Debt Issuance in the Face of Tax Loss Carryforwards*

Anne-Marie Anderson and Nandu Nayar
Lehigh University

Forthcoming, *The Financial Review*

We examine the market impact of issuances of public and private debt by firms with sizable tax loss carryforwards. Public issuances are met with a significantly negative stock-price reaction, while private placements are associated with a positive marginally significant stock-price reaction. After controlling for asymmetric information proxies, the stock-price reaction to the debt issuance is more negative, the larger the tax loss carryforward. The evidence suggests that debt financing is suboptimal when issuers have large tax loss carryforwards, which in turn, supports the relevance of taxes for debt usage.

Keywords: asymmetric information, capital structure, corporate debt offering, event studies, non-debt tax shields, taxes
JEL classification: G14, G32

*We thank Kathy Kahle, Mike Pagano, David Reeb, Mike Rozeff, Ajai Singh, Mike Weisbach, and participants at the Temple University finance workshop, and 2007 EFMA meetings in Vienna (Hubert de la Bruslerie, discussant) for helpful comments. Two anonmymous referees, and the editor, Arnie Cowan, provided useful input to sharpen the analysis presented. Nandu Nayar acknowledges support from the Hans Julius Bär Chair.

1 Introduction

The area of corporate capital sources and securities issuance has been extensively researched. Smith (1986) comprehensively summarizes early evidence, while Ritter (2005) discusses more recent developments. The evidence, in general, indicates that public equity issuance is associated with a strongly negative stock-price reaction. However, the result for public straight debt financing is still an open question. While the consensus view (Ritter, 2005) indicates that public straight debt financing is associated with an insignificant stock-price reaction, some evidence in Howton, Howton, and Perfect (1998) and Akhigbe, Easterwood, and Pettit (1997) suggests that straight debt financing is associated with a negative stock-price reaction. Given the mixed evidence, we do not believe that it is a closed issue, and therefore merits further examination. Several reasons have been provided for the Ritter (2005) view regarding the insignificant stock-price reaction to public issuances of straight debt financing. These explanations are based not only on theoretical concepts, but also on empirical measurement issues. For example, Shyam-Sunder (1991) suggests that the default risk of the debt (captured through bond ratings), if not controlled for, can cloud the average stock-price reaction to the debt issuance. Specifically, if a sample contains high-rated issuers for which the stock-price reaction may be positive and low-rated debt issuers for which the stock-price reaction may be negative, then, the average stock-price reaction for the mixed risk sample may turn out to be insignificant. Additionally, Shyam-Sunder considers predictability of the debt issuance as another factor to be controlled for. The predictability argument is also raised by Chaplinsky and Hansen (1993) and Kish (1997).

Our paper examines one of these empirical measurement issues and we show that under certain conditions, straight debt financing does indeed elicit a significant stock-price reaction. Datta, Iskander-Datta, and Patel (2000) report that straight debt financing elicits a significant stock-price reaction. However, there are important differences between their paper and ours. They examine initial offerings of public debt and show that they are associated with a negative average stock-price reaction. Their explanation for the result is that through the debt IPO, the borrower is substituting public debt for private (bank) debt, which leads to reduced monitoring of the borrower. The reduced monitoring leads to increased agency costs, which are detrimental to stockholders, and thus, results in a negative stock-price reaction.

Our main interest is whether, after controlling for asymmetric information effects, the tax deductibility of interest payments is valued by the market when debt is issued. We assume that asymmetric information and tradeoff theories of capital structure are applicable simultaneously, not mutually exclusive. Shyam-Sunder and Myers (1999), Klein, O'Brien, and Peters (2002), and Frank and Goyal (2003) discuss these theories and empirical tests thereof. Also, Byoun (2008) shows that both effects (i.e., asymmetric information and tradeoff issues) need to be considered jointly. What makes one dominate the other depends on the information environment associated with the firm. We use debt issuances by firms with tax loss carryforwards (TLCFs). Mackie-Mason (1990) uses tax loss carryforwards in a seminal paper that shows that non-debt tax shields influence the managerial choice of whether to issue debt or equity. DeAngelo and Masulis (1980) is one of the first papers to theoretically consider these non-debt tax shields in a capital structure context.

