Advances in Accounting xxx (xxxx) xxx–xxx

Contents lists available at ScienceDirect

Advances in Accounting

journal homepage: www.elsevier.com/locate/adiac

Book-tax differences and costs of private debt☆

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ARTICLE INFO

JEL classifications:
G21
H25
H32
M41

Keywords:
Book-tax differences
permanent book-tax differences
temporary book-tax differences
bank loan contracting

ABSTRACT

In this study, we test for associations between measures of book-tax differences (BTDs) and measures of private bank loan costs. Our measures of bank loan costs are: (1) interest rate spreads, and (2) security requirements. Initial results suggest a positive association between variability in total BTDs, but not levels, and private debt costs. After decomposing BTDs into their permanent and temporary components, we find that temporary BTDs (levels and variability) are consistently positively associated with costs of private debt, whereas permanent BTDs are not. Further, we find that the positive relation between BTDs and costs of private debt is attenuated for high-tax-planning firms and is stronger for loan facilities in which leading lenders have high market shares. Consistent with the findings of Ayers, Laplante, and McGuire (2010), we interpret these results as indicative of BTDs generally impacting the precision of the information conveyed in the financial statements, raising concerns about earnings quality, except where the BTDs likely result from tax planning.

1. Introduction

Differences between reported financial statement income and taxable income, or book-tax differences (BTDs), are known to originate from any of several sources, broadly speaking. Simple differences in the accounting rules between Generally Accepted Accounting Principles (GAAP) and the Internal Revenue Code (IRC) are responsible for many book-tax difference items, but BTDs also often arise from decisions made by management (e.g., application of accounting rules, generation of estimates, incorporation of anticipated future events into current accounting, aggressive reporting, etc.). The reflection of managerial judgment in BTDs can make interpretation of them more complex and add to uncertainty surrounding the information conveyed in the financial statements, thus affecting the financial statements' informativeness (Comprix, Graham, & Moore, 2011; Hanlon, 2005). In this study, we examine whether any such information effects of BTDs manifest in bank loan contracting and influence price and non-price costs of private debt.

Understanding whether and how the information effects of BTDs impact the costs of private debt is important in part because of the economic significance of private debt. Specifically, bank loans are a major source of external financing for public and private firms worldwide (Bharath, Sunder, & Sunder, 2008; Faulkender & Petersen, 2006; Graham, Li, & Qiu, 2008; Kim, Li, & Li, 2010; Qian & Strahan, 2007; Sufi, 2007), with the global volume of syndicated loans exceeding $2.9 trillion for the first three quarters of 2016 (Thomson Reuters, 2016). Accordingly, deepening our insights on the relation between tax-related reporting and private loan costs will help us to better understand the properties of this pervasive economic transaction.

Further, notwithstanding recent research documenting information effects of BTDs on public debt costs (Ayers et al., 2010; Crabtree & Maher, 2009) and effects of tax avoidance on private loan costs (Hasan, Hoi, Wu, & Zhang, 2014; Kim et al., 2010), the literature does not yet provide a clear picture of how the information in tax-related disclosures factors into the costs of borrowing. Specifically, Ayers et al. (2010) find that large positive or negative changes in BTDs are associated with negative changes in credit ratings and attribute this result to large BTDs of either sign having a negative effect on the quality and precision of the information reported in the financial statements (e.g., Hanlon, 2005). These findings are consistent with large BTDs contributing to higher borrowing costs in a *public* debt setting. However, it is not clear *ex ante* that private lenders, and thus the costs of *private* debt, will be similarly affected by the information quality implications of BTDs. This is because of private lenders' arguably greater access to firms' private

☆ We thank Roger Graham (editor), our referee, participants at the 2018 Advances in Accounting Conference, and workshop participants at Washington State University for helpful comments and suggestions. Jared Moore gratefully acknowledges financial support from the Mary Ellen Phillips professorship. Li Xu gratefully acknowledges financial support from the College of Business and the Hoops Institute of Taxation Research and Policy at Washington State University.

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https://doi.org/10.1016/j.adiac.2018.07.001
Received 30 April 2018; Received in revised form 29 June 2018; Accepted 1 July 2018

information and greater abilities and incentives to monitor borrowers' credit quality (Diamond, 1984; Fama, 1985; James, 1987).

In addition, multiple recent studies (Hasan et al., 2014; Kim et al., 2010) address a similar question by using BTD-based measures (among others) to represent tax avoidance/aggressiveness and report mixed evidence as to its relation with private loan costs. However, the BTD-based measures employed by these papers to capture tax avoidance/aggressiveness use signed BTD amounts (i.e., not absolute values), thus treating large negative BTDs as low levels of tax avoidance/aggressiveness. As such, these studies do not acknowledge the potential for large *negative* BTDs to have effects on private loan costs similar to those of large *positive* BTDs. Any extent to which this is true would suggest that BTDs, beyond tax avoidance itself, impact costs of private debt in a manner more consistent with the information quality effects of BTDs discussed above.

Based on the findings of Ayers et al. (2010) and other studies linking BTDs of both signs to information-related effects such as lower earnings quality (e.g., Hanlon, 2005), higher audit costs (e.g., Hanlon, Krishnan, & Mills, 2012), and higher market uncertainty (e.g., Comprix et al., 2011; Dhaliwal, Lee, Pincus, & Steele, 2017), we predict that BTDs will be positively associated with costs of private debt, similar to their documented associations with costs of public debt. However, we may not find this relation if private lenders' greater access to private information and greater incentives and ability to monitor relative to public debtholders neutralize the BTD-related uncertainty surrounding the information conveyed in the financial statements. Further, to the extent that BTDs are more indicative of tax planning (e.g., Frank, Lynch, & Rego, 2009; Hasan et al., 2014; Wilson, 2009) than contributing to uncertainty in financial reports (e.g., Comprix et al., 2011), we may find no such association or even a negative one (e.g., Kim et al., 2010). Accordingly, the existence and degree of this association is an empirical question.

We examine the relation between private debt costs and BTDs, measured in terms of absolute values and time-series variability. By measuring BTDs in these ways, we account for the potential contributions of both large positive and large negative BTDs to uncertainty surrounding the information presented in the financial statements. We also decompose BTDs into their permanent and temporary components to provide some insight as to the types of BTDs that may make interpretation of the financial statements a more complex task for private lenders. To capture private loan costs, we employ interest rate spread and security requirements. Using a sample of 6336 firm-year observations covering the period 1996–2012, we find that costs of private debt are increasing in temporary BTDs, but not permanent ones, and that this association is present across both private debt cost measures and for both levels of and variability in BTDs. We also find that the relation between temporary BTDs and private debt costs applies to BTDs of both signs (i.e., positive and negative).

In additional analyses, we find that tax planning impacts the association between BTDs and loan costs. In particular, we demonstrate that the positive relation documented in our main results is mitigated for firms that engage in heavy tax planning activities. Finally, we find that the positive relation between BTDs and private debt costs is stronger where the loan facility is provided by lenders with high market share, consistent with lenders with higher stakes in the private loan market reacting more strongly to risk-relevant information contained in BTDs.

Overall, our results suggest that book-tax differences are positively associated with costs of private debt. Given the connection between BTDs, especially temporary ones, and earnings quality documented in prior literature (e.g., Badertscher, Phillips, Pincus, & Rego, 2009; Frank & Rego, 2006; Hanlon, 2005; Phillips, Pincus, & Rego, 2003; Phillips, Pincus, Rego, & Wan, 2004), this finding is consistent with BTDs raising concerns about earnings quality, resulting in a perception by lenders of increased borrower risk and thus resulting in higher borrowing costs. Our findings further indicate that earnings quality-related concerns about risk are alleviated if the BTDs are generated by a high-tax-planning firm, consistent with the findings of Ayers et al. (2010) and with recent evidence that tax avoidance is generally seen as a credit-quality-enhancing activity (e.g., Kim et al., 2010). Our findings related to tax planning indicate that BTDs contain risk-relevant information beyond tax avoidance, expanding on recent evidence linking tax avoidance and private loan costs directly (Hasan et al., 2014; Kim et al., 2010).

Our evidence on the manner in which book-tax differences relate to private debt costs adds to our understanding of the role of tax and financial reporting in private debt contracting and extends the growing literature examining the potential economic effects of the information (and related uncertainty) contained in BTDs. Our study is most closely related to Ayers et al. (2010), which focuses on credit ratings (i.e., public debt). Unlike Ayers et al. (2010), we examine the information effects of BTDs in the context of private lenders. This is an important distinction because private lenders arguably have greater abilities and incentives to monitor borrowers' credit quality as well as greater access to private information (Diamond, 1984; Fama, 1985; James, 1987). Accordingly, it is not clear *ex ante* that they will necessarily respond to reported tax-related financial disclosures in the same manner as participants in the public debt market. Together with Ayers et al. (2010), our results show that the information (and related uncertainty) contained in BTDs can impact debt markets on multiple dimensions.

Section 2 provides a review of the prior literature and the development of our hypotheses. Section 3 discusses our research method and data used to test the association between book-tax differences and private debt costs. Section 4 presents the results of our analyses, and Section 5 presents our concluding remarks.

2. Prior literature and hypothesis development

2.1. Book-tax differences

Book-tax differences (BTDs) represent the gap between financial statement income and federal taxable income, both of which publicly traded firms are required to report annually. Financial statement income summarizes a firm's economic gains and losses for investors and other interested external parties, while taxable income does the same for the federal government (Internal Revenue Service). However, the two income measures rarely match each other because they are derived according to different sets of accounting standards that have competing objectives and views of conservatism. Generally Accepted Accounting Principles (GAAP), used for financial reporting, apply a conservatism standard that seeks to avoid overstatement of income and/or assets. On the other hand, the accounting rules provided in the Internal Revenue Code (IRC) are generally more concerned with preventing understatement of income (and thus income tax liability).

Total BTDs can be decomposed into their temporary and permanent components. Temporary differences result from disparity in the timing of an item's recognition for book vs. tax purposes. Temporary BTDs ultimately reverse such that their cumulative effect eventually becomes zero over time, with the reversal timeframe dependent upon the nature of the item generating the BTD. Common examples of items that give rise to temporary BTDs include depreciation expense and unearned revenue. Permanent differences result when GAAP and the IRC prescribe different accounting treatments for specific revenue or expense items, and these accounting differences will not reverse or resolve over time. Common examples include nondeductible expenses (e.g., political contributions) and nontaxable income (e.g., key-person life insurance proceeds).

