The Information Content of Forgoing Tax Refunds: Evidence from Private Debt Contracts

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Abstract

In this study, we consider whether forgoing a tax refund in favor of carrying losses forward conveys information relevant to prospective lenders. We model the tax refund decision and provide evidence that lenders rationally infer that firms with higher expected future profits are more likely to carry forward losses, rather than carry losses back for an immediate tax refund. Firms that forgo tax refunds report higher future profits and receive lower borrowing costs than do firms that claim refunds after controlling for other factors that may influence tax refund decisions. These results are stronger in cases where there is greater information asymmetry between lenders and borrowers. More generally, our findings contribute to the literature on real corporate decisions as devices that credibly reduce information asymmetry about firms' future prospects.

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1. Introduction

Under the carryback provision of the U.S. Tax Code, a firm experiencing a net operating loss (NOL) in a given year and that paid income taxes in the preceding two years may claim a tax refund at that time. Eligible firms must either apply the loss to the carryback period and receive a tax refund or forgo the tax refund, in which case they may carry the loss forward to offset future taxable income. Recent studies document that a large proportion of firms eligible for tax refunds do not file claims for such refunds (Cooper and Knittel 2006; Edgerton 2010; Mahon and Zwick 2015) notwithstanding that the choice to delay the tax benefit of an NOL implies a lost return on interim investment. In this study, we consider whether forgoing a tax refund provides information relevant to prospective lenders as a contributing explanation for such decisions.

Specifically, we propose that a consideration in decisions whether to claim a tax refund is the private information about expected future profitability that forgoing a tax refund may credibly convey to lenders in subsequent syndicated debt offerings. The choice not to carry back NOLs implies an opportunity cost of delay in present value terms associated with carrying NOLs forward against future profits[1], and potential loss of tax benefits should future profits prove insufficient to absorb such losses. These costs are likely to be decreasing in expected future profitability, thereby providing firms with private information of higher expected future profitability as a means of separating from firms with lower expected future profitability in an endeavor to obtain better future borrowing terms from lenders.[2]

A setting in which firms are financially distressed as evidenced by recent NOLs is especially well suited in terms of incentives by those with private information of higher than

[1] In this regard, Dobridge (2015) finds that firms apply an important fraction of tax refund dollars to new investments; investments that might not be made in the absence of a refund.

[2] If there are no costs, low profit borrowers can always mimic the actions/communications of high profit borrowers.

average expected future profitability to find some means of credibly conveying that information to prospective lenders in order to reduce agency costs and obtain more favorable borrowing terms. In this regard, Chen et al. (2011) find that expectations of future profitability are not likely to be discernible from the limited disclosures that typically accompany NOLs suggesting that publicly available information may be insufficient to resolve information asymmetries. Although other means of establishing credibility may be present,[3] firms experiencing NOLs are unique in the availability of the tax refund decision as a potential credible communication device.

Apart from a financial signaling incentive, firms may choose to forgo tax refunds from carrying back NOLs to avoid disallowance of investment tax credits (Maydew 1997) or other costs associated with IRS scrutiny of past tax filings should the implied loss exceed the opportunity cost of delay by instead carrying NOLs forward. [4] Holding exposure to loss of investment tax credits and related IRS scrutiny constant across firms with NOLs, firms with lower expected future profitability may nonetheless choose to reveal their type by taking a tax refund given the greater prospect of insufficient future profits to absorb NOLs if carried forward. Another factor could be a higher implicit interim return on a refund from meeting liquidity needs when financially constrained by firms with lower expectations. [5] However, while financial constraints might explain why certain firms claim tax refunds, it does not explain why other firms forgo tax refunds.

Whether signaling higher expected future profitability, avoiding loss of investment tax credits and greater IRS scrutiny, or less severe financial constraints contribute to a decision to forgo an immediate tax refund, lenders may rationally infer that eligible firms forgoing a tax refund

[3] One possibility for establishing credibility is relationship banking, a feature that we later consider in our cross-sectional tests.

[4] In our empirical tests, we assume that costs associated with IRS scrutiny are relatively minor compared to investment credits at risk.

[5] Another possible explanation for not taking a tax refund is confusion about provisions of the IRS Tax Code related to firm size or complexity (Mahon and Zwick 2015). We control for these potential influences in our empirical tests.

are more likely to have higher expected future profitability leading to a lower cost of debt.[6] We employ a simple model to distinguish conditions consistent with signaling, cost avoidance, or interim return as factors in tax refund decisions. The model provides for type-dependent opportunity costs of forgoing a tax refund related to future profitability and endogenously derived loan spreads that may or may not exceed those costs. As described below, we find empirical support for tax refund decisions that serve to signal higher future profitability, avoid disallowance of investment tax credits, or meet liquidity needs when financially constrained.

We base our tests on a sample of all publicly traded firms that became eligible to carryback NOLs and subsequently issued new loans in the syndicated loan market between 1987 and 2012. To be eligible for a tax refund, a firm must experience a net operating loss and have paid taxes during the carryback period in the U.S. We assume that firms file a claim if they receive a tax refund in the year following the loss year and identify firms claiming a tax refund as those that disclose a negative tax payment to tax authorities in their financial statements.[7] The syndicated loan market is the primary source of financing for corporations possibly facing financial distress (Rauh and Sufi 2010), as is generally the case for most firms eligible to claim a tax refund. Moreover, compared to the cost of capital measures available for equities, the debt market setting allows for a relatively clean and observable measure of the cost of capital in the form of loan spreads at contract initiation.

We first test the adequacy of our measure of tax refunds by relating it to the business cycle. We observe that the percentage of firms claiming a tax refund spiked as did the dollar amounts

[6] In addition to higher future profitability considerations, lenders might prefer firms that forgo tax refunds because carrying the NOL forward will reduce tax payments during the life of the loan and, therefore discipline firms against alternative uses of cash if received earlier as a tax refund.

[7] Since 1987, firms are required to provide a supplemental cash flow disclosure about the amount of taxes paid to or received from tax authorities. To avoid concerns that the tax refund is attributable to foreign operations, we exclude from the analysis all observations with a negative current foreign tax expense in the NOL year.

claimed following the 2001 and 2008 financial crises, consistent with firms claiming tax refunds when losses were more prominent, suggesting that our measure of tax refunds is reasonable, as it related to periods of losses and liquidity needs. Next, we examine the determinants of the tax refund decision. We find that eligible firms that have significantly higher future U.S. taxable income, pretax income, and return on assets up to four years after the refund decision are more likely to forgo the refund after controlling for past performance and liquidity that might distinguish future firm prospects and other factors that might induce firms to forgo a refund. Consistent with Maydew (1997) and Mahon and Zwick (2015), we also find that proxies for investment tax credits, firm complexity, and financial constraints affect the likelihood of claiming a refund. Next, we examine whether eligible firms forgoing the tax refund obtain lower loan spreads on new borrowings in the syndicated loan market than do those that take the tax refund, having controlled for other characteristics that might affect tax refund decisions or loan spreads. We find that firms forgoing a tax refund on average pay a 8.6% lower loan spread than do firms claiming a tax refund. For the average loan, the decrease in the loan spread implies a decrease of $0.5 million in annual interest payments.[8] Moreover, the R-Squared of 59.3%, suggests that the explanatory power of the regression including the tax refund variable increases by 12.7%, which is quite remarkable.

We enhance our tests of differential borrowing costs associated with the tax refund decision by partitioning the sample into high and low information asymmetry firms. Following Sufi (2007), we employ the below median number of previous relationships with lenders in the syndicated loan market, non-existence of a credit rating, and engagement in research and development activities as indications of high asymmetry. Consistent with the tax refund decision as a communication device, we find stronger results in loan spreads for the high asymmetry subsample. As a further

[8] As discussed below, the additional cost associated with higher loan spreads could be an underestimate given the implicit costs of more restrictive covenants.

indication of differential borrowing costs associated with the tax refund decision when information asymmetry is high, we expect and find stronger results for multinational firms given their complexity and less transparent tax situations (Balakrishnan, et al. 2013) than for domestic firms.

To further control for differences in financial constraints as a factor affecting opportunity costs of delay in obtaining a tax refund, we add a measure created by Whited and Wu (2006) to the set of independent variables in explaining loan spreads. We also insert controls for book-tax differences, accounting conservatism, or valuation allowances for deferred tax assets, factors that could affect the interpretation of our results. Our results are qualitatively unchanged. To further reduce concerns related with not having access to actual tax return information, we only classify firms as forgoing a tax refund if their balance of net operating losses increases in the loss year and find similar results. Consistent with a greater value of a tax refund for firms with lower expected future profitability, we find that borrowing costs are increasing in the magnitude of the tax refund. As well, contracts for firms receiving refunds tend to include a greater number of restrictive covenants and collateral requirements than for firms not receiving tax refunds, implying a further implicit cost of borrowing by constraining managerial decisions.

While in our previous tests we control for a large set of factors that might account for differences between firms claiming tax refunds and those forgoing tax refunds, we cannot fully rule out that borrower type specific omitted correlated variables might drive our results. To further mitigate this concern, we also use a firm fixed effects specification, which allows us to hold the borrower type constant. To do so, we expand our sample by comparing the outcomes of the tax refund decision to those of all other loans issued by the same borrower. We expect and find that when borrowers claim tax refunds that they will incur higher loan spreads than when borrowers forgo tax refunds relative to all other loans issued by the same borrower although this result is only statistically significant for when the borrower claims a tax refund.

Broadly speaking, our study contributes to the literature that investigates information conveyed by real corporate decisions to outside investors (e.g., Ross 1977; Bhattacharya 1979; Myers and Majluf 1984; Miller and Rock 1985; and Welch 1989). In particular, our finding that forgoing a tax refund by otherwise similar firms *ex ante* is significantly associated with higher *ex post* profitability and lower loan spreads in the syndicated loan market is consistent with a communication role of tax refund decisions; i.e., decisions that have real effects as a communication device. Our paper also contributes to the tax literature as we model several factors affecting the tax refund decision including a communication role as a new explanation for why firms do not claim tax refunds. Finally, we address the call in Christensen, Nikolaev, and Wittenberg-Moerman (2016) to conduct theory based debt contracting research.

We organize the remainder of this paper as follows: Section 2 reviews prior literature and institutional details. Section 3 provides a model formalizing the communication roles that a tax refund may play. Section 4 presents the research design and sample. Section 5 discusses the empirical results. Section 6 concludes.

