a baseline EBITDA number. Second, contracting parties might determine that other features of GAAP income are not informative about the borrower's ability to meet its payment obligations under the loan. For example, asset impairment charges might be removed because they do not reflect immediate cash outflows, and are less likely to affect the borrower's near-term ability to pay debt obligations than changes to other types of revenues or expenses (e.g., sales revenue or cost of

goods sold). To the extent that renegotiation is costly, and imprecise signals of repayment ability impose costs on borrowers and lenders, both parties will find it mutually agreeable to eliminate accounting information that creates noise in the performance signal.

Lending parties may have a particular desire to reduce noise in the accounting signal used in debt contracts when renegotiations could be subject to holdout problems. This is because the costs of false-positive violations that often lead borrowers and lenders to renegotiate a contract are magnified if holdout problems arise among lenders.[7] Prior research suggests that the both the number of lenders (e.g., Nikolaev (2018); Saavedra (2018)) and type of lenders (e.g., Demiroglu and James (2015)) can be associated with greater holdout problems.[8]

3. Research Design

3.1. Data and Sample Selection

Our analyses require data from numerous sources. We construct an initial sample of nearly 4,000 credit agreements for U.S. syndicated loans from 2000 through 2016 that are available on the SEC's EDGAR filing system. This sample was identified in part using Practical Law's database of loan summaries (which includes links to the debt contracts on EDGAR) and in part through searches of EDGAR filings. Practical Law also provides certain coded information about each loan package (including, for our purposes, loan size and type, maturity, investment grade or high-yield rating, whether the loan was secured, and whether it was private equity-sponsored). We use a Python script to extract the definition of EBITDA from each credit agreement, and hand-check

[7] Griffin et al. (2021) develop a model of optimal covenant design that balances the costs of false positives against false negatives. Their evidence suggests that lenders have eased covenant restrictiveness over time to reduce the investigation costs associated with false positives.

[8] While Berlin et al. (2020) show that parties can mitigate holdup up costs by splitting some control rights (e.g., giving financial lenders the exclusive right to waive financial covenants), renegotiating loan facilities held by institutional lenders will still require their consent. The holdup costs associated with this type of renegotiation are likely to increase the cost of false positives for loans that have institutional lenders.

each definition to ensure that it has been correctly identified.[9]

To obtain borrower characteristics, we merge EBITDA definitions from credit agreements with accounting data from Compustat using CIK codes from the credit agreements.[10] Finally, we add deal characteristics associated with the credit agreements by linking the agreements to Dealscan, using the linking data provided by Chava and Roberts (2008).[11]

Table 1, Panel A reports the sample selection for the Contractual EBITDA sample. We begin with 3,919 unique contracts between 2000 and 2016 (associated with 2,098 unique borrowers) that have EBITDA definitions used to compute an Addback Score. The sample is reduced to 2,920 agreements (1,637 unique borrowers) because we are unable to match 244 unique contracts (associated with 150 unique borrowers) to Compustat and 755 unique contracts (associated with 311 unique borrowers) to Dealscan. After removing additional observations with insufficient data to compute the deal and borrower characteristics used in our analyses, our sample includes 2,111 unique credit agreements associated with 1,280 unique borrowers.

Table 1, Panel B reports the sample selection for the sample used in our second set of analyses in which we examine the relation between addbacks and financial covenant outcomes. For these analyses, we begin with a hand-collected sample of 7,362 firm-quarter observations in which a firm discloses both its required covenant target(s) and its covenant realization(s) for the period. We remove firm-quarter observations that do not contain EBITDA-based covenants (e.g., only net worth covenants), which reduces are sample to 5,395 unique firm-quarters.[12] We require

[9] The process of manually reviewing and cleaning EBITDA definitions from EDGAR filings is a non-trivial task and the primary reason we examine only a relatively small (4,000) set of credit agreements.
[10] We merge credit agreement data with Compustat data based on the borrower's most recent quarterly filing prior to the start date associated with the credit deal.
[11] From Dealscan, we obtain information about deal size, deal maturity, number and type of tranches within the deal package, credit spread and whether loans are secured.
[12] We define an EBITDA-based covenant as one of three covenant types: interest coverage ratios, fixed charge coverage ratios or debt-to-EBITDA ratios.

each firm-quarter observation to be linked to a credit agreement originated within five years prior to the end of the fiscal quarter. After eliminating observations that we are unable to link to a credit agreement for which we have an Addback Score and observations with insufficient accounting information, we retain 3,840 firm-quarter observations comprised of 215 unique firms.

Table 2, Panel A compares our sample of 3,840 firm-quarters to the universe of firms from Compustat and a merged sample of Compustat-Dealscan firms with EBITDA-based covenants (CompDeal Sample). Our sample is a relatively small percentage of both the Compustat and CompDeal Samples. The main reason for this is that, in order to compute covenant slack, we require firms to disclose both required covenant thresholds and realized covenant amounts or ratios in their periodic filings, something relatively few firms do.

Table 2, Panel B compares summary statistics for accounting- and market-based measures for firms in our sample with firms in the broader CompDeal Sample. We find that firms in our sample tend to be larger, more levered and incur accounting losses less frequently than firms in the CompDeal Sample. Table 2, Panel C compares the industry composition of firms in our sample with those in the CompDeal Sample, using industries as defined in Fama and French (1988). Overall, the industry composition of firms in our sample is quite similar to the CompDeal Sample, with no extreme differences.[13]

3.2. Categorizing EBITDA Definitions

While some credit agreements define EBITDA simply as net income (or loss) plus 1) interest expense, 2) tax expense, 3) depreciation and 4) amortization, many other agreements define EBITDA with far more complexity. Appendix B provides some examples of EBITDA

[13] We do not directly compare loan characteristics from our sample to those in the CompDeal Sample in Table 2 because our sample is at the firm-quarter level and some firms may have zero or multiple outstanding loans for a given quarter making comparisons impractical.

definitions from credit agreements.

Individually coding EBITDA definitions from thousands of credit agreements is costly, therefore we use machine learning and textual analysis to facilitate our empirical examination of contractual EBITDA. To do this, we manually code the EBITDA definition from 580 credit agreements, which represents approximately 12.8% of the total sample of credit agreements for which we have EBITDA definitions.[14] Specifically, we code whether any of seven specific adjustments (see Appendix C) are made to EBITDA, coding a 0 or 1 for each adjustment. All the definitions include the base case of EBITDA (GAAP net income plus interest, taxes, depreciation and amortization), which we code as a 1. We then sum the score for seven additional addbacks, resulting in a maximum score of 8, which we label as the number of addbacks (# of Addbacks).

After hand-coding a sample of EBITDA definitions, we use a Naive Bayes classifier to develop an out-of-sample prediction of the number of addbacks that is applied to the remaining EBITDA definitions. Our approach is similar to that described in Buehlmaier and Whited (2018). The Naive Bayes algorithm uses a bag-of-words approach to train a model to identify the number of addbacks included in the EBITDA definition. We use term-frequency inverse document frequency (tf-idf) of unigrams as the inputs, which should better identify document differences by placing stronger weights on terms that are unique to expansive and non-expansive definitions.[15]

3.3. Measuring Covenant Slack and Violations

An extensive body of research examines the determinants and consequences of covenant

[14] Our total sample of credit agreements for which we have EBITDA definitions is 4,532 (1996-2018).

[15] To assess the performance of the text model, we perform 100 iterations of 3-fold cross-validation. In each iteration, the 580 hand-coded definitions are split into three roughly equal folds. To obtain a prediction for each definition, we build a model using two of the three folds and use that model to generate predictions for each definition in the held-out fold. Over 100 iterations, the mean of the difference between the predicted number of addbacks and the hand-coded number of addbacks—that is, the difference for 58,000 predictions—is -.114, which suggests that, on average, the model predicts the number of addbacks with little bias.

slack, also referred to as tightness (Drucker and Puri 2009; Demiroglu and James 2010; Murfin 2012; Demerjian and Owens 2016; Prilmeier 2017). One empirical challenge this research faces is how to appropriately measure covenant slack since definitions of financial covenants can vary widely across credit agreements and are frequently based on non-GAAP accounting terms, for which information is not readily available in electronic databases such as Compustat (Beatty 2007; Armstrong et al. 2010). Additionally, required covenant thresholds frequently change due to ex-post negotiated amendments or pre-planned changes; however, changes to required thresholds are not commonly reported in databases such as Dealscan (Roberts 2015; Li et al. 2016).

To mitigate concerns surrounding the accuracy of covenant slack measures used in prior research, we compute slack using a hand-collected sample of firm-quarters for which the borrowing firm discloses both the required covenant ratio and the realized ratio for the given quarter, enabling us to compute "true slack" (Dyreng et al. 2021). Because our research focuses on contractual definitions of EBITDA, we limit our sample to firms with coverage (interest or fixed charge) or debt-to-EBITDA covenants since these covenants include EBITDA in either the numerator or denominator. Using this hand-collected sample, we compute covenant slack (SLACK) as the difference between the required covenant ratio and a firm's realized covenant ratio scaled by the required ratio (see Appendix D). For firms with multiple EBITDA-based covenants for a given quarter, we define SLACK as the minimum covenant slack among the EBITDA-based covenants.