Basic differences in the accounting rules for book and tax purposes are responsible for many temporary and permanent BTD items, but BTDs also often reflect managerial judgment that manifests in decisions ranging from interpretation and application of financial and tax accounting rules, including estimates, to aggressive reporting practices. Some examples of the former in both the book and tax contexts include

determination of bad debt expense, recognition of deferred tax asset valuation allowances, capitalization of costs under IRC Section 263A, allocation of overhead for purposes of the domestic production activities deduction, and recognition of a liability for uncertain tax positions under FIN 48.[1] With respect to aggressive reporting practices, prior evidence documents a relation between BTDs and earnings management (e.g., Badertscher et al., 2009; Frank & Rego, 2006; Hanlon, 2005; Phillips et al., 2003; Phillips et al., 2004; Tang & Firth, 2011) and aggressive tax avoidance (e.g., Desai, 2003; Frank et al., 2009; Mills, 1998; Tang & Firth, 2011; Wilson, 2009).[2,3]

2.2. Book-tax differences, the information environment, and costs of private debt

Given that managerial judgment is an important factor in the determination of BTDs, one might reasonably expect BTDs to have an impact on the information environment. Prior evidence supports this expectation, although the information effects of BTDs appear to be a two-sided coin. Some extant studies find that taxable income communicates information to the market over and above that provided in the financial statements, suggesting that BTDs themselves contain information that is useful to market participants (Hanlon, Laplante, & Shevlin, 2005; Hanlon, Maydew, & Shevlin, 2008; Lev & Nissim, 2004).

On the other hand, however, BTDs also reflect uncertainty, and prior research suggests that this uncertainty can affect the precision of the information conveyed in the financial statements (Comprix et al., 2011). Chen, Dhaliwal, and Trombley (2012) report lower earnings persistence (on average) for firms with higher (in terms of absolute values) or more volatile "discretionary" total BTDs. Similarly, Hanlon (2005) and Guenther, Hu, and Williams (2012) find that large positive and negative temporary BTDs are associated with less persistent earnings. Although some recent research seeks to determine whether this association is driven by specific components of temporary BTDs, results are mixed. For instance, Blaylock, Shevlin, and Wilson (2012) report that the negative relation between large *positive* temporary BTDs and earnings persistence applies only in situations where the BTDs likely arise from earnings management. Their results also suggest that earnings persistence is *higher* where the BTDs stem from tax avoidance. However, Guenther et al. (2012) find that earnings are less persistent for firms with large positive *and* negative BTDs, whether earnings management is present or not. Although they do not address tax avoidance directly, their results are consistent with the BTD/persistence relation stemming from a number of sources and with BTDs containing useful information incremental to earnings management.

In a market context, Lev and Nissim (2004) provide evidence that BTDs are reflected in future returns, implying that investors may have difficulty processing them from a pricing standpoint. Similarly, Chi, Pincus, and Teoh (2014) document market mispricing of BTDs and find that short sellers and insiders benefit from the ensuing arbitrage opportunities. Focusing on concurrent returns, Chen et al. (2012) report that consistency of BTDs over time (or lack thereof) impacts the informativeness of book and taxable income and that this effect is incremental to the separate impacts of earnings management and tax avoidance. Weber (2009) finds that even analysts (i.e., sophisticated financial statement users) do not fully incorporate BTDs when making earnings forecasts and that the degree to which they do so varies across analysts. Similarly, Comprix et al. (2011) document that levels of and time-series variation in BTDs (total, permanent, and temporary) are associated with divergence of opinion among market participants, both sophisticated (i.e., analysts) and otherwise.

Overall, the findings in the extant literature are consistent with BTDs conveying information that is useful for financial statement users but is also sufficiently uncertain that considerable variation exists in stakeholders' interpretations of it, resulting in variation in how market participants' process other financial statement information (e.g., earnings) as well. Further, the findings in the literature are consistent with BTDs arising from a variety of underlying causes with different levels of uncertainty. Some recent studies suggest that the uncertainty contained in BTDs can be costly to the firm because of its effects on stakeholders' assessments of earnings quality and/or firm risk. Dhaliwal et al. (2017) find that variation in estimated taxable income (covariance between book and taxable income) is positively (negatively) related with cost of equity capital, consistent with BTDs contributing to uncertainty in the market. Similarly, Hanlon et al. (2012) and Kuo and Lee (2016) link BTD levels to higher audit fees, and Ayers et al. (2010) find that large positive or negative changes in BTDs are associated with negative changes in bond ratings. However, both Hanlon et al. (2012) and Ayers et al. (2010) also find that their respective main effects of BTDs do not hold for firms classified as "tax planners," implying that BTDs are generally associated with higher audit and (public) debt costs, except where the BTDs stem from tax planning.

We extend this literature on the information effects of BTDs, particularly Ayers et al. (2010), by examining whether BTDs are associated with costs of *private* debt. Stockholders and debt holders do not necessarily share the same perspective or informational needs. Further, *private* lenders such as banks are sophisticated users of financial statement information, and their abilities and incentives to monitor borrowers' credit quality are greater than those of public debt or equity holders due to greater access to private information, concentrated positions, and ability to customize loan contract features (Beneish & Press, 1993; Diamond, 1984; Smith & Warner, 1979).

Based on prior evidence on the implications of BTDs for other sophisticated market participants (e.g., Comprix et al., 2011; Weber, 2009), we expect the uncertainty contained in BTDs to translate into an increase in private lenders' perceptions of the riskiness of borrowers with high BTDs, thereby resulting in increased loan costs. However, given the apparent information advantage of private lenders over equity and public debt holders, we may observe no such association. Specifically, the enhanced ability of private lenders to monitor borrowers may neutralize any uncertainty-related information effects of BTDs.

Further, recent studies provide mixed evidence on the effects of borrowers' aggressive tax avoidance on private loan costs, using BTD-related measures to capture tax avoidance. Hasan et al. (2014) find that tax avoidance is positively associated with covenant requirements and interest rate spreads, particularly for firms with higher "information risk" (i.e., discretionary accruals). Kim et al. (2010), on the other hand, provide evidence of a negative association between aggressive tax avoidance and private loan costs. In both studies, the BTD-related measures used to proxy for tax avoidance are based on directional values (vs. absolute values) and thus do not acknowledge the potential for negative BTDs to have similar effects to those of positive BTDs. Notwithstanding this potential measurement issue, to the extent that BTDs reflect tax avoidance itself (e.g., Frank et al., 2009; Wilson, 2009) more than contributing to uncertainty in financial reports, one might expect no, or even a negative, relation between them and private debt costs. As such, the relation between BTDs and private debt costs is an empirical question.

[1] FIN 48 refers to Financial Accounting Standards Board (FASB) Interpretation No. 48, *Accounting for Uncertainty in Income Taxes*.

[2] A literature has emerged recently that explores variation in required book-tax conformity across jurisdictions and the related implications for various reporting issues, including earnings management (Blaylock, Gaertner, & Shevlin, 2015; Sundvik, 2017; Tang, 2015; Watrin, Ebert, & Thomsen, 2014), earnings persistence (Atwood, Drake, & Myers, 2010), capital structure (Blaylock, Gaertner, & Shevlin, 2017), and audit fees (Kuo & Lee, 2016). The current study differs from these because we examine variation in BTDs within a given set of reporting rules, holding the book-tax conformity regime constant, which is a different construct.

[3] See Comprix et al. (2011) and Moore (2012) for more detailed discussions of BTDs and the role of managerial judgment in their determination.

Based on the findings of Ayers et al. (2010) and other studies linking BTDs of both signs to information-related effects such as lower earnings quality (e.g., Hanlon, 2005), higher audit costs (e.g., Hanlon et al., 2012), and higher market uncertainty (e.g., Comprix et al., 2011; Dhaliwal et al., 2017), we predict that BTDs will be positively associated with costs of private debt. We present the following hypothesis:

H1. Private debt costs are increasing in total book-tax differences.

As previously discussed, total BTDs are composed of permanent and temporary components. Both components are subject to managerial judgment, and both convey information and uncertainly as evidenced by the Comprix et al. (2011) finding that permanent and temporary differences each contribute to disagreement among market participants. We investigate whether permanent and temporary differences each affect lenders' perceptions of borrowers' risk profiles and/or credit quality over and above the other. Based on the same reasoning discussed above for total BTDs, we present the following hypothesis:

H2.

a: Private debt costs are increasing in permanent book-tax differences, and
b: Private debt costs are increasing in temporary book-tax differences.

3. Research methods

3.1. Measuring private debt costs

The costs associated with bank loans manifest in the loan contract terms. Following Bharath, Dahiya, Saunders, and Srinivasan (2011), we focus on two components of bank loans: interest rate spread and security requirements. Interest rate spread is a price attribute of bank debt and therefore directly represents a component of the costs of a loan. We follow Graham et al. (2008), Kim et al. (2010), Kim, Li, and Zhang (2011), Deng, Willis, and Xu (2014), and Hasan et al. (2014) and measure the interest rate spread (*Spread*) using the natural log of the all-in-drawn spread, which is the amount a borrower pays the lender each year in basis points over LIBOR for each dollar borrowed.

Rajan and Winton (1995) show that collateral requirements facilitate efficient monitoring. Because banks are more likely to demand such monitoring mechanisms for firms with greater uncertainty (and thus perceived risk) surrounding their prospects for repaying a loan, security requirements amount to another cost of private debt. We capture security requirements with an indicator variable (*Security*) equal to one when the loan is secured by collateral, and zero otherwise (Hasan et al., 2014).

3.2. Measuring book-tax differences

We measure BTDs in terms of both levels (i.e., absolute values) and volatility to account for current and ongoing information (and uncertainty) contained in book-tax differences. BTD levels have been examined extensively in the prior literature (e.g., Badertscher et al., 2009; Desai & Dharmapala, 2006; Hanlon, 2005; Mills, 1998; Wilson, 2009), but recent studies have also begun to employ longer-term measures of BTDs as well (e.g., Ayers et al., 2010; Chen et al., 2012; Comprix et al., 2011; Moore, 2012). While BTDs levels capture current period activity, time series variability in BTDs reflects information about a series of managerial decisions and activities over time and may therefore be just as useful in measuring the precision of reported information and capturing aspects of a firm's underlying economic fundamentals, including risk and aggressive reporting practices (Chen et al., 2012).

