Why Don't Firms Claim their Tax Refunds?
Evidence from Private Debt Contracts

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Abstract

A puzzle is why a large proportion of firms eligible for income tax refunds do not file claims for such refunds on a timely basis. I hypothesize that firms with private information about higher future profitability and seeking debt financing forgo immediate use of provisions that allow the carryback of net operating losses as a signaling device to separate from firms with lower future profitability in order to obtain more favorable borrowing terms. Firms expecting lower profitability are deterred from mimicking because carrying net operating losses forward is less valuable to them. Consistent with this hypothesis, firms that do not file claims for refunds on a timely basis display higher future profitability and receive lower debt financing costs than firms that file when they first become eligible. These results are stronger when the level of information asymmetry about the borrower's type is greater. This study is the first to offer a rational explanation for the low take-up rate of tax refunds. As a result, the evidence presented in this study could be relevant to academics and fiscal policy makers that seek to better understand how tax policies affect real decisions.

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1. Introduction

Tax refunds are an important tool of fiscal policy (Keynes 1936; Altshuler et al. 2009; Mankiw 2015). The intent of this policy is to give taxpayers the ability to smooth out changes in business income, and therefore taxes, over the business cycle.[1] To successfully implement this policy, the U.S. treasury department relies on corporations actually claiming and using those tax refunds. Surprisingly, a large proportion of firms eligible for income tax refunds through the carryback of net operating losses (NOLs) do not file claims to such refunds on a timely basis (Cooper and Knittel 2006; Edgerton 2010; Mahon and Zwick 2015) . Under a provision of the U.S. Tax Code, a firm experiencing an NOL in a given year and which paid income taxes in the preceding two years may claim a tax refund at that time (see, e.g., Maydew 1997; Erickson et al. 2013).[2] Yet it is known that many firms do not claim a tax refund, electing instead to carry the NOL forward, raising the question as to why. In response, I offer a signaling explanation for which I provide strong evidence.

Consider two types of firms with recent net operating losses, positive past tax payments, and private information about future profitability seeking to borrow from rational lenders. Plausibly, firms with high future expected profitability (i.e., high type firms) choose to forgo immediate tax refunds for recent NOLs and instead, carry the NOL forward in order to signal their type to lenders and thereby receive better borrowing terms.[3] In contrast, firms with low future expected profitability (i.e., low type firms) take tax refunds as soon as they become available since carrying the NOL forward is more costly than for high types. While carrying the NOL forward

[1] U.S. Congress, Joint Committee on Taxation, Estimated Budget Effects of The Chairman's Amendment in The Nature of a Substitute to H.R. 598, The "American Recovery and Reinvestment Tax Act of 2009," 111th Cong., 1st sess., January 22, 2009, JCX-9-09.

[2] In Section II, I review the institutional details related to the NOL carryback deduction. Moreover, I also detail how changes in regulation have affected the length of the NOL carryback period.

[3] Such NOLs are available to be carried forward up to 20 years to offset future income.

implies a cost in present value terms, the benefit in the form of better borrowing terms for high types likely outweighs that cost. Low types are deterred from mimicking since the poorer borrowing terms they face from having their type revealed are likely outweighed by the risk that future taxable income may not be high enough to fully use the NOL if carried forward.[4] Therefore, to the extent that lenders associate the decision to forgo a tax refund with higher future profitability, I would expect that forgoing a tax refund leads to a lower cost of debt. Alternatively, lenders could view the missed opportunity by the borrower to receive an infusion of funds as detrimental because, all else equal, the cash infusion would improve the liquidity of the borrower at loan contract initiation (Dobridge 2015).[5] As a result, it is an empirical question whether forgoing a tax refund affects the cost of raising debt.

To test the signaling hypothesis, I compose a sample of companies that become eligible to file a claim for a tax refund for an NOL under the carryback provisions of the U.S. Tax Code and which issue new loans in the syndicated loan market between 1990 and 2012. As mentioned earlier, to be eligible, a firm must experience a net operating loss and have paid taxes during the carryback period. I assume that firms file a claim on a timely basis if they receive a tax refund in the year following the loss year. In doing so, I exploit the fact that eligible firms must apply the entirety of the loss either to the carryback period or carry the loss forward up to a maximum of twenty years (Section 172 - Internal Revenue Code).[6] Firms expecting future losses may have a stronger incentive to take the refund promptly notwithstanding higher debt financing costs from

[4] Notwithstanding controls in the research design, I cannot rule out the possibility that for some firms, potential lenders are aware of their type *ex ante*. For those firms, there is no potential benefit from carrying the NOL forward. However, if this were true for all firms, then there would be no incentive for high types to carry the NOL forward.

[5] Consistent with this intuition, I find in untabulated tests that tax refunds are positively and strongly related to corporate cash holdings.

[6] A firm will only receive a tax refund *and* carry a fraction of the NOL forward if the NOL exceeds taxable income over the NOL carryback period.

revealing their type. I identify firms claiming a tax refund as those that disclose a negative tax payment to tax authorities in their financial statements.[7]

I first examine whether firms that take the refund promptly have lower future profitability than firms that do not. I find that firms taking the refund in the year following a net operating loss have significantly lower pretax income, lower net income, and higher losses in the year immediately after claiming the refund than eligible firms that do not take the tax refund, consistent with high types choosing to forgo filing an immediate claim as a way to signal their type to lenders. For instance, I find that firms claiming a tax refund are 6.6% more likely to have a loss in the year immediately after claiming the refund. This 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.

Next, I examine whether those eligible firms that do not file for a refund on a timely basis obtain lower interest rates on new borrowings in the syndicated loan market. This market provides an interesting setting because it is a primary source of financing for corporations (Gorton and Winton 2003). Moreover, compared to bondholders and equity investors, banks tend to be more exposed to declines in future profitability. This is because banks usually keep large fractions of the loans they issue on their books (Sufi 2007).[8]

As hypothesized, loan spreads over LIBOR are significantly lower for firms forgoing tax refunds than for firms receiving refunds in the year following an operating loss. For instance, I find that firms that claim a tax refund pay a 6.9% higher interest rate relative to eligible firms not claiming a tax refund.[9] This result holds even after including a large number of control variables

[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.
[8] Banks either keep 100% of a loan on their books or, in the case of a syndicated loan, retain an important fraction of it. (Sufi (2007), e.g., indicates that in a syndicated loan, the average percentage kept by the lead arranger is 28.5%.)
[9] Again, the additional cost associated with higher interest rates could be an underestimate given implicit costs of more restrictive covenants and collateral requirements, as addressed below.

to account for borrowers' performance and/or credit risk (e.g., stock returns, credit ratings, leverage, current and lagged profitability, or the volatility of cash flows). Thus, at the margin, from the perspective of lenders, the positive signal associated with forgoing a tax refund appears to outweigh the cash infusion benefits at loan inception in setting interest rates.