In addition to covenant slack, we also examine the relation between addbacks and covenant violations. Therefore, we create an indicator variable (VIOLATION) equal to one if a firm reports that it violates a covenant in its periodic filing, and zero otherwise. To calculate this variable, we merge violation data from Nini et al. (2012) with our addbacks-slack sample and extend this data

through 2016 by following the methodology outlined in the online appendix of Nini et al. (2012).[16]

4. Results

4.1. Determinants of Addbacks

Table 3 reports cross-tabulation of the # of Addbacks in contractual EBITDA in relation to other deal characteristics. The results indicate that addbacks are increasing in deal size and maturity. Additionally, secured loans tend to have EBITDA definitions with more addbacks relative to unsecured loans, revolver-only deals tend to have EBITDA definitions with fewer addbacks relative to deals with both a revolving and term loan, and deals with private equity sponsors have more addbacks relative to those without sponsors. These findings suggest that EBITDA definitions include more addbacks for loans typically considered riskier. While Table 3 examines the relation between addbacks and other characteristics of the underlying credit deals, it is also possible that addbacks are influenced by borrower characteristics. Thus, we select several borrower characteristics that prior research (e.g., Harris and Raviv (1991); Rajan and Winton (1995); Vig (2013)) suggests are related to loan terms and investigate whether these characteristics are associated with the number of addbacks.[17] We report the summary statistics for these borrower characteristics, addbacks and deal characteristics in Table 4, Panel A.[18] We find that the mean (median) number of addbacks for the 2,741 unique contracts with sufficient deal characteristics is

[16] We use reported violations (e.g., Nini et al. (2012)) to identify when a violation has occurred instead of relying on instances in which the covenant slack is negative using our hand-collected sample because covenant thresholds may be modified prior to the end of the fiscal period to avoid violations. Nini et al. (2012) consider these modifications to be violations, yet such modifications are largely unobservable using our computed measure of covenant slack.

[17] Borrower characteristics that we examine include: size(assets), firm age, tangibility, growth opportunities (market-to-book ratio), leverage, return-on-assets (ROA) and earnings volatility. In some analyses, we replace earnings volatility with cash flow and accrual volatility. All variables are defined in Appendix A.

[18] Data on private equity sponsors in Dealscan only indicates when there is a known private equity sponsor associated with a given loan. Thus, the lack of private equity sponsor in the data could be due to either insufficient data (i.e., measurement error) or a true lack of sponsorship. Because of concerns about the reliability of this measure, we do not include private equity sponsorship as a control in our regression analyses. However, in untabulated results we find that controlling for the indication of a private equity sponsor doesn't change the sign or significance of our results.

3.61 (3), or that the typical contractual EBITDA definition has over two common adjustments beyond baseline EBITDA. Additionally, we find that 53% of underlying deals in our sample contain only revolving loans and 47% of loans are reported as being secured.

Table 4, Panel B reports the correlations between addbacks and both the borrower and deal characteristics. Correlations between addbacks and deal characteristics are consistent with findings in Table 3. For borrower characteristics, addbacks are negatively correlated with size, firm age, tangibility, and ROA, consistent with the notion that there are more addbacks for riskier loans. To more formally examine the relation between the number of addbacks and potential determinants, we report results from a multivariate regression analysis in Table 5.

Column 1 in Table 5 reports the results from regressing addbacks on our set of borrower characteristics.[19] Consistent with the simple correlations, we find addbacks are negatively related to firm age, tangibility and ROA, and positively related to leverage and earnings volatility. This suggests contractual EBITDA is likely to include more addbacks for firms that are younger, more highly leveraged, poorer performing and exhibit more volatile earnings. Table 5, Column 2 reports the results when regressing addbacks on deal characteristics. We find that deal size and maturity are positively related to addbacks. Additionally, secured loans are associated with more addbacks, while revolver-only loans are associated with fewer addbacks.

Table 5, Column 3 reports the results when regressing addbacks on both borrower and deal characteristics. The sign and significance of coefficient estimates is generally consistent with results from Columns 1 and 2. While the results in Column 3 suggest a positive relation between earnings volatility and addbacks, prior research suggests that earnings can be separated into two

[19] Because Figure 1 suggests that the number of addbacks in EBITDA definitions has increased over time, we include year, lender and industry fixed effects throughout Table 5. Any singleton observations are removed during the estimation procedure (Correia 2015).

components – cash flows and accruals, and that the two components convey different information about the quality and persistence of a firm's performance (Dechow 1994; Sloan 1996; Dechow and Dichev 2002). Because cash flows (and cash flow volatility) are directly related to a borrower's ability to meet its debt obligations, we expect cash flow volatility to convey meaningful information to creditors about borrowers' capacity to meet debt obligations. While accruals capture the difference between earnings and cash flows, if the information captured by accruals conveys information that is less meaningful to creditors in assessing borrowers' ability to meet obligations, then addbacks could be used to remove the "noisy" information associated with accruals to provide a more precise signal about the underlying condition of the borrower. To investigate the nature of the relation between the components of earnings volatility and the number of addbacks we replace earnings volatility with its components and report the results in Table 5, Column 4.[20]

In Column 4, we find that cash flow volatility (CFO Volatility) is negative related to addbacks, suggesting cash flow volatility reflects underlying volatility in a borrower's economic performance which would affect its ability to meet its obligations. As a result, borrowers with greater cash flow volatility have contracts with less expansive EBITDA definitions. In contrast, we find that accrual volatility is positively related to addbacks. This suggests that accruals for some borrowers may not convey meaningful information about a borrower's capacity to meet its contractual obligations. For these borrowers, contractual EBITDA is defined with more addbacks, presumably to provide a more meaningful signal to lenders about borrowers' underlying condition.

Overall, the results in Tables 3-5 suggest that there are more addbacks for riskier borrowers and riskier loans to the extent the riskiness associated with borrowers may result in baseline

[20] Following Jayaraman (2008), we include the following components of earnings volatility: cash flow volatility, accruals volatility and the covariance of cash flow and accruals.

EBITDA providing a less informative signal of a borrower's condition relative to more expansively defined EBITDA. Moreover, we find that addbacks are negatively (positively) related to cash flow (accrual) volatility, consistent with addbacks being used to enhance the quality of the signal EBITDA provides to creditors about a borrower's underlying condition. Because EBITDA is an integral component of the most common financial covenant types (e.g., leverage and coverage covenants), we next investigate the relation between addbacks and financial covenant outcomes.

4.2. Addbacks and Financial Covenant Outcomes

4.2.1. Addbacks and Covenant Slack

To examine the relation between addbacks and financial covenant outcomes (e.g., covenant slack and violations), we use our sample that combines addbacks associated with contractual EBITDA from credit agreements with covenant slack and violations reported on a quarterly basis. Table 6 Panel A, Column 1 reports the results of regressing covenant slack (SLACK), measured at the firm-quarter level, on addbacks without control variables. The coefficient on addbacks is negative (-0.321) and statistically significant ($p<0.01$), suggesting addbacks are negatively related to covenant slack, or alternatively, that covenant tightness is increasing in the number of addbacks.[21] A coefficient estimate of -0.321 suggests that a one standard deviation change in addbacks is associated with a 0.56 change in the value of SLACK.[22]

Prior research suggests that both borrower and deal characteristics are related to covenant slack (Demiroglu and James 2010; Prilmeier 2017). Thus, in Column 2 (Column 3) we incorporate

[21] Our current research design examines the relation between addbacks and covenant slack, where slack is measured at the firm-quarter level. An alternative method would be to examine the relation between addbacks and slack when the contract originates, or at the periodic filing nearest to the contract origination. Due to sample size limitations, we do not implement this alternative method. For example, due to our requirement that firms disclose both the required covenant targets and actual covenant realizations we are only able to compute covenant slack in the immediate quarter after the credit agreement originates for 92 agreements. For these 92 agreements, the correlation between the number of addbacks (# of Addbacks) and SLACK is -0.2411 ($p<0.05$).

[22] 0.56 is computed as the product of the coefficient estimate (-0.321) and the standard deviation of addbacks (1.74).

borrower (deal) characteristics in the specification as well as time, lender and industry fixed effects. After controlling for borrower (deal) characteristics, the coefficient on addbacks in Column 2 (Column 3) remains negative and statistically significant at the 5% (1%) level. Table 6 Panel A, Column 4 reports regression results when regressing covenant slack on addbacks and controlling for both borrower and deal characteristics. In Column 4 the coefficient on addbacks remains negative (-0.247) and statistically significant ($p<0.05$). Thus, across all four columns in Table 6, Panel A we observe that addbacks are negatively related to covenant slack.[23] Our findings suggest it is plausible that for financial covenants, tight EBITDA definitions and tight numerical thresholds may be substitute mechanisms for monitoring and constraining borrowers.