We follow prior literature (e.g., Ayers et al., 2010; Comprix et al., 2011; Frank et al., 2009; Hanlon et al., 2005; Manzon & Plesko, 2002) in calculating book-tax differences as follows (subscripts suppressed):

$$BTDiff = PreTxInc - \left[\frac{(CurrFedTx + CurrForTx)}{StatRate}\right] \quad (1)$$

where:

BTDiff = total book-tax differences for firm *i* in year *t*,
PreTxInc = pre-tax book income less minority interest for firm *i* in year *t*,
CurrFedTx = current federal income tax expense for firm *i* in year *t*,
CurrForTx = current foreign income tax expense for firm *i* in year *t*, and
StatRate = the top statutory tax rate in year *t*.

We decompose total *BTDiff* to derive permanent and temporary differences following recent prior literature (e.g., Comprix et al., 2011; Frank et al., 2009; Hanlon, 2005; Moore, 2012). Temporary differences are defined as deferred tax expense for firm *i* in year *t* grossed up by the top statutory corporate income tax rate in year *t*, and permanent differences are the net of total (*BTDiff*) and temporary differences. We scale each of our BTD measures by beginning-of-year total assets in our regression models. We measure BTD levels as the absolute values of scaled total, permanent, and temporary differences (as applicable), thereby accounting for the likelihood that both positive and negative BTDs reflect uncertainty at some level. We capture volatility in BTDs by calculating the standard deviation of scaled raw total, temporary, and permanent differences (as applicable) over the five years ending in year *t* for each of our sample firm-year observations.

3.3. Empirical models

To investigate the effect of BTDs on bank loan contract costs, we specify the following model (subscripts suppressed):

$$\begin{aligned} LoanFeature = {} & \alpha + \beta \times BTD + \gamma \times LoanFactors + \theta \times FirmFactors \\ & + \rho \times MacroeconomicFactors + YearEffects + IndustryEffects \\ & + LoanPurposeEffects + LoanTypeEffects + \varepsilon \end{aligned} \quad (2)$$

Loan contract terms differ across facilities, and one loan may have multiple facilities. Thus, we estimate Eq. (2) at the loan facility level. Our specification follows that of Deng et al. (2014) by controlling for firm-specific, loan-specific, and macroeconomic factors that may affect the attributes of bank loan contracts as applicable. Similar to Deng et al. (2014), we include industry effects (defined at the two-digit SIC level) to account for cross-sectional differences in bank loan contracts attributable to industry features. We also include fixed effects for year, loan purpose, and loan type.[4]

LoanFeature is the dependent variable and represents the two components of bank loans (spread and security) that we examine (separately). *BTD* represents the book-tax difference measures, which are the main independent variables of interest. For our main tests of the association between BTDs and costs of private debt, we estimate Eq. (2) separately for each of the proxies for loan contract costs. We also estimate Eq. (2) separately for the levels-based BTD measures (*AbsBTD*) and the volatility-based BTD measures (*VarBTD*). A positive coefficient on the BTD measures in the *Spread* and *Security* models would indicate a positive association between BTDs and costs of private debt.

To control for loan-specific factors we include loan size, the natural log of the loan amount (*LoanSize*). It is expected to be negatively related to the cost of borrowing due to the economies of scale associated with larger loans. *Maturity* is the natural log of loan maturity in months. Loans with longer maturity have less liquidity, and thus we expect higher costs to be associated with longer term loans. Performance

[4] Our sample contains multiple observations for the same firm; moreover, debt contract terms tend to be persistent. Thus, we expect residual autocorrelation within firms over time. Furthermore, because debt contract terms pick up systematic changes in value, there is residual correlation across firms for a given time period. We address this "within" and "between" firm residual correlation using loan purpose and type fixed effects as well as robust standard errors following Rogers (1993).

pricing (*PerfPricing*) is an indicator variable equal to one if a loan contract has a performance pricing clause, and zero otherwise. We include *CreditRating*, based on the S&P Domestic Long Term Issuer Credit Rating. *CreditRating* assumes ordinal values 1 (AAA), 2 (AA+), 3 (AA).....20 (CC), 21 (D), 22 (SD), 23 (No rating) (e.g., Kisgen, 2009).

To control for firm-specific factors, we include *CovenantV*, an indicator variable equal to one if the firm experienced a covenant violation in the five-year period preceding the loan issuance date, and zero otherwise.[5] Nini, Smith, and Sufi (2012) find that loans made after a covenant violation are smaller, carry higher interest rate spreads and fees, have a shorter maturity, and involve fewer lenders in the lending syndicate. We include *Restate*, an indicator variable equal to one if the firm disclosed a restatement in the five-year period before the loan issuance date, and zero otherwise.[6]Graham et al. (2008) find that after restatements, loans have higher interest rates, shorter maturities, a higher likelihood of being accompanied by collateral requirements, and are more likely to experience covenant restrictions.

We also include firm size, measured by the natural log of total assets (*Size*). Larger firms are expected to have lower cost of debt because they have lower default risk. Following Bharath, Dahiya, Saunders, and Srinivasan (2007), we use market-to-book ratio (*MTB*) to proxy for a firm's growth opportunities, measured as the market value of equity plus the book value of liabilities and preferred stock divided by the book value of assets. We expect that firms with more growth opportunities are likely to have lower cost of debt as they have lower default risk. To control for overall firm risk, we also include *RVol,* the daily stock return volatility for the year. We expect firms with more volatile stock returns to have higher cost of debt due to higher systematic risk. Leverage (*Debt*), the ratio of the book value of total debt to the book value of total assets, is also included. Firms with higher *Debt* borrow more and thus have higher default risk, which leads to a higher cost of debt. Following Graham et al. (2008), we use the modified Altman *Z*-score (*ZScore*) as a further control for default risk (Altman, 1968). Higher *ZScore* indicates lower insolvency risk, so we expect negative coefficients on *ZScore* in the *Spread* and *Security* models.

We include profitability (*ROA*), which is the ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total assets. More profitable firms have lower default risk, resulting in a lower cost of debt. We also include tangibility (*CapIntens*), which is the ratio of net property, plant, and equipment to the book value of total assets. Firms with more tangible assets should have lower borrowing costs as lenders may recover these assets in the event of a default. Cash flow volatility (*CFVol*) is the standard deviation of quarterly operating cash flow, computed over the 16 fiscal quarters prior to the loan initiation year (deflated by total debt). We expect that firms with higher cash flow volatility experience higher cost of borrowing due to the increased uncertainty regarding their ability to make timely debt payments. *CETR*, defined as the ratio of cash tax paid over pretax income, captures tax avoidance. Given that several prior studies have used BTDs and/or various aspects thereof as proxies for tax avoidance (e.g., Desai & Dharmapala, 2006; Frank et al., 2009; Hasan et al., 2014; Wilson, 2009), this control ensures that any results we find are not due to an association between bank loan costs and *tax avoidance itself* (vs. the broader information content of BTDs). *Public* is an indicator variable equal to one if the firm has issued public debt within five years of the loan issuance date, and zero otherwise.

To control for macroeconomic conditions, we include credit spread (*CreditSpread*) and term spread (*TermSpread*). *CreditSpread* is the yield difference between BAA and AAA corporate bonds; credit spreads typically widen during economic recessions and narrow during economic expansions as investors demand higher rates of return for increased default risk during economic downturns. *TermSpread*, a reflection of economic prospects, is the difference in yields between 10-year and 2-year Treasury bonds.

3.4. Data and descriptive statistics

The empirical tests described above require data on private loan characteristics and financial statement information. Using the link file compiled by Chava and Roberts (2008), we start with all firms with data in both the Dealscan and Compustat databases from 1996 to 2012.[7] We eliminate firms that are in regulated and financial industries. We then eliminate firms lacking data necessary to calculate book-tax differences and required control variables, reducing the sample to 4415 unique firm-year observations (1823 unique firms). These 4415 unique firm-years had 6336 bank loans (also called “facilities”) on the Dealscan database compiled by the Loan Pricing Corporation (LPC) of Thomson Reuters. Dealscan contains detailed loan-specific information.

We provide the distribution by the calendar year in Panel A of Table 1 for the 6336 firm-year observations. The fewest number of firms, just over 2%, was in 2012. The yearly sample generally trended upward until its peak in 2001 (8.33% of the sample) and held steady at around 7% of the sample between 2002 and 2006 before generally trending down in the last six years of the sample period.

We report industry membership of the sample firms in Panel B of Table 1 and, as a benchmark for comparison, all firms on Compustat in 2001 (largest concentration of firm-years in the sample period). Industry definitions are based on the aggregation of similar two-digit SIC classifications (defined in the notes to Table 1). With a few exceptions, industry representation of our sample firms is generally consistent with that of firms in the broader Compustat database. The exceptions, for which industry membership differs notably from the industry composition represented in the Compustat population, are as follows: telecommunications (1.78 vs. 8.46%), wholesale and retail (19.59 vs. 10.78%), and business services (5.73 vs. 14.29%). As noted previously, we include industry effects in all empirical models to ensure that our results are not driven by industry-specific factors.

Table 2 reports descriptive statistics for our total of 6336 sample observations. With respect to our dependent variables, the mean (median) value for *Spread* is 4.93 (5.16), and just over half (51%) of our sample observations involve a loan with a collateral requirement (*Security*). The mean (median) *AbsBTD(Total)* value is 0.048 (0.030), and the permanent and temporary components have mean (median) values of 0.031 (0.012) and 0.036 (0.022), respectively. Similarly, the mean (median) value for *VarBTD(Total)* is 0.050 (0.033), and the permanent and temporary components have mean (median) values of 0.036 (0.013) and 0.042 (0.029), respectively.

Notable statistics among the control variables include *ROA*, for which the mean (median) value of 0.14 (0.13) indicates that our sample firms are profitable on average. Our sample firms also carry debt at an average and median rate of 24% of total assets. Finally, while mean and median values are generally similar across our continuous regression variables, values for *CFVol* are 1.63 and 0.17, respectively, indicting skewness in that variable.