Under the tradeoff theory of capital structure, when a firm has sizable TLCFs, it is less likely, all else being equal, to use debt financing for its capital needs (see Mackie-Mason, 1990). This is because the TLCFs reduce the probability of exploiting the tax shield on future interest payments associated with the incremental debt. Thus, by studying debt issuances conducted by firms with sizable TLCFs, we avoid the problem proposed by Shyam-Sunder (1991) and Chaplinsky and Hansen (1993) that debt issues are predictable, and are therefore, "no-news" events.

Studying debt issuances by firms with TLCFs also allows us to examine whether the offerings are positive indicators of firm value as suggested by asymmetric information theories. The fact that a firm issues debt even when such financing is not favored by tax considerations could send a signal that it expects future operating income to be larger than the combined amount of non-debt tax shields including the loss-carryforwards and the future interest expense on the new debt. Signaling becomes even more plausible when the debt is privately placed (Kwan and Carleton, 1998). The confidentiality of information and the possibility of more effective monitoring in a private placement alleviates informational concerns that the market may have about the borrower.

We also examine whether the magnitude of loss carryforwards (a tax-

shield substitute) affects the tax deductibility of interest payments, and in turn, the value of the firm. While Mackie-Mason (1990) reports that the security issuance choice is influenced by tax considerations, there remains a need to investigate the role of taxes in market valuation after controlling for asymmetric information effects. In this context, we study whether a larger TLCF relative to pre-issuance operating earnings affects the stock-price reaction to the issuance after instituting such controls. This provides a market-based view of the value of tax deductibility of interest payments.

Our results indicate that issuances of public debt by firms with large TLCFs are associated with a significantly negative stock-price reaction, on average, while privately placed debt does not evoke a negative average stock-price reaction. The stock-price reaction is more negative when the loss carryforward amount is large relative to pre-issuance operating income before depreciation. The negative stock-price reaction is more pronounced for firms that increase their reliance on debt financing as opposed to using the proceeds of the new debt issue for refinancing existing debt. Thus, the evidence appears supportive of the tradeoff theory view of capital structure, after controlling for asymmetric information effects. Specifically, debt financing is optimal only when deducting the associated interest expense produces a tax benefit via a reduced tax bill.

Given our results, the remaining question is why firms with large TLCFs issue debt if there is going to be a large stock price decline. We suspect that this is because managers could feel that debt is the least costly source of funds even though the issuing firm may have large non-debt tax shields. Issuing firm managers could believe they will be able to take advantage of the interest tax deductions at some future point despite the TLCFs. They could also feel that the debt issued provides enough benefits other than tax shields to make it attractive in that alternatives such as postponing investment or incurring the adverse selection costs of raising equity could prove even more costly. Since the stock price effects of these alternatives are not observable, it is conceivable that managers are making the optimal decision given the circumstances by issuing debt despite the negative average stock price reaction.

2 Prior literature and hypotheses

In this section, we focus on loss carryforwards and the relationship to debt financing, conditional on the information environment.[1] Mackie-Mason (1990) reports that the choice between public debt and equity is associated with tax loss carryforwards. Using discrete choice analysis, he finds that firms with high TLCFs are less likely to use debt as opposed to equity. Given the predisposition to avoid issuing debt when the firm has loss carryforwards, we ask the question, "What happens when a firm with large loss carryforwards goes against the grain, and actually issues debt?"

2.1 Predictability explanation

Shyam-Sunder (1991) and Chaplinsky and Hansen (1993) consider the possibility that the stock market reaction to a straight debt issuance is insignificant because the market anticipates such an issuance and impounds its effects into the stock price before announcement. To account for potential predictability, we employ a completely transparent metric, TLCFs, as Mackie-Mason (1990) suggests, to capture the fact that firms with large TLCFs are not expected to issue debt. Under this framework, any debt issuance should come as a surprise to the market, and is more likely to evoke a significant stock-price reaction which could be either positive or negative.[2]

2.2 Capital structure theories

While re-examining the predictability explanation, we also test various capital structure theories. First, consider the theories based on asymmetric information (which include signaling and agency theory concepts). If a firm that has sizable TLCFs issues debt, the signaling theory would predict that the firm expects to earn taxable income (after removing all other non-debt tax shields like depreciation and TLCFs) that exceeds interest expense on

[1] Ritter (2005) summarizes the literature on security issuance while Graham (2005) discusses the importance of tax issues in corporate finance.