Further tests indicate that not only do those firms receiving refunds incur higher loan spreads, they also tend to have more restrictive covenants and collateral requirements. For example, I find that firms that claim a tax refund have 15% more covenants and are 6.7% more likely to post collateral relative to eligible firms not claiming a tax refund. As a result, the prospect of higher implicit as well as explicit debt financing costs from being pooled with lower types can be viewed as strengthening incentives for better types seeking to separate at the cost of forgoing an immediate cash inflow.

My next tests are addressed to the role of information asymmetry in the signaling story. The greater the asymmetry, the less that is known about borrowers' types by lenders *ex ante*, in which case forgoing the refund is more likely to convey information that is not already in the public domain. Accordingly, partitioning the sample into high and low asymmetry firms, I anticipate stronger results in loan spreads for the high subsample. I employ the non-existence of a credit rating and the firm's engagement in research and development activities as an indication of high asymmetry and find significantly higher loan spreads in that case. The direction of the difference in loan spreads for the low asymmetry subsample is consistent with the signaling story; however, that difference is not statistically significant.

In my final test, I examine the impact of the magnitude of the tax refund on the cost of debt financing for firms that claim the refund immediately. When the refund is small, the benefit in lower borrowing costs for a low type by mimicking a high type is more likely to be greater than the cost of delaying a claim, implying that delay in filing for a refund is likely to be less effective

as a signaling device. In this case, high and low types are more likely to be pooled, implying more comparable borrowing costs for both types. In contrast, when the refund is large, the cost of mimicking is too great and high types can separate by delay in filing a claim. In this case, the low types are revealed and face greater debt financing costs. Consistent with this intuition, I find that borrowing costs and the restrictiveness of other loan terms are increasing with the magnitude of the tax refund.

The primary contribution of this study is to provide initial evidence about the signaling consequences that firms face when evaluating whether to claim a tax refund. Carryback refunds serve as an important automatic fiscal stabilizer. In addition, policymakers often expand carryback length in recessions with the goal of injecting cash into the economy to promote business activity. Remarkably, however, a large fraction of U.S. firms eligible to claim a tax refund choose not to do so. The results of my empirical tests suggest that firms forgoing the full benefits of tax refunds from the carryback provisions of the U.S. Tax Code do so to signal their future profitability and thereby obtain better borrowing terms than would otherwise ensue. While not taking refunds on a timely basis mutes the stimulus intended by Congress in adopting the carryback of net operating losses, the signal conveyed by such choices does contribute to the efficiency of the debt market. Hence, from a public policy standpoint, the social welfare implications are ambiguous within the confines of this study.

The remainder of the paper is organized as follows: Section 2 reviews prior literature and institutional details. Section 3 presents the research design and sample. Section 4 discusses the empirical results. Section 5 concludes.

2. Prior literature and institutional background

2.1. Prior literature

2.1.1. Signaling

A number of tax and accounting signaling devices have been modeled in the literature. 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, such 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. Less closely related, Williams et al. (2010) consider how an asymmetry in the tax treatment of capital gains and losses may serve as a credible signal of better future prospects. Levine and Hughes (2005) consider recourse to a combination of compensation contracts and debt covenants as a non-dissipative set of signals better firms can employ to gain lower interest rates in credit markets.

Earlier studies characterize many other commitment devices for signaling firms' types to financial markets including capital structure by Ross (1977), ownership retention by Leland and Pyle (1977), investment strategies requiring outside financing by Myers and Majluf (1984), dividend policy by Miller and Rock (1985), convertibles strategy by Harris and Raviv (1985), accounting disclosures by Hughes (1986), underpricing of IPOs by Welch (1989), and audit quality by Datar et al. (1991).

However, the empirical literature provides mixed findings regarding signaling stories. For instance, Healy and Palepu (1988) provide evidence that investors interpret announcements of dividend initiations and omissions as managers' forecasts of future earnings changes. In contrast, DeAngelo et al. (1996) study the signaling content of managers' dividend decisions for 145 NYSE

firms whose annual earnings decline after nine or more consecutive years of growth. They find virtually no support for the notion that dividend decisions help identify firms with superior future earnings. Feltham et al. (1991) test the predictions of Datar et al. (1991) and overall find only weak evidence of signaling. My results are distinct in the consistency with which the several test results conform to a signaling explanation for not immediately claiming tax refunds.

2.1.2. Tax refunds

The literature that investigates tax refunds has been mostly centered on individual tax refunds. For instance, Souleles (1999) investigates the response of household consumption to income tax refunds.[10] He finds the response of total consumption to be at least 35% and up to more than 60% of refunds within a quarter. Given the large aggregate value of tax refunds, these results imply rather substantial macroeconomic effects of refunds and, more generally, of fiscal policy.

More closely related to my paper are studies that research corporate tax refunds. 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. Graham and Kim (2010) estimate that extending the carryback period from two to five years, as proposed in President Obama's budget blueprint, would provide $19 ($34) billion of additional liquidity to the corporate sector for 2008 (2009). Unexplored in this study is the extent to which eligible firms claim tax refunds on a timely basis and the consequences such delay could have on optimal policies. Dobridge (2015) studies whether fiscal stimulus policies implemented in the two previous recessions and targeted at firms incentivize investment and improve firms' financial conditions. She finds that after passage of the 2002 policy, firms allocated $0.40 of every tax refund dollar to investment. After passage of the 2009 policy, in contrast, firms used the refunds to increase cash holdings ($0.96 of every refund

[10] See also Agarwal et al. (2007).

dollar) before paying down debt in the following year. She concludes that while the policy had no discernable effect on investment in the most recent recessionary period, it did reduce firms' bankruptcy risk and the probability of a future credit rating downgrade. Her results speak to the benefits from the cash infusion for firms that take the refunds promptly. Bethmann et al. (2016) expand this analysis to a European setting and find that a less asymmetric treatment of tax losses via loss carrybacks increases loss firms' investment.