2. Prior literature and institutional background

2.1. Information content of tax-related decisions and related research

Among theoretical studies suggesting that credible tax-related decisions provide valuable information (i.e., signals) about firms' future prospects, Bhattacharya (1979) assumes that outside investors have imperfect information about firms' profitability and that cash dividends are taxed at a higher rate than capital gains. He shows that under these conditions, dividends function as a signal of expected cash flows. Hughes and Schwartz (1988) consider how the loss of tax savings through the choice of FIFO rather than LIFO methods of inventory valuation by firms with favorable price relevant private information can credibly signal their type. Williams, Hughes and

Levine (2010) show how an asymmetry in the tax implications of capital gains and losses may serve as a communication device.[9]

Directly pertaining to tax refund decisions, Maydew (1997) and Erickson el al. (2013) provide evidence that firms have incentives to shift income in order to maximize the loss in the NOL year, which could explain a concern for greater IRS scrutiny for firms filing for a tax refund. Dobridge (2015) studies whether fiscal stimulus policies implemented in the two previous recessions incentivize investment and improve firms' financial conditions. She finds that after passage of the 2002 policy, firms allocated an important fraction of tax refund dollars to investment. Although she concludes that the 2009 policy had no discernable effect on investment, it did reduce firms' bankruptcy risk and the probability of a future credit rating downgrade. Bethmann et al. (2016) expand the inquiry to a European setting and find that a less asymmetric treatment of tax losses via loss carrybacks increases loss firms' investments.

A number of prior studies have investigated the frequency with which eligible firms claim their tax refunds. Cooper and Knittel (2006) use tax return data from 1993–2003 and measure how U.S. corporations use tax losses over time. They find that for most tax years, only approximately 10-15% of losses generated in a given year are carried back for a tax refund. Edgerton (2010) corroborates this evidence by showing that a large fraction of realized losses by U.S. firms expire unused or remain unused for many years. Mahon and Zwick (2015) extend this evidence finding that only 37% of eligible firms claim their refund and that a cost-benefit analysis of the tax loss choice alone cannot explain the low take-up rate.

[9] Other commitment devices for signaling firms' types to financial markets include the following: Capital structure (Ross, 1977), ownership retention (Leland and Pyle, 1977), investment strategies requiring outside financing (Myers and Majluf, 1984), dividend policy (Miller and Rock, 1985), convertibles strategy (Harris and Raviv, 1985), accounting disclosures (Hughes, 1986), underpricing of IPOs (Welch, 1989), and audit quality (Titman and Trueman, 1988 and Datar et al., 1991).

2.2. U.S. tax code

In any given year, a firm sustains a net operating loss (NOL) for tax purposes when its allowable tax deductions exceed gross income. Under section 172 of the Internal Revenue Code, these losses provide benefits in two ways. One way is to offset taxable income in either of the prior two years, for which the firm receives a tax refund.[10] Alternatively, if the firm does not have positive taxable income in the prior two years or elects not to use its carryback, it can carry the loss forward for up to twenty years as an offset to future taxable income, [11] thereby lowering its tax payments at some point in the future.[12]

Throughout the sample period, Congress enacted legislation changing the lengths of the NOL carryback window. The Tax Reform Act (TRA) of 1997 reduced the NOL carryback period from three to two years and increased the NOL carryforward period from 15 to 20 years. The Job Creation and Worker Assistance Act of 2002 (JCWA) was signed into law in early March 2002, allowing firms to carryback losses incurred in tax years 2001 and 2002 for five years instead of the usual two. As part of The American Recovery and Reinvestment Act of 2009 (ARRA), Congress extended the carryback window for losses incurred in tax year 2008. This policy was limited to small businesses, i.e., those with less than an average of $15 million in gross receipts per year over the previous three years. In September 2009, Congress passed the Worker, Homeowner, and Business Assistance Act of 2009 (WHBA) to extend the five-year carryback window in November 2009 to allow the carryback to apply to all firms.[13]

[10] A firm claims the carryback by filing either Form 1139 or Form 1120X. To remain eligible for the carryback, the firm must file within three years of the due date (plus extensions) of the tax return where it reports the loss.

[11] To use an NOL carryforward firms enter the amount of deduction they would like to take on line 29 of form 1120 when they file their tax returns. Firms keep track of their NOL carryovers and report the total on Schedule K of IRS Form 1120.

[12] The firm can elect to forgo irrevocably the carryback and fully carryforward the loss when it files its income tax return.

[13] The carryback extension could only be applied to either 2008 losses or 2009 losses, not both. The exception was for firms that qualified for the policy under the ARRA. These firms were allowed to apply the extension to both years. Firms were only allowed to apply 50% of taxable profits in the earliest year of the extension window to the policy.

2.3. The syndicated loan market

The syndicated loan market is a primary source of financing for corporations (Gorton and Winton 2003). Since the late 1980s, this market has experienced exponential growth (Sufi 2007; Wittenberg and Moerman 2008). Members of a syndicate fall into one of two groups, lead arrangers and participant lenders. The lead arranger, or lead arrangers, take(s) on the primary information collection and monitoring responsibilities (see Sufi (2007) and Standard & Poor's (2014) for more details about due diligence at loan inception). The lead arranger and the borrower negotiate an information memorandum that includes the list of terms and conditions describing the pricing, structure, collateral, covenant package, and other terms of credit. Final terms are detailed in credit and security agreements (Standard & Poor's 2014).

3. Model

We present a parsimonious model to illustrate factors that come into play regarding an eligible firm's decision whether to forgo a tax refund. The principal though not exclusive tension of interest in the model is between net benefits that may come from a tax refund and borrowing costs set by competitive lenders. By taking the tax refund, a firm gains an interim return and avoids the prospect of insufficient future profits to absorb losses if carried forward rather than back. However, taking the refund may expose the firm to costs associated with disallowance of investment tax credits and greater IRS scrutiny. Holding those costs constant, we identify conditions under which firms with private information of higher expected future profits signal their type by forgoing a tax refund in favor of carrying NOLs forward in order to lower interest rates. Alternatively, we identify conditions under which firms with lower expected future profits reveal

Also, firms that received assistance under the Troubled Asset Relief Program (TARP) were excluded from participating.

their type notwithstanding potential costs of taking the refund due to higher opportunity costs of delay in the form of an interim return on a tax refund.

We assume that there are two types of risk neutral firms eligible for a tax refund, $\theta \in \{l, h\}$ where $\theta = l$ and $\theta = h$ denote firms with private information of low and high future profits, respectively. For exogenous reasons firms seek to finance new investment by raising capital $k > 0$ from risk neutral lenders.[14] Future profits may be high x_2 or low x_1 ($x_2 > x_1$), where for simplicity we normalize x_1 =0. Hence, if a firm forgoes a tax refund, then shareholders only realize a tax benefit of carrying NOLs forward when the outcome is x_2. The conditional probabilities of a high outcome given firm type are $\pi_h = \Pr(x_2 \mid \theta = h) > \Pr(x_2 \mid \theta = l) = \pi_l; \pi_h, \pi_l \in (0,1)$. Common prior probabilities of the firm's type are $p(h) = p, p(l) = (1-p), p \in (0,1)$. The firm's action choice $a \in \{I, D\}$ is to either immediately file for a tax refund ($a = I$), or delay tax benefits by carrying NOLs forward ($a = D$). We model the net benefit to firm shareholders as $B_\theta(a)$, where $B_\theta(I) = R(1+r_\theta) - C; B_\theta(D) = R\pi_\theta$,[15] where R is the tax refund, r_θ is a type-dependent rate of return on amounts received as a refund and C is a cost associated with the loss of investment tax credits and greater IRS scrutiny independent of firm type.[16] The type dependency of r_θ allows for a larger implied return by a firm in greater need of liquidity from a tax refund in light of lower expected future profitability; i.e., a greater opportunity cost associated with delay.

[14] This assumption ignores the prospect of financing new investment in part through the proceeds from a tax refund. The effect of reducing the borrowing requirements would diminish the incentive for a low-type firm to mimic firms choosing to forgo the tax refund as a signal of a high type similar to the effect captured by an allowance for a greater rate of return on reinvestment of a tax refund for a low type than for a high type assumed below.

[15] The assumption that shareholders realize the full tax refund when claiming it can be relaxed to allow lenders to extract a portion of tax refund upon default. As it stands in the model, lenders cannot recover more than the cash flows from the project outcome.

[16] Although we have no evidence that this cost depends on type, it may plausibly be greater for firms with lower expected future profitability. If so, then this would enhance the incentives for such firms to forgo the tax refund thereby diminishing the incentive for taking the tax refund; empirically a conservative bias.

Competitive lenders providing the capital k for implementing a firm's project observe whether the firm claims a tax refund and accepts or rejects an offer with a maturity value V based upon their posterior belief about the firm's type, $\phi_\theta(a,V,p) = \Pr(\theta \mid a,V,p) \in [0,1], \theta \in \{l,h\}$. The lenders' reservation dollar return is $K = k(1+r)$. We assume that the project is always financed; i.e., $x_2\pi_l > K$ must hold.[17]

The firm's problem in maximizing expected future profits (cash flows) for $\theta \in \{l,h\}$, subject to meeting the lender's required return, is as follows:

$$\begin{aligned} &Max(x_2 - V)\pi_\theta + B_\theta(a) \\ &a \in \{I,D\}, V \\ &ST: V\left(\pi_h\phi_h(a,V,p) + \pi_l\phi_l(a,V,p)\right) \geq K \end{aligned}$$

Imbedded in the above objective function and constraint is the implication from our assumptions that the firm defaults only upon realization of a low future cash flow.

We conjecture that there exists a set of values for parameters such that, in equilibrium, a low type firm takes a tax refund and a high type firm forgoes a refund and carries NOLs forward. Suppose that lenders infer the firm is a low type if they observe a tax refund $a = I$ and receive an offer of a maturity value that meets their required return for that type $V_l = K/\pi_l$; i.e., $\phi(l \mid a = I, V = V_l, p) = 1$. Alternatively, lenders infer a high type if they do not observe a tax refund $a = D$ and receive an offer of a maturity value that meets their required return for that type

[17] Note that this assumption is consistent with our requirement that sampled firms obtain loans following tax refund decisions.

$V_h = K/\pi_h$; i.e. , $\phi(h \mid a = D, V = V_h, p) = 1$. [18] Substituting for maturity value in the firm's objective function for each type, we obtain

$$E[B_l(I) - V_l] = R(1+r_l) - C + \left(x_2 - \frac{K}{\pi_l}\right)\pi_l \tag{1}$$

$$E[B_h(\mathrm{D}) - \mathrm{V}_h] = \left(x_2 + R - \frac{K}{\pi_h}\right)\pi_h \tag{2}$$

for low and high types, respectively.