Table 3 presents Pearson correlation coefficients for the variables in Eq. (2). Several of the BTD measures are highly correlated with each other (i.e., coefficient exceeding 0.40), although none have correlations exceeding 0.75. However, the highest correlation among BTD variables

[5] We obtain data on covenant violations from Professor Amir Sufi's website: http://faculty.chicagobooth.edu/amir.sufi/data.html. We thank Professor Amir Sufi for generously sharing this data.

[6] We obtain data on restatements from Professor Andrew Leone's website: http://sbaleone.bus.miami.edu (also see Hennes, Leone, & Miller, 2008) and the AuditAnalytics database. We thank Professor Andrew Leone for generously sharing this data.

[7] The link is available at Professor Michael Roberts' website: http://finance.wharton.upenn.edu/~mrrobert/data_code.htm. We thank Professor Michael Roberts for generously sharing the link.

Table 1
Description of sample.

Panel A: Firm-Year Observations by Year

Year	Sample	% of Total
1996	365	5.76
1997	432	6.82
1998	422	6.66
1999	440	6.94
2000	444	7.01
2001	528	8.33
2002	466	7.35
2003	407	6.42
2004	455	7.18
2005	431	6.80
2006	428	6.76
2007	398	6.28
2008	237	3.74
2009	144	2.27
2010	230	3.63
2011	370	5.84
2012	139	2.19
	6,336	**100.00**

Panel B: Firm-Year Observations by Industry Group

Industry	N Sample	% Sample	% Compustat
Natural resources	387	6.11	6.01
Construction and metal	494	7.80	5.65
Food	204	3.22	2.60
Consumer goods	334	5.27	3.43
Paper and printing	357	5.62	2.78
Chemical and petroleum	523	8.25	10.59
Machinery and equipment	1,287	20.31	21.79
Transportation-related	481	7.59	5.41
Telecommunications	113	1.78	8.46
Wholesale and retail	1,241	19.59	10.78
Entertainment	140	2.21	1.66
Business services	363	5.73	14.29
Health services	382	6.03	5.51
Other	30	0.47	1.03
Total	**6,336**	**100.00**	**100.00**

Industries are defined on the basis of two-digit SIC codes as follows: Natural Resources: 0–9,10–14; Construction/Metal: 15–19, 30, 32–34; Food: 20–21; Consumer Goods: 22–23, 25, 31, 39; Paper/Printing: 24, 26–27; Chemical/Petroleum: 28–29; Machinery/Equipment: 35–36, 38; Transportation: 37, 40–47; Telecommunication: 48; Wholesale/Retail: 50–59; Entertainment: 78–79; Business Services: 73, 81; Health Services: 70, 72, 75–76, 80, 82–89; Unidentified: 99. "% Compustat" indicates the percentage of all firms on Compustat in 2001 (largest concentration of firm-years in the sample period) represented in each industry.

that appear in the same regression together is 0.48 (coefficient between *VarBTD(Temp)* and *VarBTD(Perm)*), indicating that our main independent variables are sufficiently distinct from one another so as to avoid collinearity issues.

Among the control variables, the correlations are high between loan size (*LoanSize*), firm size (*Size*), and credit ratings (*CreditRating*). Specifically, *LoanSize* and *Size* are highly correlated with each other (coefficient of 0.82), and both are highly correlated with *CreditRating* (coefficients exceeding −0.60). The correlations among these three variables are high enough to raise concerns, so we re-estimate Eq. (2) omitting *LoanSize* and *CreditRating* (i.e., leaving only *Size* to represent all three) to ensure that our main results are not affected by the collinearity between the three variables (discussed further later in "Sensitivity Analysis" section). All other correlation coefficients among the independent variables are below 0.60, suggesting that, other than these few high correlations, collinearity is not a major concern in our data overall.

4. Empirical results

4.1. Main regression results

Main regression results are presented in Tables 4 and 5, and the reported standard errors are robust following Rogers (1993). Table 4 presents the results for the estimations of Eq. (2) in which the BTD variables are computed based on total BTDs. We report the results for two estimations for both dependent variables, each reflecting one of our two measurements of BTDs (*AbsBTD* and *VarBTD*). R-squared values are around 29% in the *Security* models and 61% in the *Spread* models. Neither of the coefficients on *AbsBTD(Total)* are significantly different from zero. However, the coefficients on *VarBTD(Total)* are positive and highly significant ($p < .01$) across both proxies for private debt costs. These results provide partial support for H1, which predicts a positive association between costs of private debt and total book tax differences.

Several of the control variables are significant across the four models and are generally consistent with our expectations. Of particular note, the coefficients on *RVol*, *CovenantV*, *Restate*, *Debt*, and *CFVol* are all consistently positive and significant (at least at the 0.10 level) in the *Spread* and *Security* models as expected. Similarly, *LoanSize*, *Size*, *ROA*, and *MTB* are all significantly negative (at least at the 0.10 level) across the *Spread* and *Security* models. *CreditRating*, *CreditSpread*, and *TermSpread* are all significantly positive ($p < .01$) in the *Security* models but are insignificant in the *Spread* models, while the reverse is true for *Maturity* and *Public*. *CapIntens* is significantly negative ($p < .05$) in the *Spread* model focusing on *AbsBTD (Total)* but is not significant in the other models, while *CETR* is insignificant across all models. The results for *PerfPricing* and *ZScore* are inconsistent between the *Spread* and *Security* models.

Table 5 presents the results for the estimations of Eq. (2) where the BTD variables are disaggregated into their permanent and temporary components. Panel A shows results for continuous measurements of the BTD variables (as in Table 4) while Panel B focuses only on BTD levels, considering the potential for asymmetric effects between positive and negative BTDs. The R-square values across all models are consistent with the regressions presented in Table 4. Results for the control variables are also consistent with those reported in Table 4, showing very few differences in significance levels.

In Panel A, the coefficients on the temporary BTD variables (*AbsBTD (Temp)* and *VarBTD(Temp)*) are significantly positive, at least at the 0.10 level, across all of the regressions, suggesting that private debt costs are increasing in temporary book-tax differences and providing consistent support for H2b. However, the results provide no support for H2a; the permanent BTD measures are insignificant in all models except one (*AbsBTD(Perm)* in the *Spread* model), where it is marginally significantly *negative* ($p < .10$).

Table 2
Descriptive statistics.

	Full sample (n = 6336)				
Variable	Mean	Std. Dev.	25%	Median	75%
Continuous					
Spread	4.930	0.840	4.380	5.160	5.520
AbsBTD (Total)	0.048	0.057	0.014	0.030	0.058
AbsBTD (Perm)	0.031	0.058	0.004	0.012	0.029
AbsBTD (Temp)	0.036	0.046	0.008	0.022	0.045
VarBTD (Total)	0.050	0.050	0.019	0.033	0.063
VarBTD (Perm)	0.036	0.057	0.006	0.013	0.036
VarBTD (Temp)	0.042	0.041	0.016	0.029	0.051
LoanSize	18.400	1.640	17.400	18.600	19.500
Maturity	3.620	0.680	3.220	3.870	4.090
RVol	0.032	0.016	0.020	0.028	0.038
CETR	0.210	0.420	0.036	0.210	0.350
CreditRating	17.300	6.740	11	23	23
Size	6.610	1.830	5.320	6.560	7.810
CapIntens	0.340	0.230	0.160	0.290	0.480
Debt	0.240	0.150	0.120	0.230	0.340
ZScore	2.100	1.160	1.380	2.100	2.820
ROA	0.140	0.083	0.089	0.130	0.180
CFVol	1.630	7.600	0.086	0.170	0.420
MTB	1.650	0.870	1.090	1.390	1.920
CreditSpread	0.940	0.340	0.730	0.860	1.070
TermSpread	1.010	0.960	0.170	0.610	1.900
Categorical					
Security	51.0%				
PerfPricing	52.0%				
CovenantV	10.0%				
Restate	11.0%				
Public	9.9%				

Spread is defined as the natural log of the amount a borrower pays the lender each year in basis points over LIBOR for each dollar borrowed; *AbsBTD* is defined as the absolute value of book-tax differences for firm *i* in year *t* scaled by prior year total assets; *VarBTD* is the standard deviation of book-tax differences scaled by prior year total assets for firm *i* over the five-year period from year *t-4* to year *t*; *(Total)*, *(Perm)*, and *(Temp)* indicate whether *AbsBTD* and *VarBTD* are computed based on total, permanent, or temporary book-tax differences, respectively; *LoanSize* is the natural log of the loan facility amount for firm *i*; *Maturity* is the natural log of the loan term in months; *RVol* is the volatility of daily stock returns for firm *i* in year *t*; *CETR* is cash taxes paid scaled by pretax income for firm *i* in year *t*; *CreditRating* is measured as ordinal values based on the Compustat mnemonic SPLTICRM with values of 1 (AAA), 2 (AA+), 3 (AA), 4, (AA-), …, 20 (CC), 21 (D), 22 (SD) (see, e.g., Kisgen, 2009), measured as of the month of loan issuance; *Size* is the natural log of total assets for firm *i* in year *t*; *CapIntens* is net property, plant, and equipment scaled by total assets for firm *i* in year *t*; *Debt* is long-term debt (including short-term maturities) scaled by total assets for firm *i* in year *t*; *ZScore* is the modified Altman (1968)*Z*-score for firm *i* in year *t*, measured as (1.2(working capital) + 1.4(retained earnings) + 3.3(earnings before interest and taxes) + 0.999(sales))/total assets; *ROA* is earnings before interest, taxes, depreciation, and amortization scaled by total assets for firm *i* in year *t*; *CFVol* is the standard deviation of quarterly cash flows from operations over the four fiscal years prior to the loan initiation year scaled by total debt for firm *i*; *MTB* is market value of equity plus book value of liabilities and preferred stock/total assets for firm *i* in year *t*; *CreditSpread* is the difference between the AAA corporate bond yield and the BAA corporate bond yield from the Federal Reserve Board of Governors; *TermSpread* is the difference between the 10-year Treasury yield and the 2-year Treasury yield from the Federal Reserve Board of Governors; *Security* is an indicator variable coded 1 if the loan is secured by collateral, 0 otherwise; *PerfPricing* is an indicator variable coded 1 if the loan has a performance pricing clause, 0 otherwise; *CovenantV* is an indicator variable coded 1 if firm *i* experienced a covenant violation in the five-year period before the loan issuance date, 0 otherwise; *Restate* is an indicator variable coded 1 if firm *i* disclosed an accounting restatement in the five-year period before the loan issuance date, 0 otherwise; and *Public* is an indicator variable coded 1 if firm *i* has issued public debt within five years of the loan issuance date, 0 otherwise.