4.2.2. Addbacks and Covenant Violations

Existing research suggests tighter covenants (i.e., lower covenant slack) are associated with more frequent covenant violations (Demiroglu and James 2010; Griffin et al. 2021). Thus, all else equal, one may expect that if addbacks are positively associated with covenant tightness then addbacks may also be positively associated with covenant violations. However, if contractual EBITDA addbacks are designed to enhance the signal EBITDA provides to creditors about a borrower's condition by eliminating noisy or non-meaningful aspects of accounting earnings, addbacks may reduce the number of false positive violations, resulting in a negative relation between addbacks and violations.

To investigate the relation between addbacks and covenant violations, we regress VIOLATION, an indicator variable equal to one if a borrower reports a violation for a given quarter, on addbacks and report the results in Table 6, Panel B. In Column 1, we report the results,

[23] As features of a debt contracts are jointly determined and hence endogenous, we are unable to make causal claims regarding the effect of addbacks on SLACK.

without control variables, and find the coefficient on addbacks is -0.122 and statistically significant ($p<0.01$), suggesting that addbacks are negatively associated with the likelihood a borrower violates a covenant. In economic terms, a coefficient estimate of -0.122 suggests that a one standard deviation increase in addbacks is associated with a 21.2% decrease in the likelihood of a covenant violation.[24] Column 2 (Column 3) report the results when controlling for borrower (deal) characteristics. In both columns, the coefficient on addbacks remains negative and statistically significant ($p<0.05$). In Column 4, we examine the relation between addbacks and covenant violations when controlling for both borrower and deal characteristics. The coefficient on addbacks is -0.109 and statistically significant ($p<0.05$), consistent with previous columns.

The negative relation between addbacks and violations together with the negative relation between addbacks and covenant slack are consistent with addbacks in EBITDA definitions removing aspects of accounting earnings that are not reflective of a borrower's ability to meet its debt obligations. If addbacks enhance the signal that EBITDA-based financial covenants provide to creditors about a borrower's underlying condition, then tighter covenants can be employed without engendering additional false positive violations. One way to test this assertion is to examine market responses to covenant violations conditional on the level of addbacks included in contractual EBITDA. If addbacks enhance the signal about a borrower's condition then we would expect the economic consequences of covenant violations that occur when there are more addbacks to be more severe, relative to when there are fewer addbacks. This is because violations occurring when addbacks are high are more likely to represent a true deterioration of a borrower's condition (and not a "false positive") relative to violations occurring when addbacks are low.

To investigate market responses to violations conditional on the level of addbacks, we

[24] 21.2% is the product of the coefficient estimate (-0.122) and the standard deviation of addbacks (1.74).

separate violations between those with high and low levels of addbacks and examine market returns around the revelation of the covenant violation. We designate addbacks as "high" ("low") if the addback score is equal to or greater than (less than) the median value for addbacks. We examine market reactions to covenant violations across three event windows and report the results in Table 7. The first event window is the actual day the covenant violation is revealed, which is the day the quarterly filing is released.[25] For this event window, we find that average abnormal returns for violating firms with high addbacks is -0.013, which is statistically different ($p<0.05$) from the average abnormal returns for violating firms with low addbacks (0.01). For a three-day event window centered around the revelation date, the average abnormal return for violating firms with high addbacks is -0.033 and is statistically different ($p<0.05$) from returns for violating firms with low addbacks (-0.007). The final event window we examine is a five-day event window centered around the event date. For this window, the average abnormal return for violating firms with high addbacks is -0.044 which is statistically different ($p<0.1$) from the average returns for violating firms with low addbacks (-0.025).

Overall, the results in Table 7 show that, across multiple event-windows, market responses to violations are more severe (i.e., more negative) when contractual EBITDA includes more addbacks. This is consistent with the notion that addbacks remove noisy or less meaningful components associated with accounting performance, thereby enhancing the quality of the signal provided by EBITDA. Thus, if violations occur when using a more precise signal the market response is more severe because the violation is less likely to be a false positive violation and is therefore more reflective of the true condition of the borrower. Altogether, our evidence suggests

[25] Admittedly, the release of a quarterly filing contains numerous pieces of information. Unfortunately, we are unable to separate the news related to the covenant violation revelation from other information that may be revealed in connection with the release of the periodic filing.

addbacks can be used as a tool to enhance the contracting effectiveness of accounting information.

4.3. Addbacks and Credit Spreads

Our previous results suggest that addbacks allow for tighter covenants to be written without engendering additional covenant violations. We conjecture the reason for this is that EBITDA addbacks remove aspects of accounting performance that are less meaningful in a lending setting, thereby reducing noise in the performance signal and the likelihood of false positive violations. Consistent with this notion, we find that market responses to covenant violations when addbacks are high are more severe that responses to violations when addbacks are low. However, a remaining concern is that if addbacks reduce the frequency of false positive violations, does it do so at the expense of increasing the likelihood of false negative violations, that is, failure to detect a violation when in fact a borrower's condition has deteriorated. In other words, are more expansive EBITDA definitions unequivocally beneficial to the borrower and lender or are there costs associated with addbacks?

One direct approach to examining whether addbacks are positively related to false negative violations would be to examine the relation between addbacks and bankruptcy filings that occurred without a preceding covenant violation. However, bankruptcy is an extreme and relatively rare outcome which prevents us from undertaking this analysis. Therefore, to examine whether addbacks impose costs on lenders due to an increased threat of false negative violations, we examine the relation between addbacks and credit spreads, with the assumption that lenders will price protect against any additional costs associated with greater EBITDA addbacks.

Table 8 reports the results of regressing credit spreads on addbacks. In Column 1, we regress credit spreads on addbacks without any controls. The coefficient on addbacks is 0.146 and statistically significant ($p<0.01$), suggesting credit spreads are increasing in the number of addbacks. A coefficient estimate of 0.146 suggest that a one standard deviation increase in

addbacks is associated with a 28.9% increase in spread.[26] Column 2 (Column 3) report the results of regressing spread on addbacks when controlling for borrower (loan) characteristics and including a set of industry, lender and year fixed effects. For both columns, the coefficient on addbacks is positive and statistically significant ($p<0.01$). Finally, Column 4 reports the results when including both borrower and loan characteristics as controls. The coefficient on addbacks continues to be positive (0.086) and statistically significant ($p<0.01$). Thus, Table 8 suggests more addbacks to contractual EBITDA may increase the threat of false negative violations and lenders seem to respond to this threat by increasing the rate charged to borrowers.

4.4. Addbacks and Renegotiation Costs

Prior literature suggests that false positive covenant violations are costly to both borrowers and lenders (e.g., Nini et al. (2009); Chava and Roberts (2008); Gigler et al. (2009)), thus each party has incentives to write contracts so that violations occur only when a borrower's condition has deteriorated to an extent that its ability to meet its obligations is affected. This incentive is especially salient when renegotiation is difficult. Demiroglu and James (2015) suggest loans with institutional tranches—tranches sold to non-bank lenders such as securitization vehicles and loan mutual funds—can be more difficult to renegotiate because holdout problems are more severe for these tranches.[27] If addbacks help mitigate spurious "false-positive" covenant violations, then more expansive EBITDA definitions would be particularly useful when renegotiation is more difficult.

[26] 28.9% is equal to $exp(0.254) - 1$, where 0.254 is equal to the product of 1.74 (the standard deviation of addbacks) and 0.146 (the coefficient estimate). In untabulated results we find the average spread is 170 basis points. Thus, a one standard deviation increase in Addback Score is associated with a higher spread by 43 basis points (43=170*0.146*1.74), all else equal.

[27] Demiroglu and James (2015) provide several reasons why renegotiation is more difficult for institutional tranches. These reasons include disperse ownership, tranche warfare associated with complex capital structure, incentives structure of institutional managers in which compensation is more directly affected by write-downs and an inability to invest new money in a distressed borrower.

Thus, we examine the relation between addbacks and loans with institutional tranches.[28]

Figure 2 shows that addbacks appear positively related to the inclusion of an institutional tranche in a loan package. For example, approximately 10% of loan packages with few addbacks (addback scores equal to or less than 3) have an institutional tranche. However, for loan packages with addbacks scores of 6 or higher, more than 60% contain an institutional tranche. This finding suggests that renegotiation challenges associated with an institutional tranche decrease a lender's tolerance for false positives, resulting in EBITDA definitions that are more expansive.

4.5. Addbacks and Measurement Error in Covenant Outcomes

Our findings show there is substantial variation in contractual EBITDA across credit agreements. Because EBITDA is a core component of the most common financial covenants (leverage and coverage ratios), research that ignores differences in EBITDA definitions across debt contracts when estimating financial covenant outcomes is subject to measurement error and potential bias (Dyreng et al. 2021). Based on our examination of the relation between addbacks and financial covenant outcomes (see Table 6), these measurement error concerns persist even after controlling for underlying borrower and deal characteristics.

To demonstrate how variation in EBITDA definitions can engender measurement error when relying on standardized covenant definitions to estimate covenant violations, we examine the relation between EBITDA addbacks and incidents in which a covenant violation is estimated to have occurred using standardized covenant measures (e.g., Demerjian and Owens (2016)), when in fact no violation has occurred. Thus, we create an indicator variable – VIOL_Error – equal to one for firm-quarter observations in which standardized covenant measures suggest a violation

[28] We identify a deal package as containing an institutional tranche if the Dealscan Market Segment Table indicates that at least one facility in the deal package was targeted to institutions.

occurred, yet no violation actually occurred.[29] We then regress VIOL_Error on the number of addbacks in underlying contractual EBITDA definition and report the results in Table 9.