Sufficient conditions for a low type to prefer claiming a tax refund and the high type to delay tax benefits are as follows:

$$R(1+r_l) - C - R\pi_l \geq \left(\frac{K}{\pi_l} - \frac{K}{\pi_h}\right)\pi_l = K\left(\frac{\pi_2 - \pi_1}{\pi_2}\right) \tag{3}$$

$$R(1+r_h) - C - R\pi_h \leq \left(\frac{K}{\pi_l} - \frac{K}{\pi_h}\right)\pi_h = K\left(\frac{\pi_2 - \pi_1}{\pi_1}\right) \tag{4}$$

The inequality in (3) implies that a lower cost of debt as reflected by a lower maturity value ($K/\pi_h < K/\pi_l$) from attempting to mimic a high type by choosing to carry NOLs forward is less than the difference in net benefits ($R(1+r_l) - C - R\pi_1$) from claiming a tax refund immediately rather than delaying receipt of a tax benefit. The inequality in (4) implies that a lower cost is greater than the difference in net benefits $R(1+r_h) - C - R\pi_h$ from claiming a tax refund. Observe that the left-hand side of the inequality in (3) is strictly greater than the left-hand side of the inequality in

[18] The prior probabilities of types play no role in the separating equilibrium that follows from our analysis below. However, they would be relevant in establishing conditions under which a pooling equilibrium may exist.

(4) and the reverse is true for the right-hand sides of those inequalities, hence, we have the following proposition:[19]

Proposition 1:[20]

For values of parameters that satisfy the inequalities in (3) and (4) for low and high types, respectively, a separating equilibrium exists in which a low type firm claims a tax refund by carrying NOLs back, a high type firm delays claiming a tax benefit by carrying NOLs forward, and lenders accept the contract maturity value offered by each type.

The inequalities in (3) and (4) could hold irrespective of a difference in future borrowing costs, given that the potential loss of investment tax credits is less than the difference in benefits of an immediate tax refund and carrying NOLs forward for a low type, but not for a high type ($R(1+r)-R\pi_l > C > R(1+r)-R\pi_h$). In this case, the tax refund decision still reveals firm type to prospective lenders in advance of a debt offering. In both cases, signaling by a high type versus revelation by a low type, we should observe higher borrowing costs for firms taking the refund than for firms electing instead to carry NOLs forward.

The above analysis formalizes the arguments for our principal hypotheses:[21]

[19] Parameterizations may exist in which pooling could occur in equilibrium. Such cases would contribute a conservative bias to our later empirical tests.

[20] The equilibrium in Proposition 1 satisfies the Cho and Kreps' (1987) "Intuitive Condition"; i.e., there does not exist a defection from the proposed equilibrium action and debt contract by either type such that lenders accept the contract if offered by the worst type that would be better off than under the equilibrium contract. Lenders would not accept a contract that offered less than a maturity value of V_h and neither type of firm would offer a contract with a greater maturity value than V_l. If either type were to offer a contract with a maturity value less than V_l and greater than V_h while filing for a tax refund, the low type would be better off and lenders would not accept that contract if offered by the low type.

[21] We leave it to our empirical tests to distinguish between signaling or revelation through a refund decision as explanations for the informational content of such decisions.

Hypotheses: *Firms eligible for tax refunds under the carryback provisions of the US Tax Code choosing not to take the tax refund have (1) relatively higher expected future profitability, (2) face greater exposure to costs associated with disallowance of the investment tax credit,[22](3) are less financially constrained, and (4) obtain lower loan spreads.*

4. Research design

4.1. Timeline

All firms in the sample experience a U.S. tax loss in fiscal year t-1 (e.g., 2010) and are eligible to claim a tax refund. The receipt of the refund usually happens in the following fiscal year and is detectable from the firm's supplemental cash flow disclosure in fiscal year t (e.g., 2011).[23] Firms forgoing their tax refunds in year t-1 will be able to offset taxable income starting in year t. Accordingly, we measure future profitability starting in fiscal year t (e.g., 2011) up to year t+3. Finally, loans are issued and interest rates are set after lenders observe the receipt of the tax refund in fiscal year t (e.g., 2011).

4.2. Tax refund

We classify firms as claiming a tax refund if they receive a net annual payment from tax authorities in the year following a tax loss year. Following Dyreng et al. (2008), we rely on tax payments because they are less subject to managerial discretion than information inferred from the GAAP tax expense account.[24] In particular, *Tax Refund* is a dummy variable equal to one for firms

[22] We assume that costs of greater IRS scrutiny are either negligible or proportional to the investment tax credits.

[23] Conversations with practitioners suggest that this assumption is reasonable. For instance, a firm with a December 31st, 2010 fiscal year end will file its tax return and claim a tax refund by mid-April 2011 and most likely receive the cash inflow during fiscal year 2011. We acknowledge that firms could make their tax refund decisions at a later point. However, it is likely that firms in need of a cash infusion will claim their tax refunds as soon as possible.

[24] Theoretically, it would be possible to infer the tax refund decision based on whether the firm records a negative current federal tax expense in the NOL year. Unfortunately, firms have incentives to manage their tax expenses (Guenther 1994; Gleason and Mills 2002; Miller and Skinner 1998; Schrand and Wong 2003; Dhaliwal et al. 2004). For instance, 10% of the firms that have a non-negative current federal tax expense in year t-1 actually disclose the receipt of a tax refund in year t (same result holds when restricting the sample to domestic only firms). As a result, a negative current federal tax expense is an unreliable proxy for whether a firm actually claims a tax refund.

that disclose negative taxes paid in their financial statements.[25] We acknowledge that our classification may not correctly capture certain firms that receive a U.S. tax refund but that are sufficiently profitable (either domestically or internationally) in the year following the NOL year such that taxes net of a refund are still positive. Unfortunately, public tax disclosures are too limited (Gleason and Mills 2002; Hanlon 2003; Mills et al. 2003) to rule out this possibility. However, to the extent that banks correctly infer the tax refund decision of these firms, this would bias against finding the results presented in the paper.

4.3. The decision to claim a tax refund and future profitability

To test whether firms that expect higher future profitability are more likely to forgo the tax refund and firms that expect lower future profitability are more likely to claim a tax refund, we estimate the following:

$$Tax\ Refund_{it} = \gamma_1 Future\ Profitability_{\ it,t+2} + \Sigma\gamma_c Control_{cit-1} + \gamma_{fe} + \varepsilon_{it} \qquad (5)$$

We use three different proxies to measure *Future Profitability* as a proxy for expectations: Based on previous studies (e.g., Shevlin 1990; Kim and Graham 2009; Blouin et al. 2010), we employ U.S. taxable income in years t to t+2 calculated according to Dobridge (2015) and scaled by total assets in year t-1 (*Future U.S. Taxable Income*).[26] The other measures are pretax income in years t to t+2 scaled by total assets in year t-1 (*Future Pretax Income*) and net income in years t to t+2 scaled by total assets in year t-1 (*Future ROA*). We include the following controls for other factors that might influence the tax refund decision:

[25] Since 1987, firms are required to provide a supplemental cash flow disclosure about the amount of taxes paid to or received from tax authorities.

[26] Using alternative profitability windows yields qualitatively similar results. For example, in Table 4 we present results using a profitability window that spans years t to t+3.

1. *Lagged Tax Credits* are the accumulated tax deferrals of investment tax credits generated by new capital investments disclosed on the firm's balance sheet in year t-1 as a percentage of total assets in year t-1. We expect that claiming a tax refund could be costly in terms of losing previously taken investment tax credits.[27]
2. *Lagged Size* is the logarithm of total assets in year t-1. Mahon and Zwick (2015) suggest that larger firms are better equipped to deal with the complexities of the tax refund decision. We expect that larger firms will better understand the intricacies of the tax law and claim their tax refunds.
3. *Lagged Profitability* is equal to pre-tax income in year t-1 scaled by total assets in year t-1. We expect that firms with lower profitability are more likely to be financially constrained implying a higher return on the tax refund.
4. *Lagged Cash ratio* is equal to cash in year t-1 scaled by total assets in year t-1. Similar to 3 above, we expect that firms with higher cash ratios are less likely to need a cash infusion from the tax refund.

Finally, γ_{fe} is a set of fixed effects. We include year fixed effects to account for crisis periods, which might affect the likelihood of claiming a tax refund. Moreover, we control for industry fixed effects to account for the fact that different industries might have different tax incentives. Our prediction from estimating (5) is that $\gamma_1 < 0$, indicating that firms that expect lower future profitability are more likely to claim a tax refund.

4.4. Cost of debt

[27] We acknowledge that this is a rough proxy given that we do not observe the borrower's tax returns. It relies on firms having chosen the reserve method of accounting for the investment tax credit that need not be the case for all sample firms. Moreover, measurement of credit-based incentives is dampened by the reserve method.

To test whether forgoing (taking) a tax refund is associated with lower (higher) interest rates at the time that firms issue new loans, we estimate the following:

$$Log(Loan\ Spread)_{it} = \beta_1 Tax\ Refund_{\ it} + \Sigma\beta_c Control_{cit} + \beta_{fe} + \varepsilon_{it} \quad (6)$$

Loan Spread is the all-in spread drawn as provided in the DealScan database. All-in spread drawn is defined as the amount the borrower pays in basis points over LIBOR or the LIBOR equivalent for each dollar drawn down (e.g., Graham et al. 2008).[28] This measure adds the borrowing spread of the loan over LIBOR to any annual fee paid to lenders. Our prediction is that β_1>0, consistent with lenders viewing firms that claim tax refunds as having lower expected future profits than firms that forgo tax refunds.

The specification includes controls for several variables previously shown to affect loan spreads (e.g., Graham et al. 2008) and/or that might affect the tax refund decision:

1. *Size* is the logarithm of total assets in year t. We expect that larger firms are likely to receive better terms from banks because such firms have easier access to external financing.
2. *Tangibility* is property, plant, and equipment (PP&E) in year t scaled by total assets in year t. We expect that tangible assets are easier to employ as collateral for new loans.
3. *Leverage* is long-term debt plus debt in current liabilities in year t divided by total assets in year t. We expect that higher levered firms are likely to have higher default risk.
4. *Stock Return* is the logarithm of one plus the raw stock return during year t. We expect that firms with higher returns have lower costs of debt.
5. *Profitability* is pre-tax income in year t scaled by total assets in year t. We expect that firms with higher profitability are likely to receive more favorable loan terms.[29]

[28] For loans not based on LIBOR, DealScan converts the spread into LIBOR terms by adding or subtracting a differential that is adjusted periodically.