A number of prior studies have also 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 an immediate tax refund. Moreover, 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 even further by drawing on a sample of 1.2 million observations from the population of corporate tax returns between 1998 and 2011. They find that only 37 percent 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. Finally, they find that firms with sophisticated preparers, such as licensed accountants, are more likely to claim the refund. Moving from the 10th to 90th percentile in a predicted preparer effect would increase take-up by 9.4 percentage points. None of these studies considers a signaling explanation for delayed filings of tax refunds. As a result, my study is the first to offer a rational explanation for the low take-up rate of refunds.

2.1.3. Taxes and the cost of debt

A number of studies have investigated the relation between corporate taxation and the cost of debt. The evidence from these studies is mixed. Kim et al. (2010) and Lisowsky et al. (2013)

provide evidence that low effective tax rate (ETR) firms enjoy lower borrowing costs. In contrast, Shevlin et al. (2013) and Hasan et al. (2014) find the opposite result. Crabtree and Maher (2009) and Ayers et al. (2010) are also related. They provide evidence that firms with large book-tax differences experience lower credit ratings and higher yield spreads. Finally, Saavedra (2015a) provides evidence that firms with large tax spikes face higher financing costs when raising funds in the syndicated loan market and that lenders charge the largest penalties to firms that disclose a tax settlement and to firms that do not provide proper disclosures explaining their tax spikes. None of these studies investigates how the decision to claim a tax refund affects firms' financing costs.

2.2. Institutional background

2.2.1. 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 can be used in two ways. First, they can be used to offset taxable income in either of the prior two years, for which the firm receives a tax refund. This is known as an "NOL carryback."[11] 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 and use it to offset future taxable income, thereby lowering its tax bill at some point in the future.[12] This is known as an "NOL carryforward."[13]

[11] 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.
[12] The firm can elect to irrevocably forgo the carryback and fully carryforward the loss when it files its income tax return. This election is made by checking a box on its income tax return.
[13] To use an NOL carryforward is fairly straightforward. 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.

Throughout my 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. In 2009, Congress enacted two separate pieces of legislation. 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.[14] 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.[15]

2.2.2 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 Moerman 2008). A typical loan is provided by a group of lenders or syndicate. Members of the syndicate fall into one of two groups, namely, lead arrangers and participant lenders. Participant lenders rarely directly negotiate with the borrowing firm, having an arm's-length relationship with the borrowing firm through the lead arranger. In contrast, the lead arranger

[14] The JCT estimated that the policy would return $4.7 billion in refunds to firms in 2009 with a ten-year cost of about $1 billion. The five-year carryback was small relative to the overall package, which also included an extension of the bonus depreciation allowance, a payroll tax credit, an additional child tax credit, and additional government funding for health care, education, and infrastructure.

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

or lead arrangers establish and maintain a relationship with the borrower and take on the primary information collection and monitoring responsibilities. The lead arranger and the borrower negotiate an information memorandum that includes *the list of terms and conditions*, which is a term sheet describing the pricing, structure, collateral, covenant package, and other terms of credit. Once the loan is closed and the lead arranger sells parts of the loan to participant lenders, the final terms are then documented in detailed credit and security agreements (Standard & Poor's 2014). The lead arranger typically holds a larger share of the loan than any of the participants. Sufi (2007) indicates that in a syndicated loan, the average percentage kept by the lead arranger is 28.5%.

3. Research design and sample

3.1. Tax refund measurement

I classify firms as claiming a tax refund if they receive a net annual payment from tax authorities in the year following a loss year.[16] In particular, *Tax Refund* is a dummy variable equal to one for firms that disclose negative worldwide taxes paid in their financial statements.[17] I acknowledge that this classification may not correctly capture certain firms that receive a tax refund but operate across different tax jurisdictions. In particular, it is possible that a multinational U.S. corporation receives a tax refund in the U.S. but that this amount is offset by higher international tax payments. In this case, the multinational U.S. corporation would have a positive net annual tax payment and be classified as not claiming a tax refund. 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.

[16] As I explain in the sample selection, firms have to first record an NOL before being able to claim a tax refund.
[17] Since 1987, firms are required to provide a supplemental cash flow disclosure about the amount of taxes paid to or received from tax authorities.

3.2. Tax refunds and future losses

My hypothesis relies on the assumption that firms that expect higher future profitability are more likely to forgo the tax refund, whereas firms that expect lower future profitability are more likely to claim a tax refund. To test this, I estimate the following model:[18]

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

where *Future Profitability* is equal to three alternative proxies. First, it is equal to pretax income in the fiscal year immediately after claiming a refund scaled by total assets (*Future Pretax Income*). Second, it is equal to net income in the fiscal year immediately after claiming a refund scaled by total assets (*Future ROA*). And third, it is equal to a dummy variable equal to one if the firm experiences a loss (i.e., if pretax income is negative) in the year after claiming a tax refund (*Future Loss*).[19] γ_{fe} is a set of fixed effects that includes industry and year fixed effects. *Tax Refund* is as described in the previous section. I also include a set of control variables that I describe in the next section. My prediction is that γ_1<0. This would be consistent with firms forgoing (claiming) a tax refund being more likely to be more (less) profitable in the future.

3.3. Tax refunds and the cost of debt

To test my main hypothesis, namely, whether forgoing a tax refund is associated with lower interest rates at the time that firms issue a new loan, I estimate the following model:

$$Log(Loan\ Spread)_{it} = \beta_1 Tax\ Refund_{\ it} + \Sigma\beta_c Control_{cit} + \beta_{fe} + \varepsilon_{it} \qquad (2)$$

The main contractual term studied in this paper is *Loan Spread*. It is measured as the all-in spread drawn in the DealScan database. All-in spread drawn is defined as the amount the borrower pays

[18] An important caveat is that I test realizations and not expectations.

[19] Consistent with the suggestion in Angrist and Pischke (2009), throughout the paper I 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.

in basis points over LIBOR or the LIBOR equivalent for each dollar drawn down (e.g., Graham et al. 2008).[20] This measure adds the borrowing spread of the loan over LIBOR with any annual fee paid to the bank group. *Tax Refund* is a dummy variable equal to one if the firm claims a tax refund, zero otherwise. My prediction is that β_1>0. This would be consistent with forgoing (claiming) a tax refund being associated with lower (higher) loan spreads.