[2] Our results show that despite the reservation expressed in Chaplinsky and Hansen (1993, p.722) about their logit model, their conclusion of a negative stock-price reaction for public debt issuances after controlling for predictability is strongly supported.

the incremental debt. Firms that do not expect to earn as much will not issue debt because of increased bankruptcy costs associated with the incremental debt and the inability to expense the interest for tax purposes. Under this equilibrium, debt issues by firms with sizable TLCFs should be perceived as positive signals of firm value and should elicit a positive stock-price reaction. If the signaling explanation is valid, the stock price reaction to a debt issuance when one is not expected should be measurable in an event study. The same is also true of the agency-based theory which argues that debt imposes a disciplining effect on managers. Consequently, the market will infer that the debt issue will force managers to work harder instead of shirking, leading to an increase in firm value.

A related issue here is the nature of the debt that is employed by the borrower. If there is significant information asymmetry, companies could borrow through a private placement as opposed to a public bond issue. Privately placed debt is viewed in the literature as a more sophisticated mechanism to deal with information asymmetry related moral hazard and adverse selection (see Kwan and Carleton, 1998; Denis and Mihov, 2003.) This is because private placements are negotiated between a financially sophisticated lender and the borrowing firm. Among other factors, the lender does the following:

- conducts a due diligence investigation of the borrower prior to lending;
- is a monolithic entity enabling it to (a) better monitor the normal functioning of the borrower, and (b) to coordinate punitive actions against the borrower in case of malfeasance; and
- brings expertise in the industry and provides it to the borrowing firm in order to safeguard its investment.

Given the above explanation, the ability to place private debt will be construed by the market as a positive signal of the future prospects of the borrower despite the presence of TLCFs and also a better funding mechanism to curtail moral hazard and adverse selection related costs. Consequently, the type of debt issuance, public or private, could affect the stock-price reaction to the debt issuance announcement.

The asymmetric information theory explanation above, while theoretically appealing, may not be entirely consistent with the evidence in Auer-

bach and Poterba (1986). Auerbach and Poterba show that firms with TLCFs have a high probability of continuing to face a zero marginal tax rate in the future. Given this finding, it would seem that firms with TLCFs do not have them extinguished in short order. Specifically, such firms may not be earning enough taxable income in future years to eliminate the TLCFs. Thus, a debt issuance for firms with TLCFs may not be a signal of positive future prospects for the issuing firm. This is an empirical question that we explore in this paper.

Finally, if the results of Auerbach and Poterba (1986) are valid for firms with sizable TLCFs and for firms that have also issued debt, we could have a situation where signaling is not the *raison d'etre* of such issuances, leaving tax effects and bankruptcy costs. Larger firms, which are characterized by lower asymmetric information (see Atiase, 1985; Collins and Kothari, 1989; Barclay and Smith, 1995a, 1995b) are likely the issuers for whom signaling is not the prime motivation. If signaling is absent due to the lack of a high future taxable income, the new debt issuance is not optimal. This is because of increased bankruptcy costs and the inability to exploit the tax deductibility of interest payments on the new debt. Thus, the stock-price reaction to the issuance will reflect the lack of tax deductibility of interest payments on equity value conditional on the asymmetry of information.

We next discuss how the concepts above lead to our empirical predictions. All else being equal, the ability to deduct interest payments for tax purposes is lower, the higher the TLCF. This is because the firm must have much higher taxable income to exceed the TLCFs and the new interest payments. Consequently, the higher the TLCF relative to the firm's earnings prospects, the lower the probability that the firm will be able to exploit the tax deductibility of interest payments. This leads to our first prediction which states that the stock-price reaction to a debt issuance will be more negative when the TLCF is high relative to the pretax operating earnings (after depreciation) of the issuer.[3]

[3] At first glance, the marginal tax rate might seem to be a better proxy than TLCF of the ability to exploit the tax shield on interest payments. We use the TLCF because, unlike the marginal tax rate, it is reported in publicly released financial statements and does not require computation based on assumptions; specifically, the TLCF is transparently available to the market.