[29] Using either return on assets or U.S. taxable income as alternative measures of profitability yields similar results.

6. *Lagged Profitability* is pre-tax income in year t-1 scaled by total assets in year t. This variable controls for the borrower's profitability during the NOL year.
7. *Market-to-Book* is the ratio of the market value of equity plus the book value of liabilities in year t to total assets in year t. We expect that firms with a higher ratio have better growth opportunities.
8. *Tax Credits* the accumulated tax deferrals of investment tax credits generated by new capital investments disclosed on the firm's balance sheet in year t as a percentage of total assets in year t. We expect that firms with more tax credits are likely to have higher future profitability
9. *Cash Flow Volatility*. Following Sufi (2009), this is the standard deviation of annual changes of EBITDA over a four-year lagged period, scaled by average non-cash assets in the four-year lagged period. We expect that firms with higher volatility are riskier.
10. Altman's *Z-score* is an additional proxy for default risk. We use a modified Altman (1968) Z-score as in Graham et al. (2008). In particular, Z-score=1.2 (Working Capital/Total Assets) + 1.4 (Retained Earnings/Total Assets) + 3.3 (EBIT/Total Assets) + (Sales/Total Assets). All variables are from year t. We expect that firms with lower Z-scores have a higher probability of default.
11. *Sales Growth* is the growth rate of sales in year t, an additional variable to control for growth opportunities.

The specification also controls for loan characteristics previously shown to affect the pricing of debt: *Loan Maturity* is measured in months. Banks charge higher interest rates for longer duration loans. *Loan Amount* in millions is the loan facility amount. Banks can achieve economies of scale when lending larger amounts. *Syndication* is a dummy variable equal to one if the loan is syndicated to multiple lenders, zero otherwise. β_{fe} is a set of fixed effects that includes industry,

year, loan type, loan purpose, and credit rating. *Loan Type* is a set of controls for the type of loan, including term loans, revolving loans, 364-day facilities, institutional investors, etc. *Loan Purpose* is a set of controls for loan purpose, including takeover, working capital, etc. Finally, credit rating fixed effects control for the borrower's S&P senior debt rating (e.g., AAA, AA, A, etc.). The appendix provides detailed definitions of all variables.[30] All continuous variables are Winsorized at the 1% level to limit the influence of outliers. Standard errors are clustered at the firm level, consistent with previous studies.

4.5. Sample selection

To be eligible to claim a tax refund, a firm must experience a U.S. net operating loss and have paid taxes during the carryback period. We assume that an eligible firm could claim a tax refund in year t if they have experienced an NOL in year t-1.[31] To compose a sample of firms that are eligible to claim a tax refund, we require firms be incorporated in the U.S. with negative U.S. taxable income in year t-1 and either have paid taxes in year t-2 or have a positive balance of tax payments over the NOL carryback period.

Our sample period begins in 1987 because this is the first year companies provide supplemental disclosures about their taxes paid to or received from tax authorities.[32] To mitigate concerns about whether the tax refund is related to firms' foreign operations, we exclude an additional 752 observations that record a negative current foreign tax expense in the NOL year.

[30] To ensure that accounting information is publicly available at the time of a loan, we employ the following procedure (see, e.g., Bharath et al. 2007): For those loans made in calendar year t, if the loan activation date is four months or later than the fiscal year ending month in calendar year t, we use the data from that fiscal year. If the loan activation date is less than four months after the fiscal year ending month, we use the data from the fiscal year ending in calendar year t−1.

[31] We note that a corporation expecting to have an NOL in its current year can automatically extend the time for paying all or part of its income tax for the immediately preceding year by filing Form 1138, Extension of Time for Payment of Taxes by a Corporation Expecting a Net Operating Loss Carryback. The payment of tax postponed cannot exceed the expected overpayment from the carryback of the NOL. However, not classifying these firms as claiming a tax refund would likely bias against finding the results presented in the paper.

[32] A small number of firms in our sample were affected by the Tax Reform Act of 1986, which affected incentives to claim tax refunds (Maydew 1997). Excluding those observations leads to similar results as the ones presented.

We merge this sample with DealScan using the Roberts DealScan–Compustat link (August 2012 vintage, see Chava and Roberts 2008). We further require firms to have sufficient data to calculate different loan terms (e.g., Sufi 2007; Graham et al. 2008). This leaves 6,774 observations. Finally, we exclude an additional 1,655 observation with missing control variables, leaving a final sample of 5,119 loans issued between 1987 and 2012. Table 1 presents the sample selection.

5. Empirical results

5.1. Descriptive statistics

Figure 1 relates our measure of tax refunds to the business cycle. Panel A (Panel B) depicts the percentage of firms claiming a tax refund (the tax refund dollar amounts claimed) over time. We observe that the percentage of firms claiming a tax refund spiked as did dollar amounts following the 2001 and 2008 financial crises, consistent with firms claiming tax refunds when losses were more prominent, suggesting that our measure of tax refunds is reasonable, as it related to periods of losses and liquidity needs.[33]

Table 2 presents univariate statistics. Approximately 20% of all observations in the sample correspond to firms claiming a tax refund. This value is between the 10-15% figure documented in Cooper and Knittel (2006) and the 37% presented in Mahon and Zwick (2015).[34] Moreover, we find that for firms claiming refunds, the mean tax refund to total assets ratio is 1.4% (untabulated). The means for *Future U.S. Taxable Income*, *Future Pretax Income* and *Future ROA* in years t to t+2 are -0.033, 0.036 and -0.013, respectively, implying that many sample firms are financially distressed, a suitable setting for the relevance of tax refund decisions and potential importance of cash infusions. The average loan spread of 242 basis points is relatively high but consistent with

[33] The graphs pertain to all Compustat firms. However, the graphs are similar for our sample.

[34] Our sample selection is different from the ones used in these two studies. For example, Mahon and Zwick (2015) use administrative IRS databases that collect information for all corporations that file a tax return in the United States. In contrast, our data are limited to firms on Compustat and DealScan.

sample firms experiencing financial distress.[35] The mean number of covenants in a loan is close to four, and approximately 60% of all loans have collateral. The means for *Tangibility* and *Lagged Profitability* are 0.348 and -0.036, respectively.

Table 3 presents the correlations between *Tax Refund* and the dependent variables used in the study. *Tax Refund* is negatively correlated with *Future U.S. Taxable Income, Future Pretax Income* and *Future ROA* in years t to t+2, suggesting that firms forgoing the option to claim a tax refund have higher future profitability. *Tax Refund* is positively correlated with *Loan Spread*, suggesting that firms forgoing the option to claim a tax refund benefit from a lower cost of debt. *Tax Refund* is positively correlated with *Number of Covenants, Financial Covenants, General Covenants,* and *Collateral*, consistent with firms forgoing the option to claim a tax refund receiving a less restrictive covenant structure and being less likely to post collateral. Overall, this initial evidence suggests firms forgoing a tax refund are rewarded with better terms in the syndicated loan market.

5.2. The tax refund decision and expected future profitability

Table 4 reports regression results for the tests that link the decision to claim a tax refund in year t-1 to future profitability. Panel A, columns 1 to 3 provide results for when the explanatory variable is *Future U.S. Taxable Income, Future Pretax Income* or *Future ROA* in years t to t+2, respectively. [36] Column 1 shows that *Future U.S. Taxable Income* in years t to t+2 is significantly and negatively related to *Tax Refund*. The coefficient of -0.052 (t-stat -2.79) suggests that firms with lower future U.S. taxable income in years t to t+2 are more likely to claim a tax refund. The

[35] For instance, the sample loan spread is around 45% higher than in Hasan et al. (2014), who use a sample with an average loan spread of 167 basis points.

[36] Future U.S. Taxable Income$_{t\,t+2}$ is equal to the sum of U.S. Taxable Income in years t to t+2, scaled by total assets in year t. We set missing future profitability values equal to zero. However, only using non-missing observations leads to similar inferences.

control variables load in the expected directions. Firms with higher tax credits are more likely to forgo tax refunds consistent with possible disallowance of tax credits making it more costly to claim a refund. Larger firms are more likely to take tax refunds, consistent with the argument that bigger firms are better able to navigate the tax code. Finally, current *profitability* and *cash ratio* are negatively associated with a decision to take the refund suggesting that firms that are facing lower future profitability or low cash balances prefer the cash infusion from the refund.

Column 2 shows that *Future Pretax Income* in year t to t+2 is significantly and negatively related to *Tax Refund*. The coefficient of -0.061 (t-stat -3.03) suggests that firms with lower future pretax income are more likely to take a tax refund. Column 3 shows that firms that experience a lower *Future ROA* in year t to t+2 (coefficient of -0.133 and t-stat of -4.56) are more likely to claim a tax refund.

Panel B presents the results when future profitability is measured as the sum of profitability in years t to t+3, scaled by total assets in year t-1. The results suggest that expected future profitability up to four years after the tax loss year affects the tax refund decision.[37] These results may be an underestimate given that the probability of loss does not reflect the benefits that may have accrued to the cash infusion from the refund. Overall, Table 4 presents evidence that firms claiming a tax refund are more likely to experience lower profitability up to four future years.

5.3. Tax refunds and cost of debt

Table 5 reports regression results on whether firms forgoing a tax refund obtain a lower cost of debt in the syndicated loan market. To get a better sense of the importance of tax refund decisions in explaining loan spreads, column 1 presents the results excluding *Tax Refund* from equation 6. We find that the R-Squared of this regression is 52.6%.

[37] Untabulated results suggest a weaker relation for years t+4 or later.

Column 2 presents the result when including *Tax Refund* in the specification. Consistent with this variable containing information about future profitability, the coefficient on *Tax Refund* is significantly and positively related to *Loan Spread*. The coefficient of 0.086 (t-stat 3.50) suggests that firms claiming a tax refund pay a 8.6% higher interest rate relative to eligible firms not claiming a tax refund.[38] The average loan spread of sample firms is 242 basis points. Therefore, a 8.6% increase implies that, all things being equal, loan spreads increase by approximately 20.8 basis points. Because the average loan size for the sample firms is $247 million, the increase in the loan spread implies an average increase of $0.5 million per loan in annual interest payments. Moreover, the R-Squared of 59.3%, suggests that the explanatory power of the regression including *Tax Refund* increases by 12.7%, which is quite remarkable. In sum, the results presented in Table 5 suggest that lenders view the decision to claim a tax refund as relevant in setting loan spreads.

The effects of control variables on loan spreads are intuitive. Large *Size*, low *Leverage*, high *Stock Return*, and more *Profitable* firms with low *Cash Flow Volatility* are likely to have lower default risk and thus are associated with a lower *Loan Spread*. *Loan Size* is negatively associated with *Loan spread* consistent with economies of scale when lending larger amounts.