The specification includes controls for several variables that have been shown to affect loan spreads and other contractual terms (e.g., Graham et al. 2008):

1. *Size*, defined as the logarithm of total assets. Larger firms are likely to borrow from banks on better terms because they have easier access to external financing.
2. *Tangibility* is equal to property, plant, and equipment (PP&E) scaled by total assets. Tangible assets are easier to use as collateral when issuing a new loan.
3. *Leverage* is defined as long-term debt plus debt in current liabilities divided by book assets. Firms with higher leverage, all else equal, have higher default risk.
4. *Stock Return* is measured as the logarithm of one plus the one-year buy and hold stock return during the most recent fiscal year. I expect firms with higher returns to have lower costs of debt.
5. *Profitability* is measured as pre-tax income scaled by total assets. Firms with higher profitability are likely to get better terms from banks.
6. *Lagged Profitability* is measured as lagged pre-tax income scaled by total assets. 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 (measured as the book value of assets less the book value of equity) to the book value of

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

assets. I use *Market-to-Book* as a proxy for a firm's growth opportunities. High growth firms are usually more exposed to financial distress or are more opaque.

8. *Past Taxes Paid* is measured as the amount of taxes the firm paid during the length of the NOL carryback period. For observations with year-ends in 2001, 2002, 2008, 2009, and 2010, *Past Taxes Paid* is equal to the sum of taxes paid over the five years prior to the tax refund year. For observations with year-ends in 1997 and before, *Past Taxes Paid* is equal to the sum of taxes paid over the three years prior to the tax refund year. For all other observations, *Past Taxes Paid* is equal to the sum of taxes paid over the two years prior to the tax refund year. This variable controls for any differences in taxes paid during the NOL carryback period, which could influence the decision to claim a tax refund.[21]
9. *Volatility of cash flows*. Following Sufi (2009), I measure the volatility of cash flows by calculating 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.
10. Altman's *Z-score* is an additional proxy for default risk. I 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). Firms with lower Z-scores have a higher probability of default.
11. *Sales Growth* is measured as the growth rate of sales over the previous year. This is an additional variable to control for growth opportunities.

The specification also controls for loan characteristics that have been shown to affect the pricing of debt. Loan Maturity is measured in months. Banks charge higher interest rates when the duration of the loan increases. Loan Amount is the loan facility amount. Banks can achieve

[21] I do not include controls for Cash ETRs because this variable becomes difficult to interpret when firms have losses. That said, *Past Taxes Paid* partially controls for the borrower's past tax avoidance behavior.

economies of scale when lending larger amounts. Loan amount is measured in millions of dollars. Syndication is a dummy variable equal to one if the loan has been 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 fixed effects. 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.

To ensure that I use only accounting information that is publicly available at the time of a loan, I 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*, I use the data from that fiscal year. If the loan activation date is less than four months after the fiscal year ending month, I use the data from the fiscal year ending in calendar year $t-1$. Next, I winsorize all continuous variables at the 1% level to limit the influence of outliers. Finally, I cluster standard errors at the firm level, consistent with previous studies.

3.4. Sample selection

To be eligible to claim a tax refund, a firm must experience a net operating loss and have paid taxes during the carryback period. Moreover, I assume that an eligible firm could claim a tax refund at time t if they have experienced an NOL at time t-1. This is because firms have to first record an NOL before being able to claim a tax refund.[22] To compose a sample of firms that are

[22] That said, I acknowledge an alternative mechanism of how firms could take advantage of the NOL. A corporation that expects 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. It does this by filing Form 1138, Extension of Time for Payment of Taxes by a Corporation Expecting a Net Operating Loss Carryback. The payment of tax that can be 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.

eligible to claim a tax refund, I require firms be incorporated in the U.S., with negative lagged pretax income and positive balance of tax payments over the NOL carryback period.

Because tax returns are unobservable, I follow prior research and rely on GAAP earnings numbers to identify tax losses (Scholes et al. 1992; Guenther 1994; Maydew 1997; Erickson et al. 2013). Thus, I focus on realizations of GAAP earnings and assume that book earnings reflect the underlying tax loss reporting. I expect GAAP earnings numbers to be a noisy proxy for the reported tax numbers; therefore, this approach works against finding evidence consistent with my predictions. I start in 1990 because this is the first year that Compustat provides information about cash taxes paid during the whole carryback period.[23] In addition, I require firms to have non-missing future profitability to conduct my validation tests. This leaves me with 23,368 firm-year observations. After excluding an additional 9,221 firm-years with missing control variables, I am left with 14,147 firm-year observations. Next, I merge this sample with DealScan using the Roberts DealScan–Compustat link (August 2012 vintage, see Chava and Roberts 2008). Following previous research, I require firms to have sufficient data to calculate different loan terms (e.g., Sufi 2007; Graham et al. 2008). This leaves me with a final sample of 4,523 loans issued between 1990 and 2012. Table 1 presents the sample selection.

4. Empirical results

4.1. Descriptive statistics

Table 2 presents univariate statistics. I find that around 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).[24]

[23] Up to 1997, the carryback period was three years.

[24] It is important to note that my 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, my study is limited to firms with data on Compustat and DealScan.

The mean for both *Future Pretax Income* and *Future ROA* is -0.002 and -0.017, respectively. Moreover, around 40% of all observations experience a loss in the year after the tax refund decision. The average loan spread of 242 basis points is relative high but consistent with firms in my sample experiencing an NOL. Moreover, the mean number of covenants in a loan is almost six, and around 74% of all loans have collateral. The mean for both *Tangibility* and *Leverage* is 0.333 and 0.379, respectively.

Table 3 presents the correlations between *Tax Refund* and the dependent variables used in the study. I find that *Tax Refund* is negatively (positively) correlated with *Future Pretax Income and Future ROA* (*Future Loss*), suggesting that firms that forgo the option to claim a tax refund have higher future profitability (lower probability of generating a future loss). In addition, *Tax Refund* is positively correlated with *Loan Spread*, suggesting that firms that forgo the option to claim a tax refund benefit from a lower cost of debt. Moreover, I find that *Tax Refund* is positively correlated with *Number of Covenants*, *Financial Covenants*, *General Covenants*, and *Collateral*, consistent with firms that forgo their option to claim a tax refund getting a less restrictive covenant structure and being less likely to post collateral. Overall, this initial evidence suggests that forgoing a tax refund is positively viewed by lenders in the syndicated loan market and rewarded with better terms.