Panel B of Table 5 reports results for a version of Eq. (2) in which levels of permanent and temporary BTDs are broken down into their positive and negative components. Specifically, *PosBTD* and *NegBTD* are indicator variables representing positive and negative BTDs, respectively. Both are coded 1 for observations based on values of permanent or temporary BTDs of their respective sign, and 0 otherwise. We estimate this version of Eq. (2) for both dependent variables. Across the models, the coefficients on both *PosBTD (Temp)* and *NegBTD(Temp)* are positive and significant, at least at the 0.10 level, indicating that both positive and negative *temporary* BTDs are associated with higher interest rate spreads and likelihood of a collateral requirement. However, neither *PosBTD(Perm)* nor *NegBTD(Perm)* is significant in any case, supporting the evidence in Panel A that permanent BTDs are not associated with bank loan costs. Overall, these results provide additional partial support for H1 and H2b and shed more light on the relation between BTD *levels* and private loan costs.

4.2. The influence of tax planning

Our main results suggest a positive association between costs of private debt and BTDs that is driven by the temporary component. Our main findings further imply that the effects of temporary BTD *levels* on private loan costs are driven by both positive *and* negative BTDs. We next explore whether our main results are impacted by whether a firm engages in high levels of tax planning. The purpose of this analysis is twofold. First, while recent studies provide mixed evidence on the *direct* association between tax avoidance and private debt costs using BTD-based measures to proxy for tax avoidance (e.g., Hasan et al., 2014; Kim et al., 2010), aspects of our main findings suggest that there is information in BTDs *beyond* tax avoidance that private lenders incorporate into loan contract terms. Second, given the consistency between our main findings and those of Ayers et al. (2010) with respect to public debt costs, we aim to examine whether our results are similarly driven by firms that are not "tax planners."

We test for this interaction by re-estimating the regression models shown in Table 4 with the addition of a variable identifying high-tax-planning firms (*TaxPlan*) and interactions between *TaxPlan* and the BTD variables, following Ayers et al. (2010). *TaxPlan* is an indicator variable coded 1 if the cumulative GAAP or cash effective tax rate over the five-year period ending with year *t* is in the lowest quintile in the applicable industry-year, and 0 otherwise.[8]

Table 6, Panel A reports the results of this analysis, and we omit control variables from the table for brevity. Consistent with the results shown in Table 4, *VarBTD(Total)* is positive and highly significant ($p < .01$) in both the *Spread* and *Security* models. Unlike the Table 4 results, the coefficients on *AbsBTD(Total)* in both models are positive, and significantly so in the *Spread* model ($p < .05$). These results generally indicate a positive association between BTDs and private loan costs for firms *not* identified as high-tax-planners.

To examine the association between BTDs and private loan costs for high-tax-planning firms, we first look to the interactions between *TaxPlan* and the BTD variables. *AbsBTD(Total)*TaxPlan* is significantly negative at the 0.01 level in both the *Spread* and *Security* models. Similarly, *VarBTD (Total)*TaxPlan* is also negative and highly significant in both models ($p < .01$). These findings indicate that the positive association between BTDs and loan costs is at least partially neutralized where the BTDs stem from tax planning activities. To explore the relation between BTDs and costs of private debt specifically for high-tax-planning firms, we examine the combined coefficients on the interactions discussed here and their respective BTD variables. In both the *Spread* and *Security* models, the sums of the coefficients on *AbsBTD(Total)* and *AbsBTD(Total)*TaxPlan* (−1.165 and − 2.492, respectively) are *negative* and significant at the 0.01 level, indicating that BTDs are associated with *lower* loan costs for high-tax-planning firms. Similarly, the sums of the coefficients on *VarBTD(Total)* and *VarBTD(Total)*TaxPlan* in both the *Spread* and *Security* models (−0.588 and − 0.823, respectively) are both negative, although significantly so only in the *Spread* model ($p < .05$).

Overall, these results suggest that the positive association between BTDs and costs of private debt documented in Tables 4 and 5 hold *only* for firms

[8] GAAP (cash) ETR is based on current tax expenses (cash taxes paid) divided by pretax income less special items.

Table 3
Correlation matrix.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Spread	**1.00**											
2. Security	**0.56**	**1.00**										
3. AbsBTD (Total)	**0.16**	0.11	**1.00**									
4. AbsBTD (Perm)	0.15	0.12	**0.64**	**1.00**								
5. AbsBTD (Temp)	0.11	0.08	**0.58**	0.31	**1.00**							
6. VarBTD (Total)	**0.24**	**0.20**	**0.58**	**0.48**	**0.34**	**1.00**						
7. VarBTD (Perm)	**0.24**	**0.19**	**0.45**	**0.63**	**0.22**	**0.74**	**1.00**					
8. VarBTD (Temp)	**0.17**	**0.13**	**0.40**	**0.30**	**0.57**	**0.61**	**0.48**	**1.00**				
9. LoanSize	**−0.46**	**−0.37**	**−0.15**	**−0.17**	**−0.07**	**−0.21**	**−0.25**	**−0.12**	**1.00**			
10. Maturity	**0.12**	**0.13**	**−0.08**	**−0.07**	−0.04	**−0.06**	**−0.06**	−0.03	**0.10**	**1.00**		
11. PerfPricing	**−0.09**	**0.06**	**−0.11**	**−0.10**	−0.03	**−0.13**	**−0.12**	**−0.07**	**0.14**	**0.17**	**1.00**	
12. RVol	**0.47**	**0.35**	**0.30**	**0.28**	**0.13**	**0.33**	**0.31**	**0.18**	**−0.49**	**−0.15**	**−0.14**	**1.00**
13. CETR	**−0.10**	**−0.07**	**−0.17**	**−0.11**	**−0.12**	**−0.13**	**−0.11**	**−0.10**	**0.07**	**0.02**	**0.05**	**−0.13**
14. CreditRating	**0.46**	**0.35**	0.11	**0.13**	**0.06**	**0.15**	**0.19**	**0.10**	**−0.61**	**0.08**	0.01	**0.36**
15. CovenantV	**0.23**	**0.20**	**0.15**	**0.16**	**0.06**	**0.15**	**0.18**	**0.10**	**−0.26**	**−0.05**	**−0.05**	**0.25**
16. Restate	**0.11**	**0.10**	0.04	**0.08**	−0.01	**0.07**	**0.09**	0.03	0.01	**0.06**	0.00	0.03
17. Size	**−0.50**	**−0.44**	**−0.14**	**−0.15**	**−0.08**	**−0.22**	**−0.24**	**−0.13**	**0.82**	−0.04	0.02	**−0.47**
18. CapIntens	−0.08	**−0.08**	**0.01**	**−0.10**	**0.05**	**−0.10**	**−0.16**	**−0.05**	**0.17**	0.01	0.03	**−0.08**
19. Debt	**0.13**	**0.07**	0.01	**−0.05**	**−0.01**	0.00	**−0.07**	−0.04	**0.03**	**−0.03**	−0.02	**0.10**
20. ZScore	**−0.22**	**−0.13**	**−0.35**	**−0.28**	**−0.14**	**−0.38**	**−0.32**	**−0.18**	**0.08**	**0.05**	**0.10**	**−0.24**
21. ROA	**−0.37**	**−0.28**	**−0.24**	**−0.25**	**−0.07**	**−0.23**	**−0.24**	**−0.08**	**0.25**	**0.06**	**0.11**	**−0.35**
22. CFVol	**0.05**	**0.03**	**0.05**	**0.06**	0.02	**0.06**	**0.08**	**0.06**	**−0.04**	0.03	−0.03	0.01
23. MTB	**−0.36**	**−0.21**	**0.07**	**0.09**	**0.04**	**0.08**	**0.08**	0.04	**0.17**	**−0.07**	0.00	**−0.19**
24. Public	**−0.11**	**−0.07**	−0.02	−0.04	−0.01	−0.02	−0.03	−0.02	**0.19**	−0.02	−0.01	**−0.09**
25. CreditSpread	**0.18**	0.02	0.05	0.05	0.01	0.02	0.04	0.04	**0.07**	**−0.04**	0.01	**0.12**
26. TermSpread	**0.22**	0.02	0.04	0.02	−0.01	0.03	0.02	0.04	**0.04**	**−0.03**	**−0.02**	**0.18**

	13	14	15	16	17	18	19	20	21	22	23	24	25	26
1. Spread														
2. Security														
3. AbsBTD (Total)														
4. AbsBTD (Perm)														
5. AbsBTD (Temp)														
6. VarBTD (Total)														
7. VarBTD (Perm)														
8. VarBTD (Temp)														
9. LoanSize														
10. Maturity														
11. PerfPricing														
12. RVol														
13. CETR	**1.00**													
14. CreditRating	**−0.05**	**1.00**												
15. CovenantV	**−0.09**	**0.20**	**1.00**											
16. Restate	0.00	**0.05**	**0.08**	**1.00**										
17. Size	**0.06**	**−0.74**	**−0.26**	0.01	**1.00**									
18. CapIntens	−0.04	**−0.20**	**−0.11**	**−0.05**	**0.20**	**1.00**								
19. Debt	**−0.07**	**−0.15**	0.04	**−0.06**	**0.08**	**0.35**	**1.00**							

(*continued on next page*)

Table 3 (*continued*)

	13	14	15	16	17	18	19	20	21	22	23	24	25	26
20. ZScore	**0.19**	0.02	**−0.13**	−0.04	**−0.03**	**−0.29**	**−0.35**	**1.00**						
21. ROA	**0.19**	**−0.19**	**−0.22**	**−0.10**	**0.17**	**0.15**	**−0.17**	**0.49**	**1.00**					
22. CFVol	0.03	**0.12**	−0.01	**0.05**	**−0.08**	**−0.13**	**−0.29**	**0.09**	0.03	**1.00**				
23. MTB	**0.06**	**−0.15**	**−0.08**	−0.02	**0.14**	**−0.10**	**−0.27**	**0.20**	**0.51**	**0.11**	**1.00**			
24. Public	−0.03	**−0.27**	**−0.06**	−0.02	**0.26**	**0.11**	**0.15**	**−0.08**	0.00	**−0.04**	0.01	**1.00**		
25. CreditSpread	−0.01	−0.01	0.03	**0.14**	**0.11**	−0.04	**−0.06**	−0.01	−0.02	0.03	**−0.04**	0.01	**1.00**	
26. TermSpread	**−0.03**	0.00	0.02	**0.08**	**0.09**	**0.01**	−0.03	**−0.06**	**−0.06**	0.03	**−0.11**	−0.01	**0.49**	**1.00**