5.4. Information asymmetry between lenders and borrowers

The greater the information asymmetry, the less known about borrowers' types by lenders *ex ante*, and the more likely that forgoing the refund conveys information not yet in the public or lenders' domain. Accordingly, partitioning the sample into high and low information asymmetry firms, we anticipate stronger results in loan spreads for the high asymmetry subsample.

[38] Because the dependent variable is in logarithmic form, the coefficient estimates represent percentage change effects of the independent variables on the dependent variable.

As measures of high information asymmetry, we employ the below median number of previous relationships with members of the syndicated loan market, the nonexistence of a credit rating, the firm's engagement in research and development activities, and whether the firm also operates in foreign tax jurisdictions. The syndicated loan market is one of repeated interactions. As a result, lenders are more likely to have better information about future profitability for borrowers that repeatedly access the market. Borrowers that lack an S&P senior unsecured debt rating are less transparent to lenders than are firms with S&P senior unsecured debt ratings suggesting that information asymmetry about the borrower's type is more severe on loans to unrated firms. Future earnings of firms with high research and development activities depend on uncertain realizations from future investment opportunities suggesting less confidence in forming expectations. Given that multinational firms are more complex and their tax situation more difficult to discern relative to domestic only firms, information asymmetry about the borrower's type is likely to be more severe.

Table 6, Panel A reports the findings when the sample is partitioned based on whether firms have a below median number of previous relationships or interactions with lenders in the syndicated loan market. Column 1 shows that *Tax Refund* is significant and positively related to *Loan Spread*. The coefficient of 0.099 (t-stat 2.69) suggests that firms that claim a tax refund pay a 9.9% higher interest rate relative to eligible firms not claiming a tax refund in the *low* previous relationships sample (i.e., *low*=1). In contrast, column 2 shows that *Tax Refund* is less significantly related to *Loan Spread* in the high previous relationships sample (i.e., *low*=0) with firms taking tax refunds penalized by 5.7% higher interest rates.

Panel B reports the findings when the sample is partitioned based on whether firms have a credit rating or not. Column 1 shows that *Tax Refund* is significant and positively related to *Loan Spread*. The coefficient of 0.088 (t-stat 2.64) suggests that firms that claim a tax refund pay a 8.8%

higher interest rate relative to eligible firms not claiming a tax refund in the unrated sample. In contrast, column 2 shows that *Tax Refund* is positively but not significantly related to *Loan Spread* in the sample of firms with a credit rating.

Panel C reports the findings when the sample is partitioned based on whether firms engage in research and development activities or not. Column 1 shows that *Tax Refund* is significant and positively related to *Loan Spread*. The coefficient of 0.128 (t-stat 2.83) suggests that firms that claim a tax refund pay a 12.8% higher interest rate relative to eligible firms not claiming a tax refund in the sample of firms that engage in research and development activities. In contrast, column 2 shows that *Tax Refund* is less positively related to *Loan Spread* in the sample of firms that do not engage in research and development activities with firms taking tax refunds penalized by 7.2% higher interest rates.

Panel D reports the findings when the sample is partitioned based on whether U.S. firms also operate in foreign jurisdictions or not. Column 1 shows that *Tax Refund* is significant and positively related to *Loan Spread*. The coefficient of 0.118 (t-stat 2.76) suggests that firms that claim a tax refund pay a 11.8% higher interest rate relative to eligible firms not claiming a tax refund in the sample of multinational firms. In contrast, column 2 shows that *Tax Refund* is less positively related to *Loan Spread* in the sample of domestic only firms with firms taking tax refunds penalized by 7.5% higher interest rates.

Overall, the results suggest that forgoing a tax refund provides a more valuable signal to lenders when there is greater information asymmetry about the borrower's future prospects.

5.5. Alternative Tax Refund Measures

To strengthen our inferences, we conduct tests using two alternative tax refund measures. First, we study tax refund pricing by examining the intensive margin of tax refund claims—i.e.,

the impact of the magnitude of the tax refund on the cost of debt financing for firms that claim the refund. On one hand, the greater the refund, the less likely will firms whose future prospects are weak choose to forgo the refund.[39] On the other hand, the larger the cash infusion *per se*, the less likely firms may face financial distress or forgo profitable investments. Table 7 column 1 shows that using the net annual payments received from tax authorities scaled by total assets[40] as a measure of the magnitude of tax refunds (*Magnitude Tax Refund*) instead of *Tax Refund* in equation 6, results in a significant and positive relation to *Loan Spread* suggesting that the first effect dominates.

Second, as a further robustness tests, we only classify firms as forgoing a tax refund if their balance of net operating losses increases in the loss year (*Tax Refund (NOL)*). This test reduces concerns related with not having access to actual tax return information. However, because firms only selectively disclose their NOLs (Mills et al. 2003), the subsample to conduct this test is small.[41] Table 7, column 2 provides the results. We find that using this alternative classification does not affect our results.

5.6. Additional robustness tests – Financial constraints and other measurement concerns

Even though, we control for a large number of firm characteristic related to the borrower's ability to raise funds (e.g., credit ratings or Z-score), a concern is that our tax refund variable might pick up other observable firm attributes related to financial constraints that are penalized with higher loan spreads. To address this concern further, we conduct an additional test and control for

[39] Here is an alternative way of thinking about this: if the tax refund claimed is relatively small, it may be easier for the borrower to explain to the lender(s) that the decision to claim the refund is unrelated to future profitability. This is because, all else equal, these borrowers would be more likely to use this NOL fully as a carryforward relative to borrowers with larger NOLs. As a result, the decision to claim a smaller tax refund is associated with a weaker signal.
[40] For firms not receiving a tax refund, this variable has a value of zero.
[41] For this test, we drop firms that do not claim a tax refund following the loss year *and* that do not increase their NOL balance in the loss year.

the Whited-Wu (2006) Index of financial constraints based on the methodology described in that paper. Higher values of the Whited-Wu Index indicate that firms are more financially constrained. In our tests, *WW Financially constrained* is an indicator variable equal to one if the firm is above the sample median of firms ranked by the index and zero if below it.[42] In Table 8 column 1, we show that our result are unchanged when including this additional control.

Another concern when estimating U.S. taxable income with GAAP accounting numbers is that book-tax differences could affect the interpretation of our results. For example, Crabtree and Maher (2009) and Ayers et al. (2010) provide evidence that book-tax differences affect the cost of debt. In addition, firms forgoing tax refunds could also be more conservative in their accounting and rewarded with lower borrowing rates (Wittenberg-Moerman 2008). Finally, the tax refund decision could be related to the recognition of the valuation allowance for deferred tax assets, which in turn could be informative to investors (Dhaliwal et al. 2012; Edwards 2017). Table 8, columns 2 to 4 shows that the inclusion of proxies for book-tax differences, accounting conservatism, and valuation allowance for deferred tax assets as additional controls[43] does not affect the finding that firms claiming tax refunds have higher borrowing costs.[44]

5.7. Tax refunds and covenant intensity

If tax refunds convey information about a company's future prospects, lenders might incorporate this information into debt contracts by altering not only the loan rate, but also other

[42] Using a continuous measure of the Whited-Wu index leads to similar results.

[43] Book-tax differences are measured as the difference between pretax book income and taxable income scaled by total assets (see e.g., Hanlon 2005). To measure conservatism, we follow Givoly and Hayn (2000) and use average non-operating accruals scaled by total assets. Givoly and Hayn (2000) define non-operating accruals as accruals consisting primarily of such items as loss and bad debt provisions (or their reversal), restructuring charges, the effect of changes in estimates, gains or losses on the sale of assets, asset write-downs, the accrual and capitalization of expenses, and the deferral of revenues and their subsequent recognition. To measure valuation allowance, we follow Dhaliwal et al. (2012) and use an indicator variable designed to capture when a firm books a material increase in the valuation allowance against a deferred tax asset (loss carryforward). Valuation allowance is set equal to 1 for firm-years with accounting losses (ib < 0) and zero or positive U.S. deferred tax expense (txdfed >= 0).

[44] Using current book-tax differences leads to similar results.

contract terms, such as covenants and collateral. Covenants serve to mitigate agency conflicts between debt holders and equity holders (Smith and Warner 1979, Watts and Zimmerman 1986), but they may also limit the flexibility of the borrower to engage in value-enhancing corporate decisions. Following Bradley and Roberts (2005), we track the total number of covenants (*Number of Covenants*) included in the loan agreement. Table 9, column 1 indicates that lenders impose more restrictions on loans to firms claiming a tax refund. The coefficient of 0.510 (t-stat 3.45) suggests that firms claiming a tax refund have 0.5, or 14% more covenants than other firms in the sample.

To investigate further the type of covenants added to loan contracts after claiming a tax refund, we separately examine the effects on financial covenants and general covenants. Financial covenants place limits on accounting variables such as current ratio, leverage ratio, net worth, debt-to-EBITDA, interest-coverage ratio, and fixed-charge coverage that must be maintained while the debt is outstanding. General covenants include restrictions on actions such as equity issuance sweeps, debt issuance sweeps, asset sales sweeps, insurance proceeds sweeps, or dividend that also restrict the borrower's financial flexibility. Columns 2 and 3 show that claiming a tax refund is associated with more financial and general covenants. For example, column 3 suggests that firms claiming a tax refund have almost 0.346 or 17% more *General Covenants* than other firms in the sample.

5.8. Loan securitization

Collateral is a borrower's pledge of specific property to a lender to secure repayment of a loan. It serves as protection for a lender against a borrower's default. To assess the impact if any of a tax refund on collateral, we estimate equation 6 where the dependent variable is one if the loan

is secured and zero otherwise. [45] Table 9, column 4 shows a significant effect, suggesting that collateralization may constitute a material consideration in contracting with borrowers taking the tax refund.

5.9. Firm fixed effects specification

While in our previous tests we control for a large set of factors that might account for differences between firms claiming tax refunds and those forgoing tax refunds, we cannot fully rule out that borrower type specific omitted correlated variables drive our results. To further mitigate this concern, we also use a firm fixed effects specification, which allows us to hold the borrower type constant. To do so, we expand our sample by comparing the outcomes of the tax refund decision to those of all other loans issued by the same borrower. [46] Consistent with a communication role of tax refund decisions, we expect that when borrowers claim tax refunds (*Tax Refund*) that they will incur higher loan spreads relative to all other loans issued by the borrower. In contrast, we expect that when borrowers forgo tax refunds (*Forgo Tax Refund*) that they will incur lower loan spreads relative to all other loans issued by the borrower.