4.2. Tax refunds and future profitability

Table 4 reports regression results for the tests that link the decision to claim a tax refund to future profitability. Columns 1 to 3 provide results for when the dependent variable is *Future Pretax Income*, *Future ROA*, and *Future Loss*, respectively. Column 1 shows that *Tax Refund* is significantly and negatively related to *Future Pretax Income*. The coefficient of -0.017 (t-stat -2.06) suggests that firms that claim a tax refund have a 1.7 percentage point of lower future pretax

income relative to firms not claiming a tax refund. This lower future profitability is economically meaningful relative to a mean (median) *Future Pretax Income* of -0.002 (0.019). In addition, I find that the control variables load in the expected direction. For example, firms that had higher stock returns or profitability in the previous fiscal year are more likely to have a higher future profitability.

Column 2 shows that *Tax Refund* is significantly and negatively related to *Future ROA*. The coefficient of -0.019 (t-stat -2.21) suggests that firms that claim a tax refund have a 1.9 percentage point of lower future net income relative to firms not claiming a tax refund. This lower future profitability is economically meaningful relative to a mean (median) *Future ROA* of -0.017 (0.011). Lastly, column 3 shows that firms claiming a tax refund are more likely to experience a future loss. The coefficient of 0.066 (t-stat -2.09) suggests that firms that claim a tax refund have a 6.6% higher probability of experiencing a future loss relative to firms not claiming a tax refund. The presented 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 that claim a tax refund are more likely to experience a lower profitability or loss in the year after claiming a tax refund, which in turn provides a rationale for their decision.

4.3. Tax refunds and the cost of debt

Table 5 reports regression results for my main hypothesis, namely, whether firms forgoing their option to receive a tax refund get a lower cost of debt in the syndicated loan market. Column 1 presents the results when I exclude *Stock Returns* and credit rating controls from equation 2. These variables likely capture information regarding the decision to claim a tax refund. For example, rating agencies could learn about future prospects through private communication with managers and reflect that in the borrower's credit rating. In this case, the information content of

claiming a tax refund could be muted. Column 1 shows that *Tax Refund* is significantly and positively related to *Loan Spread*. The coefficient of 0.099 (t-stat 2.55) suggests that firms that claim a tax refund pay a 9.9% higher interest rate relative to eligible firms not claiming a tax refund.[25]

Column 2 presents the result when including *Stock Returns* and credit rating controls in the specification. Consistent with the notion that market participants and credit rating agencies capture some of the information content related to the decision to claim a tax refund, I find that the coefficient on *Tax Refund* is lower but still significantly and positively related to *Loan Spread*. The coefficient of 0.069 (t-stat 2.03) suggests that firms that claim a tax refund pay a 6.9% higher interest rate relative to eligible firms not claiming a tax refund. The average loan spread of sample firms is 242 basis points. Therefore, a 6.9% increase implies that, all things being equal, loan spreads increase by approximately 17 basis points. Since the average loan size for the sample firms is $289 million, the increase in the loan spread implies an average increase of $0.49 million per loan in annual interest payments. In sum, the results presented in Table 5 suggest that lenders view the decision to claim a tax refund as relevant even after controlling for stock returns and credit ratings. To provide evidence that claiming a tax refund is informative to lenders in addition to other observables that might contain relevant information, I use for the remainder of my analysis the specification that includes *Stock Returns* and credit rating controls.

The effects of control variables on loan spreads are intuitive. Large, low leverage, high stock return, profitable firms with low cash flow volatility and better financial health likely have lower default risk and thus are associated with a lower loan spread. Loan size is negatively related to loan spread because banks can achieve economies of scale when lending larger amounts.

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

4.4. 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 contract terms, such as covenants and collateral. Covenants play an important role in private debt contracts. They are used to mitigate agency conflicts between debt holders and equity holders (Smith and Warner 1979; Watts and Zimmerman 1986; Dichev and Skinner 2002), but they can also limit the flexibility of the borrower to engage in value-enhancing corporate decisions (Saavedra 2015b).

To estimate the impact of claiming a tax refund on the covenant intensity of a loan, I follow Bradley and Roberts (2005) and track the total number of covenants (*Number of Covenants*) included in the loan agreement. The results, reported in column 1 of Table 6, indicate that lenders impose more restrictions on loans to firms claiming a tax refund.[26] The coefficient of 0.882 (t-stat 4.80) suggests that firms claiming a tax refund have almost 0.9 or 15% more covenants than other firms in the sample.

To further investigate the type of covenants added to loan contracts after claiming a tax refund, I separately study financial covenants and general covenants. Financial covenants place limits, which must be maintained while the debt is outstanding, on accounting variables and ratios. The main financial covenants are current ratio, leverage ratio, net worth, debt-to-EBITDA, interest-coverage ratio, and fixed-charge coverage ratio covenants. General covenants include covenants such as equity issuance sweeps, debt issuance sweeps, asset sales sweeps, insurance proceeds sweeps, or dividend restrictions that also restrict the borrower's financial flexibility.

[26] Beatty et al. (2008) document that Dealscan sometimes underreports the number of covenants in deals and that deals with no covenants reported are potentially data errors. Accordingly, when conducting the covenant and collateral tests, I exclude contracts with no financial covenant information rather than set their number to zero.

Columns 2 and 3 provide the evidence when *Financial Covenants* and *General Covenants* are included as the dependent variable in equation 2. The results show that claiming a tax refund is associated with both more financial covenants and more general covenants. For example, column 3 suggests that firms claiming a tax refund have almost 0.7 or 22% more *General Covenants* than other firms in the sample.

4.5. Loan securitization

I also study the impact of the decision to claim a tax refund on the likelihood of a loan being secured because collateralization is an important feature of financial contracts. 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. I estimate equation 2 where the dependent variable is one if the loan is secured and zero otherwise and report the result in column 4 of Table 6.[27] The tax refund dummy coefficient of 0.067 indicates that the probability of a loan being secured increases by 6.7% for firms claiming a tax refund, holding other variables at their means. This is consistent with the view that firms with tax refunds are more likely to be required to provide collateral against their loans.

The effects of control variables on the likelihood of a loan being secured are intuitive. Large, profitable, low leverage firms likely have lower default risk and thus are associated with a lower probability of the loan being secured.