Column 1 in Table 9 reports the results of regressing VIOL_Error on addbacks without any controls. The coefficient on addbacks is 0.042 ($p<0.01$), suggesting that the likelihood a researcher overestimates the incidence of a covenant violation when using standardized covenant definitions is increasing in the number of addbacks. In economic terms, a coefficient estimate of 0.042 suggests that a one standard deviation increase in addbacks is associated with 7.3% increased likelihood that a researcher erroneously determines a covenant violation has occurred when using standardized covenant definitions.[30] In Column 2, we control for characteristics of the underlying deal and a set of year, lender and industry fixed effects. The coefficient on addbacks remains positive (0.043) and statistically significant ($p<0.01$). In Column 3, we find that the coefficient on addbacks remains positive (0.037) and statistically significant ($p<0.01$) even after controlling for the level of covenant slack (SLACK). This suggests that the positive relation between addbacks and VIOL_Error is not conditional on covenant tightness but can be attributed to the inability of standardized covenant measures to account for underlying variation in EBITDA definitions.

5. Conclusion

We extract the contractual definition of EBITDA from a large set of credit agreements for the years 2000 to 2016 and show there is substantial variation in how contractual EBITDA is defined. We create an index of "addbacks" ranging from one (least expansive) to eight (most

[29] Demerjian and Owens (2016) provide standardized covenant definitions for coverage and leverage ratios based on Compustat variables. The standardized definition for interest coverage ratios is $OIBDPQ/XINTQ$, for fixed charge coverage ratios the standardized definition is $\frac{OBDPQ}{XINTQ} + DLCQ_{q-1} + XRENT$ and for leverage ratios (debt-to-EBITDA) the standardized definition is $\frac{DLTTQ+DLCQ}{OIBDPQ}$. If a firm has multiple EBITDA-based covenants then we determine a researcher would estimate a violation is slack is negative for any of the covenants.

[30] 7.3% is the product of the coefficient in Table 8, Column 1 (0.042) and the standard deviation of addbacks (1.74).

expansive) to capture the extent of accounting adjustments to net income included in the contractual definition of EBITDA. We find descriptive evidence that addbacks in contractual EBITDA are greater for riskier loans and borrowers.

Results from additional analyses suggest that addbacks may enhance the informativeness of EBITDA-based contracting elements, such as financial covenants. For example, we find that addbacks are positively related to accrual volatility, yet negatively related to cash-flow volatility, covenant slack and covenant violations. If the accrual component of earnings is less informative about a borrower's underlying condition then addbacks can be used to remove less meaningful elements of accounting earnings from contractual EBITDA, thereby allowing for tighter covenants (i.e., lower covenant slack) without engendering costly false positive violations. Thus, addbacks appear to enhance the contractual efficiency of EBITDA by providing lenders with a more precise signal of a borrower's ability to meet its debt obligations. However, addbacks do not appear to be costless as we find a positive relation between addbacks and credit spreads.

A caveat to our findings is that because features of debt contracts are jointly determined, we lack strong identification and are unable to make causal inferences. Despite this limitation, we believe our findings enhance understanding about the role of accounting information in private debt contracts. For example, using a hand-collected sample of borrowers that disclose required covenant thresholds and covenant realizations on a quarterly basis, we demonstrate that researchers who use standardized covenant definitions and accounting data to estimate covenant violations are increasingly likely to overestimate the occurrence of a violation when contractual EBITDA includes a high number of addbacks. Altogether our results suggests that variation in contractual EBITDA plays in important role in enhance contracting efficiency between borrowers and lenders.

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Figure 1 – Average # of Addbacks Over Time

This figure reports the average number of addbacks to contractual EBITDA by year for 2000-2016. # of Addbacks is defined in Appendix A.

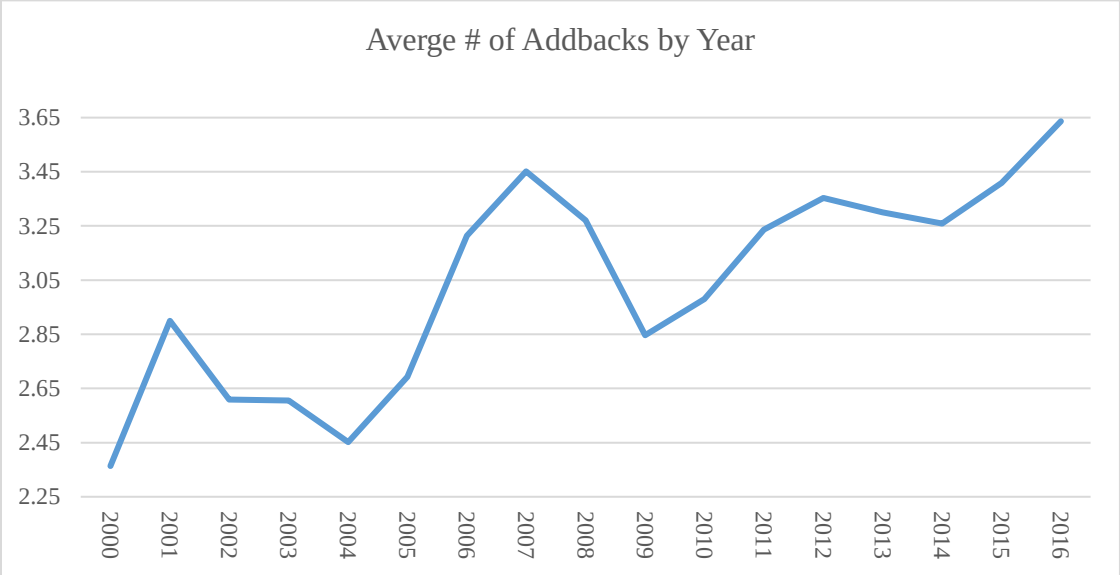

Figure 2 – # of Addbacks and Institutional Loan Percentage

This figure shows the percent of deal packages in our sample with an institutional tranche based on the number of addbacks (# of Addbacks) in the contractual EBITDA of the underlying the deal package.

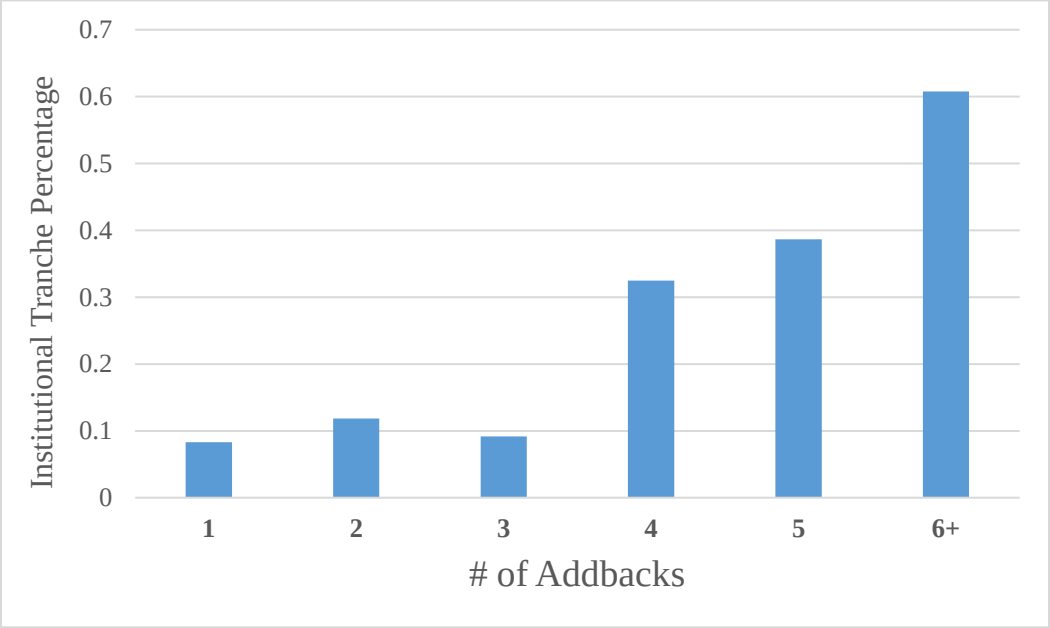

Table 1 – Sample Selection

Panel A: Sample with Contractual EBITDA

Sample Selection Criteria	Unique Firms	Unique Contracts
Total Credit Agreements for 2000-2016 with contractual EBITDA	2,098	3,919
Contracts with non-missing GVKEY	1,948	3,675
Contracts with linking PackageID	1,637	2,920
Contracts with sufficient data about deal (borrower) characteristics	1,625 (1,284)	2,741 (2,119)
Contracts with sufficient data about both deal and borrower characteristics	1,280	2,111

This table reports the Sample Selection Process for the credit agreements (contracts) used in the determinants analysis for the number of addbacks (# of Addbacks) in contractual EBITDA. Our sample period covers 2000-2016.