Pearson correlation coefficients appear in the lower diagonal. A bolded font indicates a statistically significant correlation at the 5% level. *Spread* is defined as the natural log of the amount a borrower pays the lender each year in basis points over LIBOR for each dollar borrowed; *Security* is an indicator variable coded 1 if the loan is secured by collateral, 0 otherwise; *AbsBTD* is the absolute value of book-tax differences for firm *i* in year *t* scaled by prior year total assets; *VarBTD* is the standard deviation of book-tax differences scaled by prior year total assets for firm *i* over the five-year period from year *t-4* to year *t*; *(Total)*, *(Perm)*, and *(Temp)* indicate whether *AbsBTD* and *VarBTD* are computed based on total, permanent, or temporary book-tax differences, respectively; *LoanSize* is the natural log of the loan facility amount for firm *i*; *Maturity* is the natural log of the loan term in months; *PerfPricing* is an indicator variable coded 1 if the loan has a performance pricing clause, 0 otherwise; *RVol* is the volatility of daily stock returns for firm *i* in year *t*; *CETR* is cash taxes paid scaled by pretax income for firm *i* in year *t*; *CreditRating* is measured as ordinal values based on the Compustat mnemonic SPLTICRM with values of 1 (AAA), 2 (AA+), 3 (AA), 4, (AA-), …, 20 (CC), 21 (D), 22 (SD) (see, e.g., Kisgen, 2009), measured as of the month of loan issuance; *CovenantV* is an indicator variable coded 1 if firm *i* experienced a covenant violation in the five-year period before the loan issuance date, 0 otherwise; *Restate* is an indicator variable coded 1 if firm *i* disclosed an accounting restatement in the five-year period before the loan issuance date, 0 otherwise; *Size* is the natural log of total assets for firm *i* in year *t*; *CapIntens* is net property, plant, and equipment scaled by total assets for firm *i* in year *t*; *Debt* is long-term debt (including short-term maturities) scaled by total assets for firm *i* in year *t*; *ZScore* is the modified Altman (1968)*Z*-score for firm *i* in year *t*, measured as (1.2(working capital) + 1.4(retained earnings) + 3.3(earnings before interest and taxes) + 0.999(sales)) / total assets; *ROA* is earnings before interest, taxes, depreciation, and amortization scaled by total assets for firm *i* in year *t*; *CFVol* is the standard deviation of quarterly cash flows from operations over the four fiscal years prior to the loan initiation year scaled by total debt for firm *i*; *MTB* is market value of equity plus book value of liabilities and preferred stock / total assets for firm *i* in year *t*; *Public* is an indicator variable coded 1 if firm *i* has issued public debt within five years of the loan issuance date, 0 otherwise; *CreditSpread* is the difference between the AAA corporate bond yield and the BAA corporate bond yield from the Federal Reserve Board of Governors; and *TermSpread* is the difference between the 10-year Treasury yield and the 2-year Treasury yield from the Federal Reserve Board of Governors.

that *do not* engage in high levels of tax planning. For high-tax-planning firms, our results generally indicate a *negative* relation between BTDs and loan costs. These findings are consistent with those of Ayers et al. (2010) and Kim et al. (2010) but are somewhat in contrast with the results of Hasan et al. (2014).[9] Specifically, the evidence suggests that high BTDs that *do not* stem from tax planning convey information about the firm that private lenders associate with higher risk, resulting in higher loan costs. On the other hand, private lenders do not appear to exhibit the same concerns toward high BTDs that likely stem from tax planning activities, even rewarding such high-tax-planning firms with lower loan contract costs. Consistent with Ayers et al. (2010), our findings indicate that BTDs contain risk-relevant information about a firm (e.g., earnings quality concerns) beyond tax avoidance.

4.3. The influence of high market share

Next we explore whether our main results vary according to lenders' experience and incentives to monitor a borrower. Specifically, we examine the influence of whether a loan facility financed by lenders with a high market share in the private loan market on the association between BTDs and loan costs. Lenders with high market share in the private loan market arguably have more incentive to monitor the borrower firm and react to risk-relevant issues via contract terms. Accordingly, we expect the relation between BTDs and private loan costs to be stronger where market share is high.

We test for this interaction by re-estimating the regression models shown in Table 4 with the addition of a variable identifying loan facilities with high market share (*HiShare*) and interactions between *HiShare* and the BTD variables. *HiShare* is an indicator variable coded 1 if a loan facility's lenders' total market share, calculated as the loan amount of all facilities financed by the lenders in year *t* divided by the loan amount of all facilities initiated in year *t*, is in the highest sample quintile in the applicable year, and 0 otherwise.

Panel B of Table 6 reports the results of this analysis, and we again omit control variables from the table for brevity. The results for *AbsBTD (Total)* and *VarBTD(Total)* are very similar to those reported in Table 4. Specifically, the coefficients on *AbsBTD(Total)* in both models are insignificant, while the coefficients on *VarBTD(Total)* are both significantly positive at the 0.01 level. These results indicate a positive relation between BTD variation, but not levels, and private loan costs for loan facilities *without* high market share.

The interactions between *HiShare* and the BTD variables provide evidence on the impact of high market share on these associations. *AbsBTD (Total)*HiShare* is positive in both models, albeit significantly so only in the *Security* model ($p < .05$). *VarBTD(Total)*HiShare* is significantly positive in both models, at least at the 0.05 level. Further, the combined coefficients on the interaction term and the corresponding BTD variable (untabulated), which represent the association between BTDs and private loan costs specifically for loan facilities with high market share, are significantly positive in all but the *Spread* model focusing on *AbsBTD*. These results generally indicate that the association between BTDs and loan costs becomes significantly positive, and more strongly so, where a high percentage of the total loan facility is provided by any one lender's syndicates. This evidence is consistent with lenders with higher stakes in a loan facility reacting more strongly to risk-relevant information contained in BTDs.

4.4. Summary

Overall, our results provide evidence that book-tax differences are positively associated with costs of private debt, specifically loan spreads

[9] To the extent that permanent BTDs are associated more with tax reporting/avoidance than with earnings quality issues (e.g., Frank et al., 2009; Wilson, 2009; Weisbach 2002), these results may also explain the negative coefficient on *AbsBTD(Perm)* in the *Spread* model in Panel A of Table 5.

Table 4
Industry, year, loan purpose, and loan type fixed effects regression results: Total book-tax differences.

	Dependent Variable									
	Spread					Security				
Independent Variables	**Coeff.**	**t-stat**		**Coeff.**	**t-stat**		**Coeff.**	**χ^2**		**Coeff.**	**χ^2**	
Intercept	6.875	38.54	***	6.801	37.97	***	1.642	3.44	***	1.414	2.94	***
Book-Tax Difference Variables												
AbsBTD (Total)	0.022	0.17					-0.197	-0.47				
VarBTD (Total)				0.675	4.51	***				2.023	4.16	***
Control Variables												
LoanSize	-0.018	-1.98	**	-0.020	-2.12	**	-0.038	-1.68	*	-0.042	-1.76	*
Maturity	-0.021	-1.25		-0.019	-1.15		0.137	3.27	***	0.144	3.42	***
PerfPricing	-0.055	-3.75	***	-0.052	-3.54	***	0.298	7.39	***	0.311	7.71	***
RVol	4.941	8.30	***	4.587	7.71	***	17.808	9.03	***	16.479	8.37	***
CETR	-0.009	-0.53		-0.007	-0.39		0.005	0.11		0.017	0.39	
CreditRating	0.009	5.84	***	0.010	6.08	***	-0.003	-0.62		-0.001	-0.33	
CovenantV	0.120	5.50	***	0.118	5.42	***	0.204	2.92	***	0.200	2.86	***
Restate	0.053	2.30	**	0.050	2.16	**	0.258	4.15	***	0.251	4.03	***
Size	-0.149	-15.76	***	-0.144	-15.11	***	-0.287	-11.45	***	-0.275	-10.84	***
CapIntens	-0.077	-2.01	**	-0.053	-1.37		0.053	0.49		0.125	1.14	
Debt	0.603	11.03	***	0.609	11.17	***	0.845	5.25	***	0.858	5.31	***
ZScore	-0.048	-5.44	***	-0.037	-4.10	***	0.015	0.60		0.050	1.94	*
ROA	-0.934	-7.78	***	-0.929	-7.75	***	-3.122	-8.24	***	-3.125	-8.06	***
CFVol	0.003	3.65	***	0.003	3.55	***	0.005	2.08	**	0.005	1.86	*
MTB	-0.134	-12.87	***	-0.141	-13.59	***	-0.054	-1.75	*	-0.076	-2.39	**
Public	0.025	1.02		0.025	1.01		0.159	2.62	***	0.160	2.63	***
CreditSpread	0.108	2.61	***	0.107	2.58	***	0.097	0.98		0.094	0.96	
TermSpread	0.062	2.46	***	0.064	2.55	***	0.090	1.26		0.097	1.36	
N	6,336			6,336			6,336			6,336		
F-stat.	139 ($p < 0.01$)			138 ($p < 0.01$)								
χ2							46 ($p < 0.01$)			46 ($p < 0.01$)		
R-squared (Adjusted)	0.607			0.607			0.295			0.295		