Our second empirical prediction builds on the first one. Consider a situation where a firm has a high profit margin, and this firm needs to refinance some maturing debt or use the debt to balance out an increase in equity value to maintain a target debt-to-equity ratio. In particular, this firm, while it enjoys a high profit margin, does not increase its reliance on debt financing. Now contrast this to another firm that has a low profit margin and issues debt such that the reliance on debt financing has increased. We argue that these two situations are at extreme ends of the spectrum of stock-price reactions to debt issuance. The former firm aims to maintain its (presumably optimal) capital structure, and at the same time, enjoys a profit margin such that its TLCFs can be exploited. Conversely, the latter firm has little chance of exploiting the existing TLCFs due to low profitability and worsens the situation further by adding to its debt burden. Here, the added debt destroys value in two ways: first, interest payments on the new debt may not be tax deductible given the large TLCFs that already exist, and second, the increased debt load worsens bankruptcy risk. Consequently, the stock-price reaction to the debt issuance by the former firm type will be less negative than the reaction to the latter's debt issuance. Thus, our second empirical prediction states that the stock-price reaction should be positively related to the profitability ratio of the borrowing firm and negatively related to an increased reliance on debt financing.

Our third empirical prediction pertains to the information environment. If the issuing firm has no asymmetric information-related problems, we argue that the tradeoff theory becomes more applicable. Therefore, tax-related costs and benefits and bankruptcy costs become the drivers of issuance effects. However, when asymmetric information exists, other factors need to be considered. First, whether the issuance is a public issuance or private placement can affect the stock-price reaction. Given that private debt placements are used by those borrowers who are most affected by asymmetric information and can benefit the most from the signal, it is important to control for the nature of the issuance. Additionally, after controlling for private or public issuance, another factor could be the degree of asymmetric information surrounding the issuer. It has been established in the literature that larger firms are better known and are characterized by lower information asymmetry. Thus, signaling and resolution of asymmetric information problems is less of a motivation underlying issuances by large firms. For such firms, the tradeoff theory is most applicable, which argues that in the face of sizable

TLCFs, debt issuances are suboptimal. Consequently, our third prediction is that larger firms which issue public debt will find themselves suffering a more negative stock-price reaction to the debt issuance. Conversely, smaller issuers that use private placements should experience a more positive stock-price reaction.

3 Data and descriptive statistics

From the 2006 Compustat database, we identify all non-financial firms (i.e., with Standard Industry Classification (SIC) codes less than 6000 and greater than 6999) and with net operating loss carryforwards (Compustat data item 52) greater than or equal to 5% of sales (Compustat data item 12).[4] We match these firms to three subsets of debt issuances in 1983-2003 from the Thomson Financial SDC Platinum database (SDC): regularly registered debt, debt issued through takedowns of shelf registrations, and private placements of straight debt. We retain only debt issues in the year following the fiscal-year end in which a 5% or greater TLCF is first reported.

We separately analyze the public debt issuances by regular registration versus shelf takedowns. Shelf takedowns are completed rapidly via an amendment to the original registration statement and therefore may be subject to less scrutiny prior to issuance.[5] Also, shelf registrations are typically undertaken by larger, more financially secure firms.

We apply the following additional screens to all three types of issuances:

- Proceeds of debt issued scaled by pre-issuance total assets equal or exceed 5%. This restriction eliminates debt issuances that may may be too small to engender a stock-price reaction.

[4]The 5% cutoff is admittedly arbitrary. However, our aim is to select a sample with a large enough TLCF to potentially influence the debt issuance decision. We acknowledge that the criterion could restrict the generalizability of our findings to the population of all debt-issuing firms.

[5]For example, see Allen, Lamy and Thompson (1990), Blackwell, Marr, and Spivey (1990), and Sherman (1999). Shyam-Sunder (1991) also makes this distinction between shelf and regularly registered debt issuances.

- No simultaneous issues. This restriction ensures that information about the straight debt issuance is not contaminated by the reaction to another security type being issued.
- No unit issues. This restriction is imposed because of the possibility of follow-on issues that unit issues entail.
- Sufficient data on the CRSP database to enable an event study to be performed.