Panel B: Combined EBITDA and Covenant Outcome Sample

Sample Selection Criteria	Unique Firms	Unique Observations
Disclose actual/target covenant information	367	7,362
Disclose actual/target covenant information for EBITDA-based covenants	311	5,395
Covenant information and # of Addbacks	219	3,925
With Non-Missing Total Assets	215	3,840

This table reports the Sample Selection Process for the Covenant Outcome Sample that is used in our analyses. Our sample period covers 2000-2016.

Table 2 – Sample Comparison

Panel A: Sample Size Comparison

Sample	Description	Unique Firms	Unique Firm-Quarters
Compustat	Compustat Firms with Total Assets greater than $10 million	21,296	629,770
CompDeal	Firms matches to Dealscan and reports credit agreement with at least one EBITDA-based covenant	5,591	143,692
Our Sample	Our Sample (Table 1)	215	3,840

This table compares our sample to the universe of Compustat firms and a merged Compustat-Dealscan sample of firms with EBITDA-based financial covenants (CompDeal).

Panel B: Comparison of Summary Statistics

	N		Mean		SD	
Variable	Our Sample	CompDeal	Our Sample	CompDeal	Our Sample	CompDeal
LNAT	3,840	143,692	7.39***	6.89	1.44	1.64
LNMVE	3,619	131,795	7.04***	6.48	1.64	1.92
LEV	3,840	143,072	0.39***	0.36	0.37	0.28
MB	3,618	131,486	2.52	2.42	32.24	6.16
LNSALE	3,837	143,325	5.80***	5.29	1.43	1.57
ROA	3,837	143,278	0.01	0.01	0.06	0.07
LOSS	3,840	143,692	0.22***	0.26	0.42	0.44
TANGIBILITY	3,675	136,396	0.30**	0.31	0.25	0.25

This table compares basic summary statistics for observations in our sample with a Compustat-Dealscan sample of firms with EBITDA-based covenants (CompDeal). All variables are defined in Appendix A. *, **, *** represent statistical difference between the two sample means at the 10%, 5%, or 1% level using a two-tailed *t*-test.

Panel C: Industry Comparison

Industry	Sample Firms	Percentage of Sample Firms	CompDeal Firms	Percentage of CompDeal Firms
Cars	3	1%	90	2%
Chemicals	7	3%	121	2%
Clothing	3	1%	127	2%
Construction	22	10%	209	4%
ConsumerDurables	8	4%	171	3%
ConsumerProducts	2	1%	137	2%
FabricatedProducts	6	3%	50	1%
Financial	17	8%	607	11%
Food	7	3%	185	3%
Machinery	17	8%	554	10%
Mining	3	1%	74	1%
Oil	11	5%	345	6%
Other	82	38%	2,002	36%
Retail	9	4%	414	7%
SteelWorks	5	2%	92	2%
Transportation	8	4%	249	4%
Utilities	5	2%	164	3%
	215	**100%**	**5,591**	**100%**

This table reports the distribution of firms across the 17 industries as defined in Fama and French (1988) for our sample compared to a Compustat-DealScan merged sample based on firms with contracts containing at least one EBITDA-based covenant.

Table 3 – # of Addbacks and other Credit Agreement Characteristics

	Average # of Addbacks
Deal Size	
Less than $100 million	3.25
$100 to $250 million	3.51
$250 to $500 million	3.56
$500 million to $1 billion	3.69
$1 billion or greater	3.88
Secured (Collateral)	
Missing Data	3.37
No	2.94
Yes	4.17
Maturity	
Less than 48 months	3.21
48 months or greater	3.70
Deal Package	
Term Loan and Revolver	4.09
Revolver-Only	3.19
Private Equity Sponsor	
Yes	5.19
None Indicated	3.47

This table compares the number of addbacks (# of Addbacks) in contractual EBITDA to other characteristics from credit agreements.

Table 4 – Descriptive Statistics

Panel A: Summary Statistics

	N	MEAN	STD	P25	P50	P75
# of Addbacks	2,741	3.61	1.74	2.00	3.00	5.00
DealAmount	2,741	19.95	1.08	19.23	19.98	20.72
MATURITY	2,741	4.02	0.41	4.11	4.11	4.11
REVOLVER	2,741	0.53	0.50	0.00	1.00	1.00
SECURED	2,741	0.47	0.50	0.00	0.00	1.00
LNAT	2,741	7.62	1.39	6.65	7.55	8.50
AGE	2,698	3.03	0.68	2.56	3.04	3.53
TANGIBILITY	2,496	0.27	0.25	0.08	0.18	0.40
MB	2,519	2.94	5.84	1.39	2.20	3.66
LEV	2,721	0.31	0.22	0.15	0.29	0.44
ROA	2,737	0.02	0.03	0.00	0.01	0.03
Earnings Volatility	2,519	0.03	0.04	0.01	0.02	0.03
CFO Volatility	2,519	0.04	0.02	0.02	0.04	0.05
Accrual Volatility	2,519	0.04	0.04	0.02	0.03	0.04
Cov(CFO,ACC)	2,519	-5.08	11.73	-4.30	-1.46	-0.52

This table reports summary statistics for the main variables used in the analyses. All variables are defined in Appendix A.

Panel B: Correlation

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	# of Addbacks		0.11***	0.15***	-0.26***	0.30***	-0.07***	-0.14***	-0.11***	-0.00	0.10***	-0.13***	0.08***	-0.05**	0.08***	0.03
2	DealAmount	0.07***		0.11***	-0.14***	-0.15***	0.71***	0.18***	-0.03	0.07***	0.16***	0.09***	-0.16***	-0.14***	-0.19***	-0.36***
3	MATURITY	0.22***	0.22***		-0.09***	0.18***	-0.14***	-0.03	-0.04**	-0.03	-0.02	0.03*	-0.04**	-0.02	-0.01	0.13***
4	REVOLVER	-0.25***	-0.12***	-0.28***		-0.14***	0.04**	0.11***	0.09***	0.01	-0.15***	0.09***	0.01	0.14***	0.01	-0.07***
5	SECURED	0.29***	-0.14***	0.24***	-0.14***		-0.34***	-0.21***	0.06***	-0.03	0.07***	-0.17***	0.17***	0.09***	0.22***	0.13***
6	LNAT	-0.09***	0.70***	-0.06***	0.03*	-0.35***		0.31***	-0.02	0.02	0.16***	0.03*	-0.22***	-0.27***	-0.26***	-0.45***
7	AGE	-0.14***	0.17***	-0.04**	0.12***	-0.21***	0.30***		-0.09***	-0.05**	-0.06***	0.05***	-0.03	0.02	-0.06***	-0.11***
8	TANGIBILITY	-0.08***	0.00	-0.00	0.09***	0.07***	-0.00	0.04*		-0.01	0.18***	-0.14***	0.05**	-0.02	0.05**	0.01
9	MB	0.00	0.17***	0.06***	-0.01	-0.11***	0.06***	0.01	-0.07***		-0.04**	0.11***	0.01	0.08***	-0.04**	-0.03
10	LEV	0.07***	0.21***	0.03	-0.17***	0.04**	0.23***	-0.06***	0.17***	-0.05**		-0.20***	-0.02	-0.19***	-0.00	-0.01
11	ROA	-0.15***	0.10***	0.04**	0.12***	-0.17***	0.02	0.11***	-0.09***	0.38***	-0.27***		-0.08***	0.18***	-0.19***	-0.03
12	Earnings Volatility	0.03	-0.18***	-0.01	0.11***	0.14***	-0.27***	0.08***	0.04*	0.09***	-0.23***	0.25***		0.44***	0.86***	-0.16***
13	CFO Volatility	-0.05**	-0.13***	0.01	0.17***	0.08***	-0.27***	0.08***	0.06***	0.17***	-0.34***	0.36***	0.62***		0.54***	-0.35***
14	Accrual Volatility	0.08***	-0.24***	0.03	0.07***	0.27***	-0.35***	-0.01	0.09***	-0.08***	-0.16***	-0.03	0.63***	0.66***		-0.26***
15	Cov(CFO,ACC)	0.07***	-0.47***	0.03	-0.14***	0.16***	-0.58***	-0.23***	-0.05**	-0.12***	-0.00	-0.14***	-0.12***	-0.44***	-0.30***	

This table reports the correlation of the number of addbacks (# of Addbacks) in contractual EBITDA and potential determinants of addbacks. Pearson (Spearman) correlations are shown below (above) the diagonal. All variables are defined in Appendix A. *,**, *** denote statistical significance at the 10%, 5%, or 1% level using a two-tailed *t*-test.