4.6. Variation in information asymmetry about the borrower's type

An important argument in the signaling story is that forgoing a tax refund provides a valuable signal to lenders who are uncertain about the borrower's future prospects. The greater the

[27] As mentioned previously, consistent with the suggestion in Angrist and Pischke (2009), throughout the paper I 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.

asymmetry, the less that is known about borrowers' types by lenders *ex ante*, in which case forgoing the refund is likely to convey information that is not already in the public domain. Accordingly, partitioning the sample into high and low asymmetry firms, I anticipate stronger results in loan spreads for the high subsample.

To conduct this test, I employ the nonexistence of a credit rating and the firm's engagement in research and development activities as an indication of high asymmetry (Sufi 2007). First, I would expect that unrated firms, that is, borrowers that lack an S&P senior unsecured debt rating, are less transparent to lenders than firms with S&P senior unsecured debt ratings. This is because these firms have credit quality measured by an independent third party. Information asymmetry about the borrower's type is more severe on loans to unrated firms. Second, firms with research and development activities have earnings that depend on the realization of future investment opportunities (Lorek et al. 1999); the evaluation of such future earnings realizations is difficult. As a result, information asymmetry about the borrower's type is more severe on loans to firms with research and development activities.

Table 7, Panels A and B present the results. Panel A shows the findings when the sample is partitioned based on whether firms have a credit rating or not. Column 1 shows that *Tax Refund* is significantly and positively related to *Loan Spread*. The coefficient of 0.083 (t-stat 2.13) suggests that firms that claim a tax refund pay a 8.3% 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. However, I cannot reject that the coefficient on *Tax Refund* in the non-credit rating sample is significantly different from the one in the rating sample. This likely could be due to not having sufficient power.

Panel B shows 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 significantly and positively related to *Loan Spread*. The coefficient of 0.108 (t-stat 2.04) suggests that firms that claim a tax refund pay a 10.8% 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 positively but not significantly related to *Loan Spread* in the sample of firms that do not engage in research and development activities. However, again, I cannot reject that the coefficient on *Tax Refund* in the research and development sample is significantly different from the one in the non-research and development sample. Overall, the results suggest that forgoing a tax refund provides a more valuable signal to lenders when there is more information asymmetry about the borrower's future prospects.

4.7. Magnitude of tax refunds

In my final test, I examine the impact of the magnitude of the tax refund on the cost of debt financing for firms that claim the refund immediately. When the refund is small, the benefit in lower borrowing costs for a low type by mimicking a high type is more likely to be greater than the cost of delaying a claim, implying that delay in filing for a refund is likely to be less effective as a signaling device.[28] In this case, high and low types are more likely to be pooled, implying comparable borrowing costs for both types. In contrast, when the refund is large, then the cost of mimicking is too great and high types can separate by delay in filing a claim. In this case, the low types are revealed and face greater debt financing costs.

[28] Here is an alternative way of thinking about this: if the tax refund being 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 fully use this NOL 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.

To conduct these tests, I measure the magnitude of tax refunds (*Magnitude Tax Refund*) as net annual payments received from tax authorities scaled by total assets.[29] Table 8 presents the results when using *Magnitude Tax Refund* (instead of *Tax Refund*) in equation 2. Column 1 shows that *Magnitude Tax Refund* is significantly and positively related to *Loan Spread*. Moreover, columns 2 to 4 provide evidence that *Number of Covenants*, *Financial Covenants*, and *General Covenants* are increasing with the magnitude of the tax refunds claimed by the borrower. Finally, column 5 suggests a positive although not statistically significant relation between *Magnitude Tax Refund* and *Collateral.*

5. Conclusion

A puzzle in the literature is why a large fraction of firms eligible for income tax refunds do not file claims for such refunds on a timely basis. I hypothesize that firms with private information about higher future profitability and seeking debt financing forgo immediate use of provisions that allow the carryback of net operating losses as signaling device to separate from firms with lower future profitability that are otherwise similar. Firms expecting lower profitability are deterred from mimicking because carrying net operating losses forward is less valuable to them.

My findings are consistent with this hypothesis. I provide evidence that firms that do not file claims for refunds on a timely basis display higher future profitability and receive lower debt financing costs than firms that file when they first become eligible. These results are stronger when the level of information asymmetry about the borrower is greater. As a result, my evidence suggests that firms face tradeoffs when evaluating whether to claim a tax refund. This finding is important because the effectiveness of specific tax policies (e.g., The American Recovery and Reinvestment Act of 2009) relies on firms actually claiming their tax refunds. The evidence

[29] For firms not receiving a tax refund, this variable has a value of zero.

presented in this study could be relevant to academics and fiscal policy makers that seek to better understand how tax policies affect real decisions.

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Appendix: Variable Definitions

Firm Characteristics

Tax Refund:	Dummy variable equal to one if the firm discloses a negative tax payment; zero otherwise.
Magnitude Tax Refund:	Tax refunds received scaled by total assets.
Future Pretax Income:	Pretax Income at t+1 scaled by total assets.
Future Pretax Income:	Net Income at t+1 scaled by total assets.
Future Loss:	Dummy variable equal to one if Pretax Income at t+1 is negative; zero otherwise.
Size:	The natural logarithm of total assets.
Tangibility:	Property, plant, and equipment (PP&E) scaled by total assets.
Leverage:	Long-term debt plus debt in current liabilities divided by book assets.
Stock Returns:	The logarithm of one plus the one-year buy and hold stock return.
Profitability:	Pretax Income scaled by total assets.
Lagged Profitability:	Lagged Pretax Income scaled by total assets.
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.
Past Taxes Paid:	Sum of taxes paid during the NOL carryback period.
Cash Flow Volatility:	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.
Z-score:	Modified Altman (1968) Z-score as in Graham et al. (2008) =1.2 (Working Capital/ Total Assets) + 1.4 (Retained Earnings/Total Assets) + 3.3 (EBIT/Total Assets) + (Sales/Total Assets).
Sales Growth:	The percentage growth rate of sales from the year prior (i.e., year t-1) to the year immediately before the year of loan inception (i.e., 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.

Table 1
Sample Selection

Firm years incorporated in the U.S., with negative lagged pretax income, positive balance of tax payments over the NOL carryback period, and non-missing future profitability	23,368
Excluding firm years with missing control variables	-9,221
Excluding firm years with missing loan terms	-9,624
Loan Sample (Loan Issuances)	**4,523**

Table 1 presents the selection of the sample.