Following these screens, there are 76 regularly registered debt issuances, 71 shelf takedowns, and 145 private debt placements. For the regularly registered sample, the event date is the filing date. The offering date as provided by SDC is the event date for shelf takedowns and private placements. We search Dow Jones News Retrieval/Factiva for:

- any mention of the debt issuance in an earlier news release; if we find one, the date of that news release is used as the event date.
- other significant corporate events which could contaminate the stock-price reaction on the event dates; if any is found within two trading days before to two trading days after the event date, we drop the issuance from the sample.[6]

The final sample contains 41 regularly registered issues, 52 shelf takedowns and 111 private placements.[7]

Table 1 presents the chronological distribution of events in the three samples. From Table 1, it would seem that firms with sizable TLCFs are issuing their public debt using shelf takedowns in more recent times as opposed to regular registrations. This could be because shelf registrations are completed more expeditiously. Similar to regular registrations, private placements taper off in recent years.

Table 2 reports that the most common industry groups represented in the sample are Manufacturing, Natural Resources, and Radio, TV, and Telecom. There do not appear to be major differences in industry groupings

[6]Examples of significant events are earnings announcements, dividends announcements, management changes.

[7]There are six firms that make both public and private issues. Removal of these firms in the cross-sectional analysis that follows does not affect the tenor of the results.

across the issuance subsamples. In Tables 3, 4, and 5, we present characteristics of the issuers and the debt issued for the regular registration, the shelf takedown, and the private placements samples, respectively. In Table 3, we also present results of nonparametric Wilcoxon Rank Sum tests comparing various characteristics between the regular registration subsample and the shelf registration subsample. These tests indicate that there are significant differences on numerous dimensions, thus justifying the separate examination of each public issuance subsample. First, shelf takedown issuers are significantly larger than regular registrants in terms of total assets, sales, and market value of equity. They have significantly higher profit margins and interest coverage ratios. Both issuer types seem to have similar debt and current ratios. Issuers employing regular registrations have significantly higher loss carryforwards (scaled by operating income before depreciation) than the shelf takedown issuers while they have similar Altman Z-scores.[8]

With respect to the characteristics of the issues themselves, in Panel B of Tables 3 and 4, we see that the amount issued in shelf takedowns is significantly larger than the amount issued through regular registration. Additionally, the yield to maturity (YTM) at initial issuance for the shelf takedown sample is significantly lower than the regular registration sample (median difference of close to 4%). While some of the difference in YTM can be due to the distribution of the two samples over time and the associated time variation in interest rates, it is also possibly due to the regular registration sample possessing lower interest coverage ratios and profit margins. Both types of issuers employ similar maturities (median of 10 years). Lastly, the issuances are a smaller percentage of total preissue assets for the shelf takedown sample versus the regular registration sample. The result is consistent with the former sample being made up of firms that have larger total assets and larger sales.

In Table 5, we observe that private debt placement firms are significantly smaller in terms of total assets, sales, and market value of equity. For example, the median total assets for the former is $158 million, while the medians for regular registrants and shelf issuers are $358.3 and $2,454 million, respec-

[8]This is not surprising since shelf registrants have to satisfy stringent Securities and Exchange Commission (SEC) requirements on size, total assets, etc., in order to qualify to access the shelf registered debt market. See Blackwell, Marr, and Spivey (1990) and Sherman (1999).

tively. Their smaller size implies that these private debt placement issuers are more susceptible to the effects of asymmetric information. The private placement sample is also significantly less levered as shown by the preissue debt ratio and also less profitable as measured by the profit margin. With respect to liquidity (as measured by the current ratio), the two issuance samples seem comparable. However, the Altman Z-score is higher for the private placement issuers. Finally, there is no difference in the variable measuring unused loss carryforwards scaled by pretax operating income between the private placement sample and the public issuance sample. Private placement debt issues are smaller in terms of actual dollar size (median of $35 million for private placements versus $119.6 and $245.6 million for regular registrations and shelf takedowns, respectively), but not different as a percentage of pre-issuance total assets. The maturity of the debt issued through private placements (median of about 8 years) is somewhat lower than the maturity of public issuances (median of about 10 years).[9]

4 Results

4.1 Stock-price reactions

Our event-study method is similar to that of Mikkelson and Partch (1988). We estimate the market model for each issuer over a 255 day period ending on day -51 relative to the event date. We use the CRSP equally-weighted and value-weighted indexes as proxies for the market's rate of return. Only issuances with at least 50 non-missing daily returns in the estimation period are included in the event study. We report the results of two tests to assess whether the returns in each event window are abnormal. The first statistic pertains to a two-tail test of the null hypothesis that the mean standardized abnormal return over the event window is zero. The second statistic comes from a non-parametric generalized sign test (see Cowan, 1992) of the hypothesis that the ratio of positive to negative abnormal returns in the event window is not different from this ratio computed over the market model estimation period. We perform the event study for both the regular registrations and shelf takedown issuances, as well as the sample of private debt placements.