Table 5 – Determinants of Number of Addbacks

	# of Addbacks			
	1	2	3	4
Borrower Characteristics				
LNAT	-0.099**		-0.138**	-0.153***
	(-2.378)		*(-2.496)*	*(-2.714)*
AGE	-0.434***		-0.309***	-0.300***
	(-5.212)		*(-4.006)*	*(-3.871)*
TANGIBILITY	-0.343		-0.236	-0.267
	(-1.551)		*(-1.138)*	*(-1.285)*
MB	-0.012		-0.012*	-0.010
	(-1.627)		*(-1.701)*	*(-1.466)*
LEV	1.237***		0.642***	0.552**
	(4.745)		*(2.659)*	*(2.259)*
ROA	-9.818***		-9.228***	-6.685***
	(-5.496)		*(-5.354)*	*(-3.524)*
Earnings Volatility	2.067*		2.154*	
	(1.840)		*(1.907)*	
CFO Volatility				-6.934***
				(-3.037)
Accrual Volatility				3.882***
				(3.466)
Cov(CFO,ACC)				0.001***
				(5.127)
Deal Characteristics				
DealAmount		0.109***	0.261***	0.279***
		(2.806)	*(4.397)*	*(4.745)*
MATURITY		0.292***	0.192*	0.165
		(3.447)	*(1.888)*	*(1.612)*
REVOLVER		-0.551***	-0.481***	-0.452***
		(-7.734)	*(-5.763)*	*(-5.414)*
SECURED		0.954***	0.598***	0.588***
		(11.760)	*(6.347)*	*(6.242)*
N	2,062	2,668	2,056	2,056
Adjusted R^2	0.187	0.246	0.260	0.265
Fixed Effects	Industry, Lender and Year	Industry, Lender and Year	Industry, Lender and Year	Industry, Lender and Year

This table reports the results of regressing number of addbacks (# of Addbacks) in contractual EBITDA on a set of possible determinants of permissiveness. All variables are defined in Appendix A. Standard Errors are clustered at the firm (borrower) level. *,**, *** denote statistical significance at the 10%, 5%, or 1% level using a two-tailed *t*-test.

Table 6 – Covenant Outcomes

Panel A: Covenant Slack

	SLACK	SLACK	SLACK	SLACK
Test Variable	1	2	3	4
# of Addbacks	-0.321***	-0.241**	-0.294***	-0.247**
	(-4.894)	*(-2.422)*	*(-2.601)*	*(-2.368)*
Borrower Characteristics				
LNAT		0.145		0.479***
		(0.579)		*(3.272)*
AGE		-0.128		0.092
		(-0.493)		*(0.211)*
TANGIBILITY		-0.415		-0.466
		(-0.711)		*(-0.844)*
MB		-0.021		-0.019
		(-0.676)		*(-0.635)*
LEV		-1.730		-1.707
		(-1.084)		*(-1.070)*
ROA		0.087		0.243
		(0.055)		*(0.168)*
CFO Volatility		-3.260		-0.992
		(-0.214)		*(-0.071)*
Accrual Volatility		-2.811		-3.034
		(-0.694)		*(-0.790)*
Deal Characteristics				
DealAmount			0.037	-0.365
			(0.185)	*(-1.618)*
MATURITY			0.210	0.369
			(0.718)	*(1.211)*
Revolver			0.364	0.231
			(1.482)	*(0.987)*
SECURED			0.567	1.157
			(0.846)	*(1.219)*
N	3,840	3,197	3,557	3,197
Adjusted/Pseudo R^2	0.006	0.130	0.125	0.133
Fixed Effects	None	Industry, Lender and Year	Industry, Lender and Year	Industry, Lender and Year

This table reports multivariate regressions of SLACK on the number on the number of addbacks (# of Addbacks) in contractual EBITDA and other covariates. All variables are defined in Appendix A. *,**, *** denote statistical significance at the 10%, 5%, or 1% level using a two-tailed *t*-test.

Panel B: Violations

	VIOLATION			
Test Variable	1	2	3	4
# of Addbacks	-0.122***	-0.131***	-0.097**	-0.109**
	(-3.564)	*(-3.106)*	*(-2.332)*	*(-2.372)*
Borrower Characteristics				
LNAT		-0.195***		0.024
		(-4.961)		*(0.350)*
AGE		-0.022		-0.082
		(-0.264)		*(-0.854)*
TANGIBILITY		-0.629***		-0.698***
		(-2.703)		*(-2.746)*
MB		-0.019*		-0.020
		(-1.695)		*(-1.609)*
LEV		0.783***		0.715***
		(3.908)		*(3.129)*
ROA		-0.315		-0.080
		(-0.813)		*(-0.185)*
CFO Volatility		2.623		5.400*
		(1.083)		*(1.851)*
Accrual Volatility		1.119		1.225
		(0.822)		*(0.781)*
Deal Characteristics				
DealAmount			-0.189***	-0.220***
			(-4.294)	*(-3.385)*
MATURITY			-0.287***	-0.264***
			(-3.222)	*(-2.720)*
Revolver			-0.289**	-0.208
			(-2.512)	*(-1.626)*
SECURED			0.118	0.066
			(1.071)	*(0.513)*
N	3,840	3,445	3,572	3,207
Pseudo R^2	0.017	0.115	0.074	0.123

This table reports multivariate regressions of VIOLATION on the number on the number of addbacks (# of Addbacks) in contractual EBITDA and other covariates. Because VIOLATION is a binary variable, a probit model is used. All variables are defined in Appendix A. *,**, *** denote statistical significance at the 10%, 5%, or 1% level using a two-tailed *t*-test.

Table 7 – Covenant Violations, Addbacks and Stock Returns

	Average Abnormal Return	
Window	*Low # of Addbacks*	*High # of Addbacks*
Event-Day	0.010	-0.013**
(-1, +1)	-0.007	-0.033**
(-2, +2)	-0.025	-0.044*

This table compares the average abnormal returns for event windows around the file date of the periodic filing in which it is revealed the firm violated a financial covenant depending on the number of addbacks in contractual EBITDA. Abnormal returns are computed as firm daily return less the CRSP Value-Weighted Index Return. High (Low) # of Addbacks is an indicator variable equal to one if the number of addbacks in contractual EBITDA is greater than or equal to (less than) three. The means for the two groups are compared using a one-tailed *t*-test. *,**, *** denote statistical significance at the 10%, 5%, or 1% level.

Table 8 – Addbacks and Credit Spreads

	SPREAD	SPREAD	SPREAD	SPREAD
Test Variable	1	2	3	4
# of Addbacks	0.146***	0.111***	0.103***	0.086***
	(9.023)	*(6.095)*	*(6.261)*	*(4.902)*
Borrower Characteristics				
LNAT		-0.101***		-0.016
		(-3.487)		*(-0.490)*
AGE		-0.082		0.028
		(-1.325)		*(0.465)*
TANGIBILITY		0.161		0.173
		(1.368)		*(1.616)*
MB		0.001		0.003
		(0.287)		*(0.931)*
LEV		0.345**		0.250*
		(2.126)		*(1.739)*
ROA		0.109		0.138
		(0.748)		*(1.265)*
CFO Volatility		-4.106***		-2.339*
		(-2.704)		*(-1.646)*
Accrual Volatility		2.060**		1.742*
		(2.061)		*(1.834)*
Deal Characteristics				
DealAmount			-0.107***	-0.111***
			(-4.258)	*(-3.464)*
MATURITY			-0.157**	-0.160**
			(-2.167)	*(-2.119)*
Revolver			-0.340***	-0.317***
			(-5.846)	*(-4.960)*
SECURED			0.280***	0.267***
			(4.523)	*(3.957)*
N	3,381	3,020	3,365	3,020
Adjusted/Pseudo R^2	0.160	0.566	0.596	0.630
Fixed Effects	None	Industry, Lender and Year	Industry, Lender and Year	Industry, Lender and Year

This table reports regressions of SPREAD on the number on the number of addbacks (# of Addbacks) in contractual EBITDA and other covariates. All variables are defined in Appendix A. Standard Errors are clustered at the deal level. *,**, *** denote statistical significance at the 10%, 5%, or 1% level using a two-tailed *t*-test.

Table 9 – Addbacks and Measurement Error in Covenant Violations

	VIOL_Error		
	1	2	3
# of Addbacks	0.042***	0.043***	0.037***
	(3.663)	*(3.650)*	*(3.167)*
MATURITY		-0.109*	-0.103*
		(-1.951)	*(-1.858)*
DealAmount		0.033*	0.039**
		(1.955)	*(2.206)*
SECURED		0.018	0.015
		(0.446)	*(0.374)*
SLACK			-0.008***
			(-3.372)
N	3,224	3,209	3,209
Adjusted R^2	0.026	0.307	0.313
Fixed Effects	None	Industry, Lender and Year	Industry, Lender and Year

This table reports regressions of VIOL_Error on the number on the number of addbacks (# of Addbacks) in contractual EBITDA and other covariates. VIOL_Error is an indicator variable equal to one if a researcher would identify a covenant violation for a given firm-quarter using covenant realizations based on standardized covenant definitions (Demerjian and Owens 2016), yet disclosed covenant slack reveals no violation has occurred. Standard Errors are clustered at the deal level. *,**, *** denote statistical significance at the 10%, 5%, or 1% level using a two-tailed *t*-test.