Table 10 presents the results for our firm fixed effects specification. In column 1, we find that *Tax Refund* is positively related to loan spreads, suggesting that firms claiming tax refunds are penalized with higher spreads. In column 2, we find that *Forgo Tax Refund* is negatively related to loan spreads, suggesting that firms forgoing tax refunds are rewarded with lower spreads. Notwithstanding that this latter result is not statistically significant, as reported in column 3 we find that the difference between both coefficients is statistically significant.

[45] Consistent with the suggestion in Angrist and Pischke (2009), we use a linear probability model as opposed to a nonlinear limited dependent variable model. This allows for the easy interpretation of the coefficients as well as the use of fixed effects in the model.

[46] Unfortunately, our original sample is too small and lacks sufficient variation to employ a firm fixed effects specification.

6. Conclusion

A common occurrence is that firms eligible for income tax refunds through the carryback of net operating losses do not file claims to such refunds. In this study, we provide evidence that firms choosing not to file claims for tax refunds by carrying back losses on average report higher future profits and incur lower borrowing costs than firms that do file claims. Our tests control for other explanations for decisions to forgo an immediate tax refund including potential disallowance of investment tax credits noted in prior research and other factors affecting refund decisions and loan spreads. The further finding of stronger results in cases where there is evidence of greater information asymmetry between lenders and borrowers makes an arguably strong case for the tax refund decision as a communication device. More broadly, our study contributes to the literature that investigates the role of real corporate decisions in conveying information relevant to the cost of capital.

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Appendix: Variable Definitions

Firm Characteristics

Tax Refund:	Dummy variable equal to one if the firm discloses a negative tax payment (TXPD<0) in year t; zero otherwise.
Magnitude Tax Refund:	Tax refunds received scaled by total assets (-TXPD/AT). This variable is zero for firms with TXPD≥0.
Tax Refund (NOL):	Dummy variable equal to one if the firm discloses a negative tax payment (TXPD<0) in year t; zero if TXPD>0 in year t and ΔTLCF>0 in year t-1.
Forgo Tax Refund	Dummy variable equal to one if the firm is eligible to claim a tax refund and does not disclose a negative tax payment (TXPD<0) in year t; zero otherwise.
U.S. Taxable Income:	Domestic Pretax Income (PIDOM) – Federal Deferred Taxes (TXDFED)/0.35 + Extraordinary Items and Discontinued Operations (XIDO) /(1- 0.35). All measured in year t.
Future U.S. Tax. Income$_{t,t+2}$:	U.S. Taxable Income in years t to t+2 scaled by total assets (AT) in year t.
Future Pretax Income$_{t,t+2}$:	Pretax Income (PI) in years t to t+2 scaled by total assets (AT) in year t.
Future ROA$_{t,t+2}$:	Net Income (NI) in years t to t+2 scaled by total assets (AT) in year t.
Lagged Tax Credits:	Accumulated tax deferrals of investment tax credits disclosed on the firm's balance as a percentage of total assets ((ITCB/AT)*100). All measured in year t-1.
Lagged Size:	The natural logarithm of total assets (AT) in year t-1.
Lagged Cash Ratio:	The ratio of cash (CHE) to total assets in year t-1.
Size:	The natural logarithm of total assets (AT) in year t.
Tangibility:	Property, plant, and equipment (PPENT) in year t scaled by total assets (AT) in year t.
Leverage:	Long-term debt plus debt in current liabilities divided by book assets ((DLTT + DLC) / AT). All measured in year t.
Stock Returns:	The logarithm of one plus the one-year buy and hold stock return.
Profitability:	Pretax Income (PI) in year t scaled by total assets (AT) in year t.
Lagged Profitability:	Pretax Income (PI) in year t-1 scaled by total assets (AT) in year t.
Market-to-book:	The book value of total assets minus the book value of equity plus the market value of equity as the numerator of the ratio and the book value of assets as the denominator ((CSHO*PRCC_F+(AT-CEQ))/AT). All measured in year t.
Tax Credits:	Accumulated tax deferrals of investment tax credits disclosed on the firm's balance as a percentage of total assets ((ITCB/AT)*100). All measured in year t.

Cash Flow Volatility:	Standard deviation of annual changes of EBITDA (OIBDP) over a four-year lagged period, scaled by average non-cash assets (AT-CHE) in the same period.
Z-score:	Modified Altman (1968) Z-score as in Graham et al. (2008) =1.2*(WCAP/AT)+1.4*(RE/AT)+3.3*(OIBDP/AT)+(Sale/AT)
Sales Growth:	The percentage growth rate of sales (SALE) from year t-1 to year t.
Credit Rating:	Dummy variables for Standard & Poor's senior debt rating, such as AAA, AA, A, etc.

Loan Characteristics

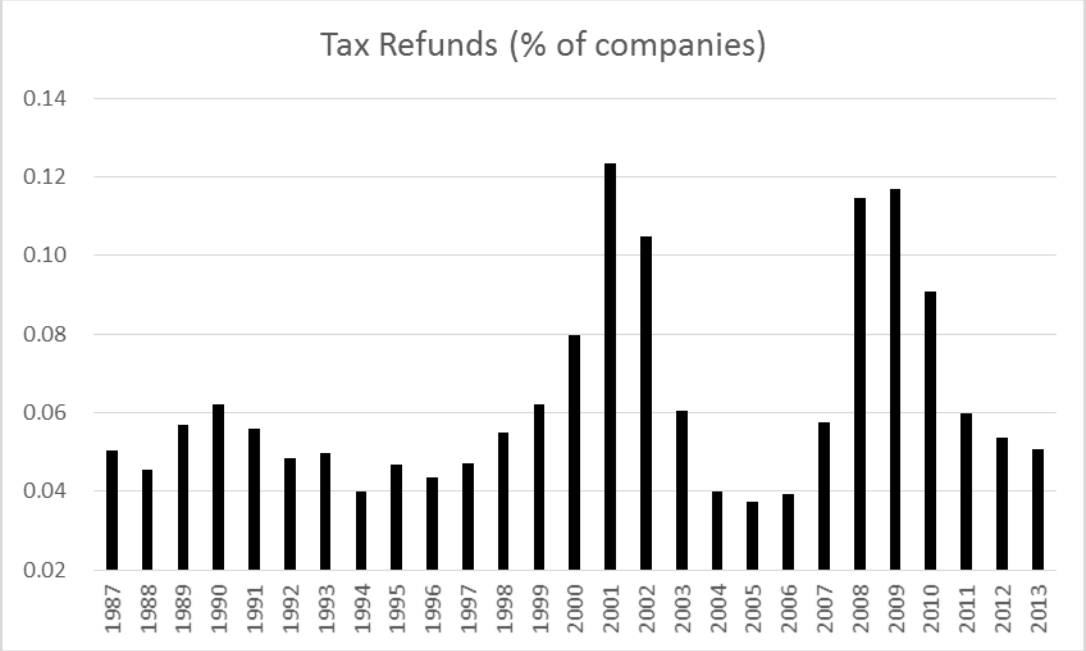
Loan Spread:	Loan spread is measured as all-in spread drawn in the DealScan database. All-in spread drawn is defined as the amount the borrower pays in basis points over the London Interbank Borrowing Rate (LIBOR) or the LIBOR equivalent for each dollar drawn down.
Number of Covenants:	Number of covenants included in the loan contract.
Financial Covenants:	Number of financial covenants included in the loan contract.
General Covenants:	Sum of equity issuance sweeps, debt issuance sweeps, asset sales sweeps, insurance proceeds sweeps, and dividend restrictions.
Collateral:	Equals one if the loan has collateral, zero otherwise.
Loan Size:	The loan amount measured in millions of dollars.
Loan Maturity:	The maturity of the loan, which is measured in months.
Syndication:	Equals one if the loan is syndicated, zero otherwise.
Loan Type:	Dummy variables equal to one for each of the following loan types: revolver, term loan, institutional investor, and bridge loan.
Loan Purpose:	Dummy variables equal to one for each of the following loan purposes: takeover, debt repayment, corporate purposes, and working capital.

Partitions – Information Asymmetry between Lenders and Borrowers

Low Relationship:	Dummy variable equal to one if the firm has a below median number of previous loans with lenders in the syndicated loan market; zero otherwise.
Not Rated:	Dummy variable equal to one if the firm has no credit rating; zero otherwise.
R&D Activities:	Dummy variable equal to one if the firm engages in R&D activities; zero otherwise.
Multinational	Dummy variable equal to one if the firm has foreign operations in year t or t-1; zero otherwise.

Figure 1
Tax Refund Descriptive Statistics

Panel A: Percentage of Firms claiming Tax Refunds



Panel B: Tax Refunds Claimed

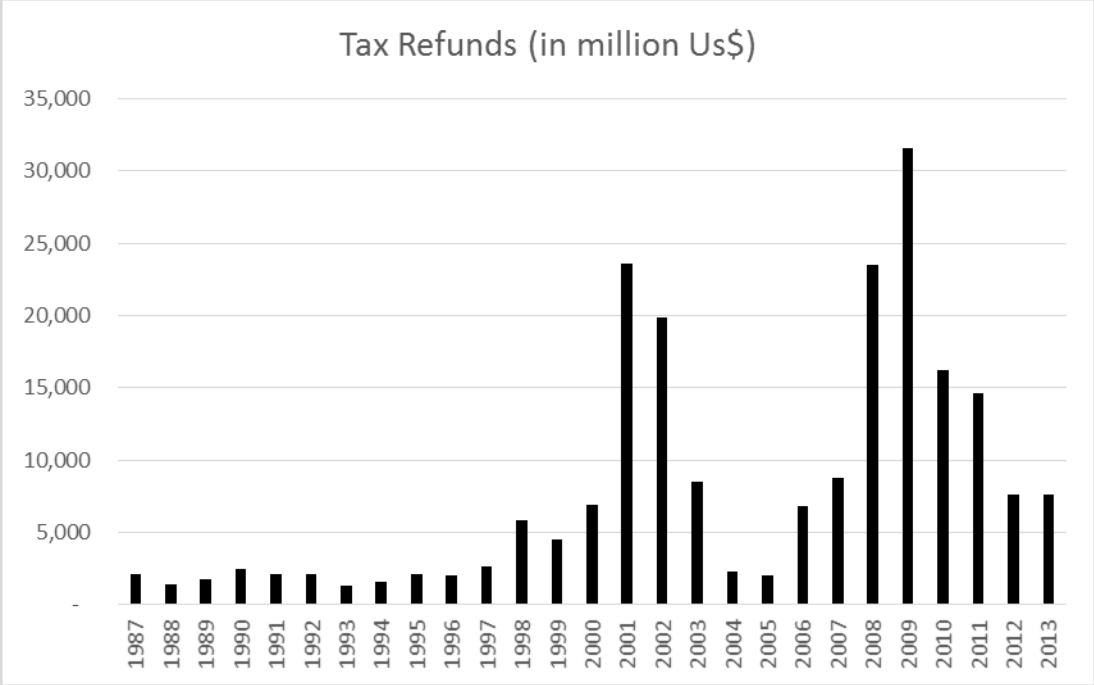


Figure 1 relates our measure of tax refunds to the business cycle. Panel A (Panel B) depicts the percentage of firms claiming a tax refund (the tax refund dollar amounts claimed) over time for all firms in Compustat.