Table 2
Descriptive Statistics

Variable	N	Mean	Median	Std Dev	25th Pctl	75th Pctl
Tax Refund	4,523	0.205	0.000	0.404	0.000	0.000
Future Pretax Income	4,523	-0.002	0.019	0.144	-0.053	0.071
Future ROA	4,523	-0.017	0.011	0.137	-0.060	0.050
Future Loss	4,523	0.406	0.000	0.491	0.000	1.000
Loan Spread	4,523	242.037	225.000	146.717	150.000	305.000
Number of Covenants	2,929	5.863	6.000	3.047	3.000	9.000
Financial Covenants	2,929	2.744	3.000	1.193	2.000	4.000
General Covenants	2,929	3.126	3.000	2.398	1.000	6.000
Collateral	2,929	0.738	1.000	0.440	0.000	1.000
Size	4,523	6.474	6.458	1.928	5.135	7.802
Tangibility	4,523	0.333	0.280	0.237	0.132	0.506
Leverage	4,523	0.379	0.350	0.261	0.200	0.519
Stock Returns	4,523	0.012	0.096	0.702	-0.320	0.414
Profitability	4,523	-0.038	0.000	0.158	-0.066	0.040
Lagged Profitability	4,523	-0.109	-0.059	0.153	-0.126	-0.022
Market-to-Book	4,523	1.447	1.222	0.727	1.037	1.613
Past Taxes Paid	4,523	0.036	0.018	0.046	0.005	0.050
Volatility Cash Flows	4,523	0.212	0.059	0.655	0.029	0.122
Zscore	4,523	1.253	1.295	1.375	0.580	2.082
Sales Growth	4,523	0.121	0.034	0.427	-0.065	0.179
Maturity (months)	4,523	46.784	48.000	22.746	32.000	60.000
Loan Amount (Us$ millions)	4,523	288.932	110.000	471.259	30.000	300.000
Syndication	4,523	0.885	1.000	0.319	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**	**-0.069**	**-0.067**	**0.066**	**0.066**	**0.110**	**0.069**	**0.109**	**0.054**
2	*Future Pretax Income*		**1.000**	**0.924**	**-0.698**	**-0.363**	**-0.043**	0.015	**-0.063**	**-0.217**
3	*Future ROA*			**1.000**	**-0.646**	**-0.330**	**-0.033**	0.027	**-0.056**	**-0.195**
4	*Future Loss*				**1.000**	**0.409**	**0.053**	0.009	**0.066**	**0.241**
5	*Loan Spread*					**1.000**	**0.161**	**0.185**	**0.118**	**0.421**
6	*Number of Covenants*						**1.000**	**0.687**	**0.934**	**0.282**
7	*Financial Covenants*							**1.000**	**0.384**	**0.283**
8	*General Covenants*								**1.000**	**0.219**
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
Tax Refunds and Future Profitability

Dependent Variable=	***Future Pretax Income***	***Future ROA***	***Future Loss***
	(1)	(2)	(3)
Tax Refund	**-0.017****	**-0.019****	**0.066****
	(-2.06)	(-2.21)	(2.09)
Size	0.002	0.001	-0.011
	(1.01)	(0.65)	(-1.33)
Tangibility	-0.026	-0.013	0.139*
	(-1.37)	(-0.69)	(1.82)
Leverage	0.021	0.034**	-0.016
	(1.45)	(2.29)	(-0.29)
Stock Returns	0.043***	0.041***	-0.170***
	(6.85)	(6.27)	(-8.43)
Profitability	0.189***	0.150***	-0.415***
	(4.86)	(4.05)	(-4.14)
Lagged Profitability	0.045	0.033	-0.054
	(1.40)	(1.05)	(-0.66)
Market-to-book	0.028***	0.022***	-0.078***
	(4.05)	(3.33)	(-4.61)
Past Taxes Paid	0.097	0.045	-0.546*
	(1.07)	(0.51)	(-1.93)
Volatility Cash Flows	-0.003	-0.001	-0.003
	(-0.46)	(-0.20)	(-0.15)
Z-score	0.017***	0.015***	-0.042***
	(4.35)	(3.97)	(-3.42)
Sales Growth	-0.013	-0.014*	-0.014
	(-1.51)	(-1.70)	(-0.40)
N	4,523	4,523	4,523
Control for			
Industry and Year	Yes	Yes	Yes
Clustering	Firm	Firm	Firm
R-Squared	0.291	0.241	0.270

Table 4 shows how the decision to claim a tax refund is related to future profitability. All continuous variables are winsorized at the 1% level. All variable definitions are presented in the Appendix.

Table 5
Tax Refunds and the Cost of Debt

	Dependent Variable = Log (Loan Spreads)	
	(1)	(2)
Tax Refund	**0.099****	**0.069****
	(2.55)	(2.03)
Size	-0.078***	-0.028*
	(-5.02)	(-1.94)
Tangibility	-0.033	-0.030
	(-0.39)	(-0.43)
Leverage	0.488***	0.301***
	(8.25)	(5.72)
Stock Returns		-0.088***
		(-4.80)
Profitability	-0.348***	-0.155*
	(-3.72)	(-1.87)
Lagged Profitability	-0.048	0.001
	(-0.53)	(0.01)
Market-to-book	-0.130***	-0.038
	(-4.47)	(-1.59)
Past Taxes Paid	-0.613	0.183
	(-1.60)	(0.55)
Volatility Cash Flows	0.026*	0.031**
	(1.90)	(2.27)
Z-score	-0.039***	-0.032**
	(-2.58)	(-2.30)
Sales Growth	0.025	-0.017
	(0.70)	(-0.54)
Log(Loan Maturity)	-0.013	-0.041*
	(-0.45)	(-1.66)
Log(Loan Size)	-0.122***	-0.108***
	(-8.44)	(-8.23)
Syndication	-0.112**	-0.165***
	(-2.56)	(-4.04)
N	4,523	4,523
Control for		
Loan Type	Yes	Yes
Loan Purpose	Yes	Yes
Credit Rating	No	Yes
Industry and Year	Yes	Yes
Clustering	Firm	Firm
R-Squared	0.545	0.627

Table 5 shows how the decision to claim 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
Tax Refunds and Other Contract Terms