Appendix A – Variable Definitions

Variable	Description	Source*
# of Addbacks	See definition in Appendix C	SEC Filings
Accrual Volatility	The standard deviation of accruals for the previous 12 quarters scaled by total assets. Following Dechow and Dichev (2002), we define accruals as the difference between income before extraordinary items (IBCY) and cash flows from operating activities (OANCFY)	Compustat
AGE	Natural log of 1 + firm age, where firm age is defined as the current year minus the first year that the firm has a non-missing stock price on the Compustat file (Hadlock and Pierce 2010)	Compustat
CFO Volatility	The standard deviation of cash flows from operating activities (OANCFY) for the previous 12 quarters scaled by total assets	Compustat
Cov(CFO,ACC)	The covariance of cash flows and accruals for the previous 12 quarters scaled by total assets	Compustat
DealAmount	The natural log of one plus the funded amount of the credit agreement. The funded amount is reported in millions.	DealScan
Earnings Volatility	The standard deviation of income before extraordinary items (IBCY) for the previous 12 quarters scaled by total assets (ATQ)	Compustat
LEV	The sum of long-term debt (DLTTQ) and the current portion of long-term debt (DLCQ) scaled by total assets (ATQ)	Compustat
LNAT	The natural log of one plus total assets (ATQ)	Compustat
LNMVE	The natural log of one plus the market value of equity, where market value of equity is the product of ending share price (PRCCQ) and number of shares outstanding (CSHOQ)	Compustat
LOSS	An indicator equal to one if pretax income is negative (PIQ<0)	Compustat
MATURITY	The natural log of one plus the length, in months, between the activation date of the credit agreement and maturity date.	DealScan
MB	Market-to-book ratio computed as market value of equity (PRCCQ*CSHOQ) scaled by book value of equity (CEQQ)	Compustat
REVOLVER	An indicator variable equal to one if the only loan types in a given package are revolving loans, and zero otherwise	DealScan
ROA	Pretax Income (PIQ) scaled by total assets (ATQ)	Compustat
SECURED	An indictor variable equal to one if Dealscan indicates the loan is secured with collateral and zero otherwise	DealScan
SLACK	The difference between the required covenant ratio and actual covenant ratio scaled by the required covenant ratio. For covenants with minimum thresholds (interest coverage or fixed charge coverage) this is the actual ratio less the required target ratio. For covenants with maximum thresholds (debt-to-EBITDA) this is the required target ratio less the actual covenant ratio. If a firm discloses actual and target information for multiple EBITD-based covenants in a given quarter, then SLACK is the minimum slack calculation across all EBITDA-based covenants	SEC Filings
SPREAD	The natural log of one plus the coupon spread over LIBOR on the drawn amount plus the annual fee in basis points	DealScan

Variable	Description	Source*
TANGIBILITY	Net Property, Plant, and Equipment (PPENTQ) scaled by total assets (ATQ)	Compustat
VIOLATION	An indicator equal to one if a firm discloses that it violated a covenant during the fiscal quarter based on the methodology in Nini et al. (2012)	SEC Filings
VIOL_Error	An indicator equal to one when COMPSLACK is less than one (suggesting a violation has occurred), yet SLACK is greater than one (revealing that no violation has occurred)	SEC Filings / Compustat

Appendix B – Examples of EBITDA Definitions

Our paper investigates differences in EBITDA definitions across credit agreements. To illustrate the variation in EBITDA definitions we present three examples. The first example is from Engility Holdings, Inc's Credit Agreement dated July 17, 2012.[31] Contractual EBITDA is defined as:

"Consolidated EBITDA" means, for any period, for Holdings, the Borrower and its Subsidiaries on a consolidated basis, an amount equal to Consolidated Net Income (excluding, without duplication, (v) impairment losses incurred on goodwill and other intangible assets or on debt or equity investments computed in accordance with Financial Accounting Standard No. 142 or other GAAP, (w) gains or losses incurred on the retirement of debt computed in accordance with Financial Accounting Standard No. 145, (x) gains and losses in connection with asset dispositions whether or not constituting extraordinary gains and losses, (y) non-cash gains or losses on discontinued operations and (z) gains and losses with respect to judgments or settlements in connection with litigation matters for such period) plus the following to the extent, except with respect to clause (e) below, deducted in calculating such Consolidated Net Income: (a) Consolidated Interest Expense for such period, (b) the provision for federal, state, local and foreign income taxes payable by Holdings, the Borrower and its Subsidiaries for such period, (c) depreciation and amortization expense for such period, (d) non-cash stock-based compensation expenses for such period, each as determined on a consolidated basis in accordance with GAAP, (e) the amount of cost savings, operating expense reductions and synergies projected by the Borrower in good faith to be realized as a result of specified actions taken or with respect to which substantial steps have been taken (in the good faith determination of the Borrower) during such period, net of the amount of actual benefits realized during such period from such actions; provided that (A) a duly completed certificate signed by a Responsible Officer of the Borrower shall be delivered to the Administrative Agent certifying that (x) such cost savings, operating expense reductions and synergies are reasonably expected and factually supportable in the good faith judgment of the Borrower and (y) such actions are to be taken within 12 months after the consummation of the Permitted Acquisition, Disposition, restructuring or implementation of an initiative which is expected to result in such cost savings, expense reductions or synergies, (B) no cost savings, operating expense reductions and synergies shall be added pursuant to this clause (e) to the extent duplicative of any expenses or charges otherwise added to Consolidated EBITDA whether through a pro forma adjustment or otherwise, for such period, (C) the aggregate amount of cost savings, operating expense reductions and synergies added pursuant to this clause (e) do not exceed 2.5% of Consolidated EBITDA for any four consecutive fiscal quarter period and (D) projected amounts (and not yet realized) may no longer be added in calculating Consolidated EBITDA pursuant to this clause (e) to the extent occurring more than four full fiscal quarters after the specified action taken in order to realize such projected cost savings, operating expense reductions and synergies, (f) extraordinary or non-recurring charges, expenses or losses for such period, (g) other non-cash charges, expenses or losses for such period, minus the following to the extent added in calculating such Consolidated Net Income: (a) all non-cash items increasing Consolidated Net Income for such period and (b) extraordinary or non-recurring income or gains.

It is apparent from the definition that contractual EBITDA includes many adjustments beyond those included in baseline EBITDA (GAAP net income plus interest, taxes, depreciation and amortization). While the definition of contractual EBITDA in Engility's credit agreement differs

[31] The credit agreement in its entirety can be viewed at: https://www.sec.gov/Archives/edgar/data/1544229/000119312512309118/d381537dex101.htm

noticeably from baseline EBITDA, other contractual EBITDA definitions are more similar to baseline EBITDA. For example, the contractual EBITDA definition in the credit agreement for Commercial Metals Company, dated December 27, 2011 reads:

"Consolidated EBITDA" means Consolidated Net Income plus, without duplication and to the extent deducted in determining Consolidated Net Income, (a) interest expense, (b) income taxes, and (c) depreciation and amortization expense, which will include any non-recurring, non-cash write-offs, impairments, or other charges on any asset that otherwise in the normal course would have been depreciated or amortized over its useful life including any write-off of good will, in each case of the Company and its Subsidiaries and computed on a consolidated basis and in accordance with GAAP.

This contractual EBITDA definition is quite similar to baseline EBITDA with the additional adjustment related to non-recurring, non-cash write-offs or impairments.[32]

Throughout our investigation of contractual EBITDA definitions, we even find numerous cases where the definition of contractual EBITDA changes quite dramatically for the same borrower across contracts. For example, below are credit agreements for Modine Manufacturing Company dated 1) August 30, 2013 and 2) November 15, 2016.[33] The contractual definition of EBITDA is expanded from the 2013 credit agreement to include additional adjustments in the 2016 agreement.

1) "Consolidated EBITDA" means, as to the Company and with reference to any period, Consolidated Net Income plus, to the extent not included in Consolidated Net Income, all cash dividends and cash distributions received by the Company or any Subsidiary from any Person in which the Company or any Subsidiary has made an investment), adjusted to exclude the following items (without duplication) to the extent deducted in determining Consolidated Net Income, all calculated for the Company and its Subsidiaries on a consolidated basis in accordance with Agreement Accounting Principles:

a) interest expense and Receivables Transaction Financing Costs,

b) expense for federal, state, local and foreign income and franchise taxes paid or accrued

c) depreciation and amortization,

d) non-cash stock based compensation expense,

[32] View the credit agreement for Commercial Metals Company here: https://www.sec.gov/Archives/edgar/data/22444/000119312512000727/d277260dex101.htm

[33] The links to the credit agreements for Modine Manufacturing Company are 1) https://www.sec.gov/Archives/edgar/data/67347/000114036113034923/ex4_1.htm and 2)

e) extraordinary gains or losses incurred other than in the ordinary course of business,

f) any non-cash charges or gains which are unusual, non-recurring or extraordinary,

g) any non-cash charges or gains related to exchange gains or losses on intercompany loans,

h) Restructuring Charges in an amount not to exceed (i) $20,000,000 in any Fiscal Year or (ii) $40,000,000 for all times after the Effective Date, and

i) Make-Whole Amounts.