Table 1
Sample Selection

Firm years incorporated in the U.S., with non-missing tax payment information, negative lagged U.S. taxable income, and positive balance of tax payments over the NOL period	23,171
Excluding firm years with negative lagged current foreign tax expense	-752
Excluding firm years with missing loan terms	-15,645
Excluding firm years with missing control variables	-1,655
Loan Sample (Loan Issuances)	**5,119**

Table 1 presents the selection of the sample. It includes firms that were eligible to claim a U.S. tax refund and that issued loans in the syndicated loan market between 1987 and 2012.

Table 2
Descriptive Statistics

Variable	N	Mean	Median	Std Dev	25th Pctl	75th Pctl
Tax Refund	5,119	0.202	0.000	0.401	0.000	0.000
Tax Refund Determinants Model						
Future U.S. Taxable Income $_{t, t+2}$	4,948	-0.033	-0.003	0.497	-0.142	0.093
Future Pretax Income $_{t, t+2}$	5,119	0.036	0.055	0.491	-0.102	0.199
Future ROA $_{t, t+2}$	5,119	-0.013	0.021	0.297	-0.127	0.128
Lagged Tax Credits (%)	5,119	0.067	0.000	0.346	0.000	0.000
Lagged Size	5,119	6.481	6.487	1.923	5.073	7.828
Lagged Profitability	5,119	-0.036	-0.007	0.139	-0.072	0.039
Lagged Cash Ratio	5,119	0.073	0.033	0.098	0.012	0.090
Loan Spread Model						
Loan Spread	5,119	241.601	225.000	145.370	125.000	325.000
Number of Covenants	5,119	3.638	3.000	3.641	0.000	7.000
Number of Financial Covenants	5,119	1.642	2.000	1.645	0.000	3.000
Number of General Covenants	5,119	1.994	1.000	2.398	0.000	5.000
Collateral	5,119	0.601	1.000	0.490	0.000	1.000
Size	5,119	6.507	6.499	1.928	5.099	7.861
Tangibility	5,119	0.348	0.293	0.239	0.146	0.516
Leverage	5,119	0.364	0.345	0.233	0.204	0.496
Stock Returns	5,119	0.005	0.070	0.631	-0.259	0.361
Profitability	5,119	-0.012	0.022	0.147	-0.041	0.062
Lagged Profitability	5,119	-0.036	-0.007	0.139	-0.072	0.039
Market-to-Book	5,119	1.426	1.219	0.692	1.027	1.581
Tax Credits (%)	5,119	0.059	0.000	0.306	0.000	0.000
Volatility Cash Flows	5,119	0.071	0.042	0.088	0.022	0.082
Zscore	5,119	1.523	1.489	1.189	0.805	2.192
Sales Growth	5,119	0.109	0.048	0.318	-0.051	0.187
Maturity (months)	5,119	44.953	48.000	23.614	24.000	60.000
Loan Amount (Us$ millions)	5,119	247.249	100.000	411.676	25.000	275.000
Syndication	5,119	0.860	1.000	0.347	1.000	1.000

Table 2 presents descriptive statistics. All continuous variables are Winsorized at the 1% level. All variable definitions are presented in the Appendix.

Table 3 – Correlation Table

		1	2	3	4	5	6	7	8	9
1	*Tax Refund*	**1.000**	**-0.077**	**-0.094**	**-0.121**	**0.135**	**0.045**	**0.039**	**0.042**	**0.080**
2	*Future U.S. Taxable Income* $_{t, t+2}$		**1.000**	**0.855**	**0.733**	**-0.180**	**-0.042**	**-0.036**	**-0.038**	**-0.101**
3	*Future Pretax Income* $_{t, t+2}$			**1.000**	**0.818**	**-0.247**	**-0.032**	-0.012	**-0.040**	**-0.152**
4	*Future ROA* $_{t, t+2}$				**1.000**	**-0.324**	**-0.062**	**-0.029**	**-0.074**	**-0.212**
5	*Loan Spread*					**1.000**	**0.157**	**0.113**	**0.160**	**0.419**
6	*Number of Covenants*						**1.000**	**0.852**	**0.933**	**0.416**
7	*Financial Covenants*							**1.000**	**0.607**	**0.379**
8	*General Covenants*								**1.000**	**0.372**
9	*Collateral*									**1.000**

Table 3 presents the correlation table. Correlations that are significant at the 10% level or lower are marked in bold. All continuous variables are winsorized at the 1% level. All variable definitions are presented in the appendix.

Table 4
The Tax Refund Decision and Future Profitability

Panel A: Profitability in years t to t+2

Dependent Variable =	***Tax Refund*** $_t$	***Tax Refund*** $_t$	***Tax Refund*** $_t$
	(1)	(2)	(3)
Future U.S. Taxable Income $_{t, t+2}$	**-0.052*****		
	(-2.79)		
Future Pretax Income $_{t, t+2}$		**-0.061*****	
		(-3.03)	
Future ROA $_{t, t+2}$			**-0.133*****
			(-4.56)
Lagged Tax Credits	-0.082***	-0.089***	-0.087***
	(-3.06)	(-3.80)	(-3.76)
Lagged Size	0.011**	0.013**	0.013**
	(2.03)	(2.32)	(2.26)
Lagged Profitability	-0.327***	-0.307***	-0.293***
	(-4.96)	(-4.65)	(-4.50)
Lagged Cash Ratio	-0.019***	-0.020***	-0.019***
	(-2.64)	(-2.85)	(-2.77)
N	4,948	5,119	5,119
Control for			
Industry and Year	Yes	Yes	Yes
Clustering	Firm	Firm	Firm
R-Squared	0.098	0.101	0.104

Panel B: Profitability in years t to t+3

Dependent Variable =	***Tax Refund*** $_t$	***Tax Refund*** $_t$	***Tax Refund*** $_t$
	(1)	(2)	(3)
Future U.S. Taxable Income $_{t, t+3}$	**-0.022***		
	(-1.69)		
Future Pretax Income $_{t, t+3}$		**-0.030****	
		(-2.28)	
Future ROA $_{t, t+3}$			**-0.060*****
			(-2.89)
Lagged Tax Credits	-0.086***	-0.090***	-0.088***
	(-3.32)	(-3.82)	(-3.79)
Lagged Size	0.013**	0.013**	0.013**
	(2.26)	(2.32)	(2.33)
Lagged Profitability	-0.347***	-0.323***	-0.319***
	(-5.20)	(-4.90)	(-4.86)
Lagged Cash Ratio	-0.020***	-0.020***	-0.019***
	(-2.79)	(-2.82)	(-2.76)
N	4,991	5,119	5,119
Control for			
Industry and Year	Yes	Yes	Yes
Clustering	Firm	Firm	Firm
R-Squared	0.096	0.099	0.099

Table 4 shows how the decision to claim a tax refund is related to future profitability. *Future U.S. Taxable Income*$_{t,t+2}$ is equal to the sum of U.S. Taxable Income in years t to t+2, scaled by total assets in year t. *Future Pretax Income*$_{t,t+2}$ is equal to the sum of Pretax Income in years t to t+2, scaled by total assets in year t. *Future ROA*$_{t,t+2}$ is equal to the sum of Net Income in years t to t+2, scaled by total assets in year t. *Future U.S. Taxable Income*$_{t,t+3}$ is equal to the sum of U.S. Taxable Income in years t to t+3, scaled by total assets in year t. *Future Pretax Income*$_{t,t+3}$ is equal to the sum of Pretax Income in years t to t+3, scaled by total assets in year t. *Future ROA*$_{t,t+3}$ is equal to the sum of Net Income in years t to t+3, scaled by total assets in year t. We set missing future profitability values equal to zero. All other variable definitions are presented in the Appendix. All continuous variables are winsorized at the 1% level.

Table 5
Tax Refunds and the Cost of Debt

	Dependent Variable = Log (Loan Spreads)	
	(1)	(2)
Tax Refund		**0.086*** **
		(3.50)
Size	-0.106***	-0.073***
	(-8.08)	(-5.00)
Tangibility	-0.171**	-0.167***
	(-2.46)	(-2.68)
Leverage	0.540***	0.346***
	(10.17)	(6.69)
Stock Returns	-0.076***	-0.097***
	(-3.65)	(-5.13)
Profitability	-0.377***	-0.315***
	(-4.13)	(-3.78)
Lagged Profitability	-0.341***	-0.292***
	(-4.33)	(-3.99)
Market-to-book	-0.148***	-0.100***
	(-7.77)	(-5.88)
Tax Credits	-0.245***	-0.226***
	(-3.29)	(-2.95)
Volatility Cash Flows	0.257*	0.158
	(1.75)	(1.18)
Z-score	-0.048***	-0.035***
	(-3.92)	(-3.05)
Sales Growth	0.086**	0.045
	(2.23)	(1.19)
Log(Loan Maturity)	0.025	-0.004
	(1.16)	(-0.20)
Log(Loan Size)	-0.108***	-0.099***
	(-8.59)	(-8.36)
Syndication	0.002	-0.027
	(0.06)	(-0.68)
N	5,119	5,119
Control for		
Loan Type	Yes	Yes
Loan Purpose	Yes	Yes
Credit Rating	Yes	Yes
Industry and Year	Yes	Yes
Clustering	Firm	Firm
R-Squared	0.526	0.593

Table 5 shows how the disclosure of the receipt of a tax refund is related to loan spreads. All continuous variables are Winsorized at the 1% level. All variable definitions are presented in the Appendix.