[9]The SDC database does not report the YTM of private placements.

The results for public issuances are in Table 6; the stock-price reaction is, on average, negative and significant. The result is robust to the market proxy used, and to regular registration versus shelf takedown. Both statistical tests also confirm that the negative abnormal return is statistically significant. The results in Table 6 suggest that the average abnormal return over day [+1] in event time, depending on the method, ranges from -.58% to -.75%. Our event-study results support the "predictability criticism" of studies of public debt issuances by Shyam-Sunder (1991) and Chaplinsky and Hansen (1993).

To further examine whether the stock-price reaction to public issuances depends on the issuance mechanism (regular registrations versus shelf takedowns), we perform difference of location tests using the Wilcoxon Rank Sum test and a parametric t-test. The results (not reported in a table) show that there is no statistically significant difference between the abnormal return to shelf takedowns or to regular registrations. The evidence of a negative stock-price reaction to public debt issuances does not support either the signaling or agency theory explanations. The inability to benefit from tax deductibility of interest payments on the new debt appears to dominate any alleviation of agency costs brought about by the debt issuance or any signal by the issuer.

Table 7 reports that the average stock-price reaction to private debt placements is positive and marginally significant at the 0.1 level when using the CRSP equally weighted index, and somewhat weaker using the value weighted index. Nonetheless, difference of location tests (not shown in a table), using the Wilcoxon Rank Sum test and a parametric t-test between the abnormal return for the private placement sample and the combined public issuance sample (regular registrations and shelf takedowns), is significant at the 0.01 level in a two-tail test. This suggests that private placement debt issuers are not as negatively affected as public debt issuers with tax loss carryforwards. These results imply that whether the debt is private or public is important for market expectations.[10]

[10]An optimal tax approach would suggest that firms with large TLCFs should issue equity instead of debt since such firms cannot exploit the tax deduction on interest payments associated with the latter. In this context, we examine the announcement period stock-price reaction for a sample of firms with large TLCFs which subsequently conducted seasoned equity offerings (SEO). Such announcements are also met with a negative stock-

4.2 Determinants of the stock-price reaction

This section reports cross-sectional regressions to explain the stock-price reaction to the issuance event using the following explanatory variables.

- *TLCFPOT*
  This is the net operating loss carryforward (Compustat data item 52) scaled by the operating income before depreciation (Compustat data item 13) as of the fiscal year-end immediately preceding the event date. This variable is our proxy for the potential to exploit the tax deductibility of interest payments.[11] Assuming a random walk for operating income (i.e., the denominator of *TLCFPOT*), the expected value for the operating income will be the most recent value. If the TLCF is much larger than the expected operating income, the issuing firm is less likely to be able to exploit the tax deductibility of interest payments on the new debt. Thus, our prediction is that the abnormal return should be negatively related to *TLCFPOT*.

- *PROFITMARGIN* and *IPDG*
  PROFITMARGIN is computed as net income (Compustat data item 172) scaled by sales (Compustat data item 12) as of the fiscal year-end preceding the debt issuance. This variable serves to measure the profitability of the firm. A higher *PROFITMARGIN* would lead to faster usage of a particular amount of TLCF. *IPDG* is the product of *PROFITMARGIN*, as defined earlier, and an indicator variable measuring increased reliance on debt financing following the debt issuance. To compute this indicator variable, we use the ratio of the amount of debt outstanding, which encompasses short-term debt, current portion of long-term debt, and long-term debt (Compustat quarterly items 45 and 51), relative to total assets (Compustat quarterly item 44) as of the quarter end following the issuance and compare it to its analog as of the fiscal quarter end preceding the issuance. This indicator variable

price reaction as is the case for normal SEO samples.