2) "Consolidated EBITDA" means, as to the Company and with reference to any period, Consolidated Net Income (plus, to the extent not included in Consolidated Net Income, all cash dividends and cash distributions received by the Company or any Subsidiary from any Person in which the Company or any Subsidiary has made an Investment), adjusted to exclude the following items (a) through and including (k) (without duplication) to the extent taken into account in determining Consolidated Net Income and adjusted (without duplication) on a pro forma basis as contemplated by the following items (l) and (m), all calculated for the Company and its Subsidiaries on a consolidated basis in accordance with Agreement Accounting Principles:

a) Consolidated Interest Expense and Receivables Transaction Financing Costs,

b) expense for federal, state, local and foreign income and franchise taxes paid or accrued,

c) depreciation and amortization,

d) non-cash stock based compensation expense,

e) non-recurring and/or unusual gains or expenses, costs, losses and charges; provided that the aggregate cash amount added back pursuant to this clause (e) shall not, when aggregated with the Non-S-X Adjustment Amount defined in clause (l) below, exceed ten (10%) of Consolidated EBITDA for such period prior to giving effect to such cash amount and the Non-S-X Adjustment Amount for such period,

f) any other non-cash charges, losses, costs, expenses, income, gains or other non-cash items (excluding the accrual of revenue in the ordinary course, non-cash expenses in the ordinary course to the extent they represent an accrual or reserve for potential cash items in any future period, any non-cash gains or other items increasing Consolidated EBITDA which represent the reversal of any accrual of, or reserve for, anticipated cash charges in any prior period that reduced Consolidated EBITDA in an earlier period and any items for which cash was received in any prior period),

g) any net after-Tax loss from disposed, abandoned, transferred, closed or discontinued operations (provided that the aggregate amount permitted to be added back for any such loss shall not exceed $5,000,000 during such period),

h) expenses with respect to liability or casualty events or business interruption, to the extent covered by insurance and actually reimbursed or with respect to which the Company has made a determination that there exists reasonable evidence that such amount will in fact be reimbursed by the insurer, and only to the extent that such amount is (i) not denied by the applicable carrier in writing within 180 days (with a deduction for any amount so added back and then denied within such 180-day period) and (ii) in fact reimbursed within 365 days of the date of such evidence (with a deduction for any amount so added back to the extent not so reimbursed within 365 days),

i) the Transaction Costs and any other out of pocket fees, costs and expenses incurred during such period in connection with (A) any issuance of Indebtedness permitted hereunder or equity, (B) any Permitted Acquisitions and (C) any divestiture permitted hereunder,

j) Restructuring Charges in an amount not to exceed (i) $15,000,000 in any Fiscal Year or (ii) $40,000,000 for all times after the Effective Date,

k) Make-Whole Amounts,

l) with respect to each Permitted Acquisition (other than the Luvata Acquisition), demonstrable cost savings and cost synergies (in each case, net of continued associated expenses) that, as of the date of calculation with respect to such period, are anticipated by the Company in good faith to be realized within 12 months following such Permitted Acquisition, net of the amount of any such cost savings and cost synergies otherwise included, or added back, pursuant to this definition, provided that (1) the amount of such cost savings and synergies under this clause (l) relating to any Permitted Acquisition may not exceed fifteen percent (15%) of the EBITDA (determined with respect to the target of such Permitted Acquisition, determined on a basis consistent with Consolidated EBITDA as defined herein) for such period (as calculated without giving effect to this clause (l)), (2) the amount of such cost savings and cost synergies that do not comply with Article 11 of Regulation S-X (the "Non-S-X Adjustment Amount"), for any four quarter period added back under this clause (l), may not, when aggregated with the amount of any increase to Consolidated Net Income pursuant to clause (e) above, exceed ten percent (10%) of Consolidated EBITDA for such period (as calculated without giving effect to any increase pursuant to clause (e) above and the Non-S-X Adjustment Amount), (3) such cost savings and cost synergies have been reasonably detailed by the Company in the applicable compliance certificate required by Section 5.01(c), and (4) if any cost savings or cost synergies included in any pro forma calculations based on the anticipation that such cost synergies or cost savings will be achieved within such 12-month period shall at any time cease to be reasonably anticipated by the Company to be so achieved, then on and after such time any pro forma calculations required to be made under this Agreement shall not reflect such cost synergies or cost savings, all determined in accordance with Agreement Accounting Principles for such period, and

k) demonstrable cost savings and cost synergies (in each case, net of continued associated expenses) relating to the Luvata Transaction that, as of the date of calculation with respect to such period, are anticipated by the Company in good faith to be realized by no later than December 31, 2017, net of the amount of any such cost savings and cost synergies otherwise included, or added back, pursuant to this definition, provided that (1) such cost savings and cost synergies have been reasonably detailed by the Company in the applicable compliance certificate required by Section 5.01(c), and (2) if any cost savings or cost synergies included in any pro forma calculations based on the anticipation that such cost synergies or cost savings will be achieved by such date shall at any time cease to be reasonably anticipated by the Company to be so achieved, then on and after such time pro forma calculations required to be made under this Agreement shall not reflect such cost synergies or cost savings, all determined in accordance with Agreement Accounting Principles for such period; provided further that the aggregate cash amount added back pursuant to this clause (m) shall not exceed $10,000,000 during the term of this Agreement.

Appendix C – Coding of EBITDA Definitions

To compute the number of addbacks associated with contractual EBITDA, we begin with a randomly selected subsample of 581 credit agreements from a sample of 4,532 agreements ranging from 1996 to 2018 that contain an EBITDA definition.[34] We then read each definition individually and, taking our baseline case for EBITDA as GAAP net income plus interest, taxes, depreciation and amortization (which takes a value of one), we manually code whether specific adjustments are included in the definition of contractual EBITDA. More precisely, we code (zero or one) whether each of the following seven adjustments to baseline EBITDA are included in the definition of contractual EBITDA:

- Non-cash charges
- Cash charges for extraordinary or non-recurring items
- Cash charges for restructuring
- Projected cash savings from synergies, restructurings, etc.
- Fees and expense related to acquisitions, investments, equity or debt issuances, etc.
- Management/advisory fees payable to sponsor
- Miscellaneous additional addbacks

We then sum the number of adjustments associated with each contractual EBITDA definition to create an aggregate score out of a possible 8 (with 8 being the most number of addbacks and 1 being the fewest).

[34] The sample of 3,919 credit agreements between 2000 and 2016 that is used in the paper is a strict subsample of this larger set of credit agreements.

Appendix D – Measuring Covenant Slack from SEC Filings

Covenant slack or tightness is generally viewed as the difference between a required covenant threshold and a borrower's realized covenant amount or ratio at a point in time. While numerous proxies exist for estimating covenant slack, these proxies generally rely upon accounting data found in Compustat to estimate covenant realizations and required thresholds as reported by Dealscan. Two distinct problems arise in connection with these estimated proxies. First, is a measurement issue related to covenant realizations that arises because covenants are frequently defined using non-GAAP numbers that are not contained in electronic databases such as Compustat (Armstrong et al. 2010; Beatty 2007). Additionally, covenant definitions vary across credit agreements, thus applying standardized covenant measures could induce measurement error. Dyreng et al. (2021) suggest the extent of this measurement issue can be quite severe, particularly for EBITDA-based covenants. Second, required covenant thresholds reported in Dealscan generally come from an original credit agreement, yet research suggests contract amendments are frequent and commonly result in changes to required covenant thresholds; however, these amendments are frequently missing from Dealscan (Roberts 2015; Li et al. 2016).

To overcome issues related to measuring covenant slack, we follow Dyreng et al. (2021) and use hand-collect data from periodic SEC filings (10-Ks and 10-Qs) in which a borrower discloses both its required covenant thresholds and covenant realization as of the end of the fiscal period. For example, Figure D1 presents an example of the disclosure made by Ruby Tuesday Inc. in its 10-Q filing for the period ending December 2, 2008.[35] In Figure D1, we see that Ruby Tuesday reports the required covenant threshold and covenant realizations for two covenants: 1)

[35] See Ruby's Tuesdays' 10-Q for the period ending December 2, 2008: https://www.sec.gov/Archives/edgar/data/68270/000006827009000010/form10-q_2ndqtrfy09.htm

A funded debt ratio or Debt-to-EBITDA and 2) A Fixed Charge Coverage Ratio. We compute covenant slack as the difference between the required covenant threshold and the covenant realization. Thus, for the fixed charge ratio, which impose a *minimum* threshold, SLACK is computed as the realized ratio less the required ratio (2.48-2.25 = 0.23) and then scaled by the required threshold (0.23/2.25 = 0.102). For the debt-to-EBITDA ratio, which imposes a *maximum* threshold, SLACK is computed as the required ratio less the realized ratio (4.50-4.22=0.28) and then scaled by the required ratio (0.28/4.50 = 0.062). For borrowers with multiple covenants (such as Ruby Tuesdays), we define SLACK as the minimum value of slack across all covenant types (0.062 for Ruby Tuesdays).

Figure D1 – Covenant Slack Example

Our covenant requirements and actual ratios for the fiscal quarter ended December 2, 2008 are as follows:

	Covenant Requirements	Actual Ratios
Maximum funded debt ratio (1)	4.50x	4.22x
Minimum fixed charge coverage ratio (2)	2.25x	2.48x