Table 6
Variation in the Level of Information Asymmetry between Lenders and Borrowers

Panel A: Number of Previous Relationships with Lenders in the Syndicated Loan Market

	Dependent Variable = Log (Loan Spreads)	
	Low=1	Low=0
Tax Refund	**0.099*** **	**0.057***
	(2.69)	(1.82)
Size	-0.083***	-0.056***
	(-4.06)	(-3.33)
Tangibility	-0.179**	-0.122
	(-2.08)	(-1.41)
Leverage	0.312***	0.406***
	(4.66)	(5.27)
Stock Returns	-0.104***	-0.085***
	(-3.75)	(-3.28)
Profitability	-0.238**	-0.442***
	(-2.21)	(-3.19)
Lagged Profitability	-0.164*	-0.468***
	(-1.75)	(-4.34)
Market-to-book	-0.078***	-0.144***
	(-3.82)	(-5.30)
Tax Credits	-0.175**	-0.248***
	(-2.16)	(-2.86)
Volatility Cash Flows	0.068	0.528**
	(0.44)	(2.18)
Z-score	-0.035**	-0.044***
	(-2.19)	(-2.74)
Sales Growth	0.017	0.087*
	(0.34)	(1.82)
Log(Loan Maturity)	0.004	0.004
	(0.16)	(0.13)
Log(Loan Size)	-0.101***	-0.099***
	(-5.80)	(-7.11)
Syndication	-0.061	0.098
	(-1.46)	(1.05)
N	2,689	2,430
Control for		
Loan Type	Yes	Yes
Loan Purpose	Yes	Yes
Credit Rating	Yes	Yes
Industry and Year	Yes	Yes
Clustering	Firm	Firm
R-Squared	0.548	0.675

Panel B: Existence of a Credit Rating

	Dependent Variable = Log (Loan Spreads)	
	Not Rated=1	Not Rated=0
Tax Refund	**0.088*** **	**0.041**
	(2.64)	(1.27)
Size	-0.099***	-0.002
	(-5.13)	(-0.14)
Tangibility	-0.020	-0.250***
	(-0.23)	(-3.23)
Leverage	0.361***	0.328***
	(5.15)	(4.44)
Stock Returns	-0.066**	-0.149***
	(-2.43)	(-5.32)
Profitability	-0.268***	-0.167
	(-2.82)	(-1.04)
Lagged Profitability	-0.285***	-0.259*
	(-3.38)	(-1.91)
Market-to-book	-0.062***	-0.131***
	(-3.16)	(-4.75)
Tax Credits	-0.202**	-0.048
	(-2.37)	(-0.99)
Volatility Cash Flows	0.080	0.259
	(0.56)	(0.82)
Z-score	-0.036***	-0.004
	(-2.65)	(-0.21)
Sales Growth	-0.007	0.039
	(-0.16)	(0.68)
Log(Loan Maturity)	-0.017	0.001
	(-0.73)	(0.02)
Log(Loan Size)	-0.076***	-0.113***
	(-5.33)	(-7.38)
Syndication	-0.016	0.040
	(-0.36)	(0.44)
N	2,592	2,527
Control for		
Loan Type	Yes	Yes
Loan Purpose	Yes	Yes
Credit Rating	N/A	Yes
Industry and Year	Yes	Yes
Clustering	Firm	Firm
R-Squared	0.411	0.726

Panel C: R&D Activities

	Dependent Variable = Log (Loan Spreads)	
	R&D Activities=1	R&D Activities=0
Tax Refund	**0.128*** **	**0.072** **
	(2.83)	(2.44)
Size	-0.086***	-0.069***
	(-3.56)	(-3.92)
Tangibility	-0.202	-0.199***
	(-1.62)	(-2.65)
Leverage	0.395***	0.326***
	(3.80)	(5.28)
Stock Returns	-0.072**	-0.110***
	(-2.39)	(-4.28)
Profitability	-0.242*	-0.381***
	(-1.76)	(-3.37)
Lagged Profitability	-0.251**	-0.406***
	(-2.20)	(-3.90)
Market-to-book	-0.105***	-0.079***
	(-4.62)	(-2.88)
Tax Credits	-5.581***	-0.226***
	(-3.30)	(-3.11)
Volatility Cash Flows	0.173	0.049
	(0.85)	(0.28)
Z-score	-0.048**	-0.025*
	(-2.57)	(-1.66)
Sales Growth	-0.051	0.090**
	(-0.83)	(1.96)
Log(Loan Maturity)	0.024	-0.015
	(0.77)	(-0.61)
Log(Loan Size)	-0.110***	-0.090***
	(-5.90)	(-6.68)
Syndication	-0.087	-0.008
	(-1.56)	(-0.15)
N	1,911	3,208
Control for		
Loan Type	Yes	Yes
Loan Purpose	Yes	Yes
Credit Rating	Yes	Yes
Industry and Year	Yes	Yes
Clustering	Firm	Firm
R-Squared	0.660	0.575

Panel D: Multinational vs. Domestic Only Firms

	Dependent Variable = Log (Loan Spreads)	
	Multinational	Domestic Only
Tax Refund	**0.118*** **	**0.075*** **
	(2.76)	(2.65)
Size	-0.060***	-0.091***
	(-3.06)	(-4.44)
Tangibility	-0.208**	-0.130*
	(-2.06)	(-1.72)
Leverage	0.456***	0.264***
	(5.01)	(4.13)
Stock Returns	-0.084**	-0.121***
	(-2.54)	(-5.09)
Profitability	-0.312**	-0.338***
	(-2.29)	(-3.32)
Lagged Profitability	-0.291**	-0.295***
	(-2.47)	(-3.30)
Market-to-book	-0.131***	-0.064***
	(-4.73)	(-3.09)
Tax Credits	-5.321***	-0.236***
	(-3.14)	(-3.31)
Volatility Cash Flows	0.325	-0.015
	(1.25)	(-0.10)
Z-score	-0.047***	-0.018
	(-2.65)	(-1.22)
Sales Growth	-0.036	0.070
	(-0.62)	(1.48)
Log(Loan Maturity)	0.020	-0.017
	(0.69)	(-0.72)
Log(Loan Size)	-0.125***	-0.070***
	(-7.69)	(-5.04)
Syndication	-0.061	-0.007
	(-0.95)	(-0.15)
N	2,292	2,827
Control for		
Loan Type	Yes	Yes
Loan Purpose	Yes	Yes
Credit Rating	Yes	Yes
Industry and Year	Yes	Yes
Clustering	Firm	Firm
R-Squared	0.650	0.573

Table 6 shows how the disclosure of the receipt of a tax refund is related to loan spreads across subsamples with high and low levels of information asymmetry about the borrower. All continuous variables are Winsorized at the 1% level. All variable definitions are presented in the Appendix.

Table 7
Alternative Tax Refund Measures

	Dependent Variable = Log (Loan Spreads)	
	(1)	(2)
Log(1+Magnitude Tax Refund)	**3.095***** (4.11)	
Tax Refund (NOL)		**0.061**** (1.98)
All Controls	Yes	Yes
N	5,119	2,149
Control for		
Loan Type	Yes	Yes
Loan Purpose	Yes	Yes
Credit Rating	Yes	Yes
Industry and Year	Yes	Yes
Clustering	Firm	Firm
R-Squared	0.593	0.570

Table 7 shows robustness tests using alternative tax refund measures. All continuous variables are Winsorized at the 1% level. All variable definitions are presented in the Appendix.

Table 8
Additional Robustness Tests

	Dependent Variable = Log (Loan Spreads)			
	(1)	(2)	(3)	(4)
Tax Refund	**0.084*** **	**0.077*** **	**0.082*** **	**0.086*** **
	(3.40)	(3.12)	(3.46)	(3.50)
WW Financially Constrained	0.094***			
	(3.57)			
Lagged Book-Tax Differences		0.235***		
		(2.66)		
Conservatism			-0.152***	
			(-3.23)	
Valuation Allowance				0.050*
				(1.87)
All Controls	Yes	Yes	Yes	Yes
N	5,109	5,119	4,373	5,119
Control for				
Loan Type	Yes	Yes	Yes	Yes
Loan Purpose	Yes	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes	Yes
Industry and Year	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm
R-Squared	0.597	0.594	0.600	0.594

Table 8 provides robustness tests. *WW Financially constrained* is an indicator variable equal to one if the firm is above the sample median of firms ranked by the Whited-Wu (2006) index of financial constraints and zero if below it *Lagged book-tax differences* are measured as the difference between pretax book income and taxable income in year t-1 scaled by total assets in year t-1. To measure *conservatism*, we follow Givoly and Hayn (2000) and use the average non-operating accruals scaled by total assets. Firms with larger negative (i.e., income decreasing) accruals are assumed to be more conservative. To measure *valuation allowance*, we follow Dhaliwal et al. (2012) and use an indicator variable designed to capture when a firm books a material increase in the valuation allowance against a deferred tax asset (loss carryforward). *Valuation allowance* is set equal to 1 for firm-years with accounting losses (ib < 0) and zero or positive U.S. deferred tax expense (txdfed >= 0). All continuous variables are winsorized at the 1% level. All other variable definitions are presented in the Appendix.

Table 9
Tax Refunds and Other Contract Terms

Dependent Variable=	*Number of Covenants*	*Number of Financial Covenants*	*Number of General Covenants*	*Collateral*
	(1)	(2)	(3)	(4)
Tax Refund	**0.510***** (3.45)	**0.163**** (2.43)	**0.346***** (3.38)	**0.048**** (2.50)
All Controls	Yes	Yes	Yes	Yes
N	5,119	5,119	5,119	5,119
Control for				
Loan Type	Yes	Yes	Yes	Yes
Loan Purpose	Yes	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes	Yes
Industry and Year	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm
R-Squared	0.415	0.404	0.347	0.343

Table 9 shows how the disclosure of the receipt of a tax refund is related to covenant intensity and collateral. All continuous variables are Winsorized at the 1% level. All variable definitions are presented in the Appendix.

Table 10
Firm Fixed Effects Specification

Dependent Variable=	*Log (Loan Spreads)*		
	(1)	(2)	(3)
Tax Refund	**0.045****		**0.044****
	(2.12)		(2.04)
Forgo Tax Refund		**-0.009**	**-0.003**
		(-0.57)	(-0.16)
F-Test			
Tax Refund - Forgo Tax Refund			**0.057**
All Controls	Yes	Yes	Yes
N	26,651	26,651	26,651
Control for			
Firm	Yes	Yes	Yes
Loan Type	Yes	Yes	Yes
Loan Purpose	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes
Year	Yes	Yes	Yes
Clustering	Firm	Firm	Firm
R-Squared	0.786	0.786	0.786

Table 10 shows how the decision to either claim a tax refund (*Tax Refund*) or forgo a tax refund (*Forgo Tax Refund*) affects loan spreads relative to all other loans issued by the same borrower. All continuous variables are Winsorized at the 1% level. All variable definitions are presented in the Appendix.