***, **, and * indicate significance for a two-tailed test at the 1%, 5% and 10% levels, respectively. Standard errors are clustered by firm and year. The dependent variables are *Spread* and *Security*. *Spread* is defined as the natural log of the amount a borrower pays the lender each year in basis points over LIBOR for each dollar borrowed; *Security* is an indicator variable coded 1 if the loan is secured by collateral, 0 otherwise; *AbsBTD* is the absolute value of book-tax differences for firm *i* in year *t* scaled by prior year total assets; *VarBTD* is the standard deviation of book-tax differences scaled by prior year total assets for firm *i* over the five-year period from year *t-4* to year *t*; *(Total)*, *(Perm)*, and *(Temp)* indicate whether *AbsBTD* and *VarBTD* are computed based on total, permanent, or temporary book-tax differences, respectively; *LoanSize* is the natural log of the loan facility amount for firm *i*; *Maturity* is the natural log of the loan term in months; *PerfPricing* is an indicator variable coded 1 if the loan has a performance pricing clause, 0 otherwise; *RVol* is the volatility of daily stock returns for firm *i* in year *t*; *CETR* is cash taxes paid scaled by pretax income for firm *i* in year *t*; *CreditRating* is measured as ordinal values based on the Compustat mnemonic SPLTICRM with values of 1 (AAA), 2 (AA+), 3 (AA), 4, (AA-), …, 20 (CC), 21 (D), 22 (SD) (see, e.g., Kisgen, 2009), measured as of the month of loan issuance; *CovenantV* is an indicator variable coded 1 if firm *i* experienced a covenant violation in the five-year period before the loan issuance date, 0 otherwise; *Restate* is an indicator variable coded 1 if firm *i* disclosed an accounting restatement in the five-year period before the loan issuance date, 0 otherwise; *Size* is the natural log of total assets for firm *i* in year *t*; *CapIntens* is net property, plant, and equipment scaled by total assets for firm *i* in year *t*; *Debt* is long-term debt (including short-term maturities) scaled by total assets for firm *i* in year *t*; *ZScore* is the modified Altman (1968)*Z*-score for firm *i* in year *t*, measured as (1.2(working capital) + 1.4(retained earnings) + 3.3(earnings before interest and taxes) + 0.999(sales)) / total assets; *ROA* is earnings before interest, taxes, depreciation, and amortization scaled by total assets for firm *i* in year *t*; *CFVol* is the standard deviation of quarterly cash flows from operations over the four fiscal years prior to the loan initiation year scaled by total debt for firm *i*; *MTB* is market value of equity plus book value of liabilities and preferred stock / total assets for firm *i* in year *t*; *Public* is an indicator variable coded 1 if firm *i* has issued public debt within five years of the loan issuance date, 0 otherwise: *CreditSpread* is the difference between the AAA corporate bond yield and the BAA corporate bond yield from the Federal Reserve Board of Governors; and *TermSpread* is the difference between the 10-year Treasury yield and the 2-year Treasury yield from the Federal Reserve Board of Governors.

and the likelihood of a security requirement. These effects present for both levels of and variation in BTDs and are driven by the temporary component of BTDs (vs. the permanent component).[10] Further, the effects related to levels of BTDs are driven by both positive and negative BTDs. In supplemental tests, we document that the positive relation between BTDs and costs of private debt applies only to firms that do not engage in heavy tax planning activities. Finally, we provide evidence that the relation between BTDs and loan costs is stronger where a lender has higher stakes in a total loan facility and thus has higher incentives to monitor and react to risk-relevant information.

Given the connection between BTDs, particularly temporary ones, and earnings quality documented in prior literature (e.g., Badertscher et al., 2009; Frank & Rego, 2006; Hanlon, 2005; Phillips et al., 2004, 2003), our main findings are consistent with BTDs raising concerns about earnings quality, resulting in increased assessments of borrower risk by lenders and thus higher borrowing costs. Our results also suggest that earnings quality-related concerns about risk are alleviated if the BTDs appear to reflect tax planning, consistent with recent evidence

[10] In an untabulated supplemental test, we find that our results relative to temporary BTDs are stronger for firms that are likely to have materially increased their deferred tax asset valuation allowance, according to the classification scheme introduced by Dhaliwal, Kaplan, Laux, and Weisbrod (2013). We leave a more detailed examination of the components of temporary BTDs most strongly associated with private debt costs to future research.

Table 5
Industry, year, loan purpose, and loan type fixed effects regression results: Permanent vs. temporary book-tax diffetences.

Panel A: BTD Levels and Volatility

	Dependent Variable: Spread				Dependent Variable: Security			
Independent Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**χ^2**	**Coeff.**	**χ^2**
Intercept	6.862	38.40 ***	6.777	37.60 ***	1.604	3.35 ***	1.432	2.96 ***
Book-Tax Difference Variables								
AbsBTD (Perm)	-0.224	-1.72 *			-0.075	-0.18		
AbsBTD (Temp)	0.786	5.22 ***			0.823	1.69 *		
VarBTD (Perm)			0.238	1.62			0.663	1.40
VarBTD (Temp)			0.798	4.38 ***			1.367	2.37 **
Control Variables								
LoanSize	-0.019	-2.12 **	-0.019	-2.04 **	-0.040	-1.71	-0.040	-1.69 *
Maturity	-0.018	-1.06	-0.019	-1.11	0.142	3.36 ***	0.144	3.41 ***
PerfPricing	-0.055	-3.74 ***	-0.052	-3.56 ***	0.301	7.46 ***	0.308	7.63 ***
RVol	5.010	8.43 ***	4.640	7.84 ***	17.576	8.97 ***	16.874	8.59 ***
CETR	-0.002	-0.15	-0.004	-0.22	0.014	0.32	0.017	0.38
CreditRating	0.009	5.86 ***	0.010	6.02 ***	-0.002	-0.57	-0.002	-0.44
CovenantV	0.120	5.45 ***	0.116	5.29 ***	0.201	2.88 ***	0.196	2.81 ***
Restate	0.055	2.40 **	0.051	2.23 **	0.260	4.18 ***	0.255	4.10 ***
Size	-0.148	-15.64 ***	-0.145	-15.25 ***	-0.285	-11.32 ***	-0.278	-11.03 ***
CapIntens	-0.084	-2.18 **	-0.053	-1.36	0.048	0.44	0.105	0.96
Debt	0.611	11.20 ***	0.620	11.36 ***	0.860	5.32 ***	0.881	5.45 ***
ZScore	-0.048	-5.52 ***	-0.039	-4.31 ***	0.021	0.86	0.040	1.56
ROA	-0.945	-7.83 ***	-0.952	-7.92 ***	-3.094	-8.08 ***	-3.148	-8.17 ***
CFVol	0.003	3.66 ***	0.003	3.50 ***	0.005	2.02 **	0.005	1.91 *
MTB	-0.134	-12.85 ***	-0.138	-13.37 ***	-0.061	-1.95 *	-0.068	-2.17 **
Public	0.025	1.02	0.024	0.97	0.161	2.63 ***	0.158	2.59 ***
CreditSpread	0.111	2.65 ***	0.111	2.69 ***	0.098	0.99	0.103	1.05
TermSpread	0.064	2.55 ***	0.064	2.53 ***	0.092	1.29	0.092	1.29
N	6,336		6,336		6,336		6,336	
F-stat.	139	(p < 0.01)	138	(p < 0.01)				
χ2					46	(p < 0.01)	46	(p < 0.01)
R-squared (Adjusted)	0.607		0.607		0.295		0.295	

Panel B: Positive vs. Negative BTDs

	Dependent Variable: Spread		Dependent Variable: Security	
Independent Variables	**Coeff.**	**t-stat**	**Coeff.**	**χ^2**
Intercept	6.845	38.29 ***	1.607	3.36 ***
Book-Tax Difference Variables				
PosBTD (Perm)	0.020	0.08	-0.506	-0.63
NegBTD (Perm)	-0.300	-1.64	-0.184	-0.33
PosBTD (Temp)	1.246	5.64 ***	1.263	1.88 *
NegBTD (Temp)	0.565	2.61 ***	1.049	1.98 **
Control Variables				
LoanSize	-0.019	-2.05 **	-0.041	-1.72
Maturity	-0.018	-1.10	0.142	3.36 ***
PerfPricing	-0.055	-3.79 ***	0.300	7.43 ***
RVol	5.099	8.52 ***	17.685	8.96 ***
CETR	0.001	0.04	0.016	0.35
CreditRating	0.009	5.92 ***	-0.002	-0.56
CovenantV	0.120	5.44 ***	0.200	2.85 ***
Restate	0.055	2.42 ***	0.261	4.20 ***
Size	-0.148	-15.65 ***	-0.284	-11.31 ***
CapIntens	-0.091	-2.34 **	0.041	0.38
Debt	0.613	11.21 ***	0.860	5.31 ***
ZScore	-0.049	-5.55 ***	0.021	0.83
ROA	-1.007	-8.06 ***	-3.105	-8.01 ***
CFVol	0.003	3.63 ***	0.005	2.01 **
MTB	-0.133	-12.71 ***	-0.058	-1.85 *
Public	0.024	0.96	0.159	2.61 ***
CreditSpread	0.110	2.66 ***	0.099	1.00
TermSpread	0.065	2.60 ***	0.093	1.31
N	6,336		6,336	
F-stat.	137	(p < 0.01)		
χ2			47	(p < 0.01)
R-squared (Adjusted)	0.606		0.296	