Dependent Variable=	***Number of Covenants***	***Financial Covenants***	***General Covenants***	***Collateral***
	(1)	(2)	(3)	(4)
Tax Refund	**0.882*** **	**0.214*** **	**0.691*** **	**0.067** **
	(4.80)	(2.70)	(4.46)	(2.34)
Size	-0.403***	-0.155***	-0.252***	-0.044***
	(-4.82)	(-4.52)	(-3.64)	(-3.58)
Tangibility	-0.884*	-0.298	-0.585	0.015
	(-1.70)	(-1.57)	(-1.36)	(0.23)
Leverage	1.796***	0.485***	1.300***	0.137***
	(4.74)	(2.90)	(4.45)	(2.93)
Stock Returns	0.026	0.062	-0.034	-0.010
	(0.21)	(1.21)	(-0.34)	(-0.61)
Profitability	0.532	0.606**	-0.055	-0.211***
	(0.97)	(2.49)	(-0.13)	(-2.83)
Lagged Profitability	1.171**	0.500**	0.671	-0.036
	(2.10)	(2.08)	(1.60)	(-0.55)
Market-to-book	-0.242**	-0.108*	-0.142	-0.027
	(-2.25)	(-1.87)	(-1.59)	(-1.54)
Past Taxes Paid	-1.023	1.220	-2.266	-0.385
	(-0.56)	(1.54)	(-1.52)	(-1.54)
Volatility Cash Flows	-0.177	-0.116**	-0.066	-0.016
	(-1.46)	(-2.27)	(-0.72)	(-0.83)
Z-score	0.032	0.027	0.004	0.002
	(0.39)	(0.82)	(0.07)	(0.15)
Sales Growth	0.111	-0.014	0.130	0.036
	(0.58)	(-0.18)	(0.87)	(1.51)
Log(Loan Maturity)	0.687***	0.158***	0.535***	0.007
	(5.24)	(2.79)	(4.94)	(0.40)
Log(Loan Size)	0.146**	0.017	0.133**	-0.029**
	(1.99)	(0.53)	(2.18)	(-2.57)
Syndication	2.491***	0.522***	1.973***	0.012
	(9.41)	(4.10)	(9.00)	(0.34)
N	2,929	2,929	2,929	2,929
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	0.460	0.349	0.427	0.457

Table 6 shows how the decision to claim 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 7
Variation in the Level of Information Asymmetry about the Borrower

Panel A: Existence of a Credit Rating

	Dependent Variable = Log (Loan Spreads)	
	Not Rated=1	Not Rated=0
Tax Refund	**0.083****	**0.016**
	(2.13)	(0.35)
Size	-0.070***	0.044*
	(-4.24)	(1.91)
Tangibility	-0.074	-0.112
	(-0.80)	(-1.09)
Leverage	0.420***	0.358***
	(6.18)	(3.87)
Stock Returns	-0.094***	-0.074***
	(-3.86)	(-2.62)
Profitability	-0.168**	-0.079
	(-2.01)	(-0.42)
Lagged Profitability	-0.091	0.080
	(-1.05)	(0.51)
Market-to-book	-0.013	-0.136***
	(-0.50)	(-3.04)
Past Taxes Paid	0.085	0.476
	(0.26)	(0.81)
Volatility Cash Flows	0.010	0.119
	(0.74)	(1.28)
Z-score	-0.016	-0.037
	(-1.11)	(-1.44)
Sales Growth	-0.011	-0.002
	(-0.33)	(-0.04)
Log(Loan Maturity)	-0.004	-0.056
	(-0.15)	(-1.51)
Log(Loan Size)	-0.115***	-0.110***
	(-6.60)	(-5.67)
Syndication	-0.117***	-0.034
	(-2.76)	(-0.35)
	Prob > chi2 = 0.2499	
N	2,158	2,365
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	0.448	0.740

Panel B: R&D Activities

	Dependent Variable = Log (Loan Spreads)	
	R&D Activities=1	R&D Activities=0
Tax Refund	**0.108****	**0.021**
	(2.04)	(0.55)
Size	-0.027	-0.031*
	(-1.09)	(-1.87)
Tangibility	-0.065	-0.022
	(-0.44)	(-0.27)
Leverage	0.415***	0.250***
	(4.81)	(3.58)
Stock Returns	-0.108***	-0.076***
	(-3.31)	(-3.34)
Profitability	-0.061	-0.172
	(-0.53)	(-1.52)
Lagged Profitability	0.178	-0.173*
	(1.30)	(-1.87)
Market-to-book	-0.038	-0.046
	(-1.53)	(-1.00)
Past Taxes Paid	0.452	-0.009
	(0.98)	(-0.02)
Volatility Cash Flows	0.018	0.073***
	(1.03)	(2.75)
Z-score	-0.039**	-0.025
	(-2.06)	(-1.38)
Sales Growth	-0.058	-0.011
	(-1.12)	(-0.32)
Log(Loan Maturity)	-0.025	-0.038
	(-0.71)	(-1.21)
Log(Loan Size)	-0.112***	-0.101***
	(-5.10)	(-6.87)
Syndication	-0.188***	-0.146***
	(-3.02)	(-2.74)
	Prob > chi2 = 0.1471	
N	1,781	2,742
Control for		
Loan Type	Yes	Yes
Loan Purpose	Yes	Yes
Credit Rating	Yes	Yes
Industry and Year	Yes	Yes
Clustering	Firm	Firm
R-Squared	0.695	0.607

Table 7 shows how the decision to claim 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 8
Magnitude of Tax Refunds

Dependent Variable=	***Log (Loan Spreads)***	***Number of Covenants***	***Financial Covenants***	***General Covenants***	***Collateral***
	(1)	(2)	(3)	(4)	(5)
Log(1+Magnitude Tax Refund)	**2.841***	**23.016****	**9.519****	**14.607****	**0.917**
	(1.96)	(2.39)	(2.05)	(2.10)	(0.73)
All Controls	Yes	Yes	Yes	Yes	Yes
N	4,523	2,929	2,929	2,929	2,929
Control for					
Loan Type	Yes	Yes	Yes	Yes	Yes
Loan Purpose	Yes	Yes	Yes	Yes	Yes
Credit Rating	Yes	Yes	Yes	Yes	Yes
Industry and Year	Yes	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm	Firm
R-Squared	0.627	0.453	0.349	0.418	0.454

Table 8 shows how the magnitude of the tax refund is related to loan spread and other contract terms. All continuous variables are winsorized at the 1% level. All variable definitions are presented in the Appendix.