***, **, and * indicate significance for a two-tailed test at the 1%, 5% and 10% levels, respectively. Standard errors are clustered by firm and year. The dependent variables are *Spread* and *Security*. *Spread* is defined as the natural log of the amount a borrower pays the lender each year in basis points over LIBOR for each dollar borrowed; *Security* is an indicator variable coded 1 if the loan is secured by collateral, 0 otherwise; *AbsBTD* is the absolute value of book-tax differences for firm *i* in year *t* scaled by prior year total assets; *VarBTD* is the standard deviation of book-tax differences scaled by prior year total assets for firm *i* over the five-year period from year *t-4* to year *t*; *PosBTD* is an indicator variable coded 1 for observations with positive values of total BTDs, 0 otherwise; *NegBTD* is an indicator variable coded 1 for observations with negative values of total BTDs, 0 otherwise; *(Total)*, *(Perm)*, and *(Temp)* indicate whether *AbsBTD* and *VarBTD* are computed based on total, permanent, or temporary book-tax differences, respectively; *LoanSize* is the natural log of the loan facility amount for firm *i*; *Maturity* is the natural log of the loan term in months; *PerfPricing* is an indicator variable coded 1 if the loan has a performance pricing clause, 0 otherwise; *RVol* is the volatility of daily stock returns for firm *i* in year *t*; *CETR* is cash taxes paid scaled by pretax income for firm *i* in year *t*; *CreditRating* is measured as ordinal values based on the Compustat mnemonic SPLTICRM with values of 1 (AAA), 2 (AA+), 3 (AA), 4, (AA-), …, 20 (CC), 21 (D), 22 (SD) (see, e.g., Kisgen, 2009), measured as of the month of loan issuance; *CovenantV* is an indicator variable coded 1 if firm *i* experienced a covenant violation in the five-year period before the loan issuance date, 0 otherwise; *Restate* is an indicator variable coded 1 if firm *i* disclosed an accounting restatement in the five-year period before the loan issuance date, 0 otherwise; *Size* is the natural log of total assets for firm *i* in year *t*; *CapIntens* is net property, plant, and equipment scaled by total assets for firm *i* in year *t*; *Debt* is long-term debt (including short-term maturities) scaled by total assets for firm *i* in year *t*; *ZScore* is the modified Altman (1968)*Z*-score for firm *i* in year *t*, measured as (1.2(working capital) + 1.4(retained earnings) + 3.3(earnings before interest and taxes) + 0.999(sales)) / total assets; *ROA* is earnings before interest, taxes, depreciation, and amortization scaled by total assets for firm *i* in year *t*; *CFVol* is the standard deviation of quarterly cash flows from operations over the four fiscal years prior to the loan initiation year scaled by total debt for firm *i*; *MTB* is market value of equity plus book value of liabilities and preferred stock / total assets for firm *i* in year *t*; *Public* is an indicator variable coded 1 if firm *i* has issued public debt within five years of the loan issuance date, 0 otherwise: *CreditSpread* is the difference between the AAA corporate bond yield and the BAA corporate bond yield from the Federal Reserve Board of Governors; and *TermSpread* is the difference between the 10-year Treasury yield and the 2-year Treasury yield from the Federal Reserve Board of Governors.

that tax avoidance is generally seen by lenders as a credit-quality-enhancing activity (Kim et al., 2010). Finally, our findings indicate that BTDs contain risk-relevant information beyond tax avoidance.

4.5. Sensitivity analysis

We perform additional analyses (untabulated) to test the robustness of our main results to alternate model specifications.

4.5.1. Selection

Selection (or "selection bias") arises because firms are non-randomly assigned to outcomes. We observe the outcome and (some) variables correlated with that outcome, not the complete set of information that managers or market participants considered in arriving at that outcome. In our setting, selection may occur because managers' reasons to borrow with private debt are not completely observable. Based on the discussion in Tucker (2010), we use the Heckman (1979) two-step estimation approach to address the possibility that selection bias may be present in our results.

In the first step, based on Files and Gurun (2010), we estimate (using a probit model) the outcome of interest, whether or not a firm borrows funds with private debt, as a function of BTDs, firm size, leverage, cash levels, cash flow volatility, capital expenditures, market-to-book ratio, analyst following, institutional ownership, the stock exchange on which the firm is traded, and whether the firm has a credit rating. In the second step, we re-estimate the four equations shown in Panel A of Table 5 inserting the inverse Mills ratio from the first-step model into each one. *VarBTD(Perm)* becomes significantly positive ($p < .05$ and 0.10 in the *Spread* and *Security* models, respectively), but our inferences are unchanged overall. As such, our results appear to be unaffected by selection bias.

4.5.2. Other robustness tests

As previously discussed, the correlations among some of our control variables are high enough to warrant concern about collinearity issues in our data. Specifically, *LoanSize*, *Size*, and *CreditRating* are all very highly correlated with one another. To address these collinearity concerns, we re-estimate the four equations shown in Panel A of Table 5 omitting *LoanSize* and *CreditRating* (i.e., leaving only *Size* to represent all three). In a separate robustness test, we re-estimate the equations

Table 6
Industry, year, loan purpose, and loan type fixed effects regression results: Interactive effects of tax planning and high market share.

Panel A: Tax Planning

	Dependent Variable							
	Spread				Security			
Independent Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**χ^2**	**Coeff.**	**χ^2**
TaxPlan	0.176	6.06 ***	0.181	5.10 ***	0.478	4.62 ***	0.493	3.98 ***
Book-Tax Difference Variables								
AbsBTD (Total)	0.327	2.30 **			0.277	0.61		
AbsBTD (Total)*TaxPlan	-1.492	-5.60 ***			-2.769	-2.91 ***		
VarBTD (Total)			0.921	5.53 ***			2.377	4.44 ***
VarBTD (Total)*TaxPlan			-1.509	-4.80 ***			-3.200	-2.86 ***
Control Variables	Yes		Yes		Yes		Yes	
N	6,336		6,336		6,336		6,336	
F-stat.	134 ($p < 0.01$)		134 ($p < 0.01$)					
χ2					47 ($p < 0.01$)		47 ($p < 0.01$)	
R-squared (Adjusted)	0.601		0.622		0.281		0.289	
	Coeff.	**p-value**	**Coeff.**	**p-value**	**Coeff.**	**p-value**	**Coeff.**	**p-value**
AbsBTD (Total)+AbsBTD (Total)*TaxPlan=0	-1.165	0.00 ***			-2.492	0.00 ***		
VarBTD(Total)+VarBTD (Total)*TaxPlan=0			-0.588	0.04 **			-0.823	0.43

Panel B: High Market Share

	Dependent Variable							
	Spread				Security			
Independent Variables	**Coeff.**	**t-stat**	**Coeff.**	**t-stat**	**Coeff.**	**χ^2**	**Coeff.**	**χ^2**
HiShare	-0.028	-1.02	-0.056	-1.94 *	0.010	0.12	-0.086	-0.89
Book-Tax Difference Variables								
AbsBTD (Total)	-0.028	-0.21			-0.394	-0.92		
AbsBTD (Total)*HiShare	0.413	1.16			2.833	2.09 **		
VarBTD (Total)			0.551	3.52 ***			1.579	3.15 ***
VarBTD (Total)*HiShare			0.892	2.38 **			4.808	2.86 ***
Control Variables	Yes		Yes		Yes		Yes	
N	6,336		6,336		6,336		6,336	
F-stat.	134 ($p < 0.01$)		134 ($p < 0.01$)					
χ2					51 ($p < 0.01$)		51 ($p < 0.01$)	
R-squared (Adjusted)	0.605		0.607		0.287		0.289	

***, **, and * indicate significance for a two-tailed test at the 1%, 5% and 10% levels, respectively. Standard errors are clustered by firm and year. The dependent variables are *Spread* and *Security*. *Spread* is defined as the natural log of the amount a borrower pays the lender each year in basis points over LIBOR for each dollar borrowed; *Security* is an indicator variable coded 1 if the loan is secured by collateral, 0 otherwise; *AbsBTD* is the absolute value of book-tax differences for firm *i* in year *t* scaled by prior year total assets; *VarBTD* is the standard deviation of book-tax differences scaled by prior year total assets for firm *i* over the five-year period from year *t-4* to year *t*; *(Total)*, *(Perm)*, and *(Temp)* indicate whether *AbsBTD* and *VarBTD* are computed based on total, permanent, or temporary book-tax differences, respectively; *TaxPlan* is an indicator variable coded 1 if the cumulative GAAP or Cash ETR over the period from year *t-4* to year *t* is in the lowest quintile ranked by industry (2-digit SIC code) and year, 0 otherwise; GAAP ETR is the current tax expense divided by pre-tax book income less special items each summed over five-year period from year *t-4* to year *t*; Cash ETR is cash taxes paid divided by pre-tax book income less special items each summed over five-year period from year *t-4* to year *t*; and *HiShare* is an indicator variable coded 1 if the percentage of a total loan facility provided by any one lender's syndicates in year *t* is in the highest quintile in the applicable industry-year, 0 otherwise. Other control variables from Tables 4 and 5 are not reported here but are included in the models; results for the control variables are consistent with those reported in Tables 4 and 5.

reported in Panel A of Table 5 adding control variables to represent 1) intangible assets, 2) minority interest, 3) income reported under the equity method of accounting, 4) state income tax expense, and 5) net operating loss carryforwards. The purpose of this test is to ensure that our results are not driven by more non-discretionary components of BTDs (Frank et al., 2009). Finally, we re-estimate the equations reported in Panel A of Table 5 making (separately) two different changes to the model specification based on Hasan et al. (2014). First, we use lagged (i.e., year *t-1*) BTD measures. Second, we use the natural log of the total number of financial and governance covenants for the loan as an alternate measure of private debt costs (i.e., dependent variable). In this context, more stringent covenant requirements associated with a loan would equate to higher non-price costs of private debt. The results for all of these specification changes remain consistent with those reported in Panel A of Table 5.

5. Concluding remarks

This study examines whether book-tax differences (BTDs) are associated with private borrowing costs. Specifically, we examine whether total, permanent, and/or temporary BTDs relate to two separate proxies for private debt costs, interest rate spread and security requirements. We find that costs of private debt are generally increasing in the levels of and variability in temporary BTDs, but not permanent ones. We also find that the relation between BTDs and private debt costs holds for BTDs of both signs (i.e., positive and negative) and is stronger where lenders have especially high stakes in the private loan market (i.e., more experience and higher incentive to monitor). Further, our results suggest that tax planning impacts the association between BTDs and loan costs; the positive relation documented in our main results is mitigated for firms that engage in heavy tax planning activities.

Overall, our results are consistent with BTDs raising concerns about earnings quality, resulting in a perception on the part of lenders of increased borrower risk and thus higher borrowing costs. Our findings further indicate that earnings quality-related concerns about risk are alleviated if the BTDs are generated by a high-tax-planning firm. Notwithstanding recent research documenting (mixed) evidence of a direct link between tax avoidance, measured using BTD-based proxies, and private loan costs (Hasan et al., 2014; Kim et al., 2010), our study provides evidence in a private debt setting that BTDs contain risk-relevant information beyond tax avoidance itself.

Our findings on the interaction between book-tax differences and private debt costs contribute to our understanding of the role of tax and financial reporting in private debt contracting and to the growing literature examining the potential economic effects of the information (and related uncertainty) contained in BTDs. Our study extends and complements Ayers et al. (2010), which focuses on credit ratings (i.e., public debt). We provide evidence on the manner in which book-tax differences relate to costs of *private* debt, and together with Ayers et al. (2010), our results show that the information (and related uncertainty) contained in BTDs can impact debt markets on multiple dimensions.

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