[11] As pointed out by an anonymous reviewer, the use of gross operating loss carryforward may overstate the true tax deductability situation because some of those loss carryforwards may be subject to Section 382 limitations.

is equal to one if this ratio has increased in the quarter following the issuance.[12] Thus, the indicator variable measures whether the proceeds of the debt issuance were employed for refinancing existing debt or to add to the debt load of the firm.[13] Our prediction here is that while the abnormal return should be positively related to *PROFITMARGIN*, it should be negatively related to *IPDG*. Specifically, while a high profit margin, in and of itself, is beneficial in exploiting the TLCFs, increasing the reliance on debt financing reduces the probability of exploiting the TLCFs because of the increased interest expense on the higher debt following the issuance.[14]

- *INCDEBT*
  This variable is the percentage change in the debt measured from the fiscal quarter-end prior to the issue to the fiscal quarter-end following the issue. We suggest that the stock-price reaction to the debt issuance should be negatively associated with this variable. If *INCDEBT* is large, then the firm has increased its reliance on debt financing which will lead to higher interest expenses. This has two possible effects that both decrease stockholder value. First, it exacerbates bankruptcy risk faced by the firm. Secondly, in the face of large TLCFs, the firm cannot derive any tax benefits from immediately deducting the interest expense to reduce taxes.

- *LNMVE*
  This variable is the natural logarithm of the market value of equity measured ten trading days prior to the event date. Given the discussion in section 2, large firms have less asymmetric information, and thus signaling through the debt issuance is less likely to be an influence on the stock-price reaction. Such firms are likely to be penalized more

[12] We also compute this indicator variable relying only on the dollar amount of total debt (i.e., without scaling by total assets). The results using this version mirrored the results shown in the paper.

[13] This indicator variable is equal to one for 49.5% of the private placement sample, 43.9% of the regular registration sample, and 61.5% of the shelf takedown sample.

[14] *IPDG* can be seen as a a proxy for the use of proceeds, whether for refinancing or increasing the debt load of the firm. We do not include a more direct use-of-proceeds measure because this is rarely available for privately placed debt. Additionally, in the public offering sample, several prospectuses use the generic phrase "For General Corporate Purposes", which lends little discriminatory power to any test that considers the use of proceeds variable.

for issuing a sub-optimal security given their current tax situation (i.e., issuing debt when the tax deductibility of interest cannot be exploited). Thus, our prediction is that the abnormal return should be negatively related to *LNMVE*.

- *PUBLIC*
  This variable is an indicator variable that takes on the value of one if the issuance is a public debt issuance and zero if it is a private placement. As mentioned in section 2, a private placement could be more optimal in resolving asymmetric information-related problems as opposed to a public issuance. Our prediction here is that firms that do not suffer from asymmetric information-related problems (as is the case for the *LNMVE* variable) will be penalized if they issue debt when they have sizable TLCFs on their books. Thus, the abnormal return should be negatively related to *PUBLIC*.

The dependent variable is the abnormal return over the two-trading day window, (0,+1), using the CRSP equally-weighted index as the market proxy.[15] We use ordinary least squares regression with the explanatory variables discussed above.[16] For the regression analysis, we combine the separate samples of regular registrations (41 observations), shelf takedowns (52 observations), and private placements (111 observations) to obtain a final sample of 204 observations.

The results are in Table 8. Our results are from estimations where we checked for influential observations based on Cook's distance (Belsley, Kuh and Welch, 1980). We examine variance inflation factors to check for multicollinearity and find none. For the regression coefficients, p-values are from t-statistics adjusted for heteroskedasticity using the White (1980) procedure.

[15] We also try the abnormal return on day +1 as the dependent variable and find similar results. The results are also similar using the value weighted market index instead of equal weighted.

[16] Several other control variables suggested by theory are found to be insignificant. These variables include an indicator variable to capture the shelf takedown versus regular registration difference; indicator variables to capture industry group, whether the bond is callable, is collateralized; and also continuous variables such as size of the debt issuance (scaled by pre-issuance sales or scaled by pre-issuance total assets), Altman Z-score, growth rate measures, bond rating from Compustat as of the fiscal quarter end before the event date, and the marginal tax rate (both pre- and post-financing; Graham, 1996).

In rows 1 through 3 of Table 8, we see strong evidence that the abnormal return is significantly negatively related to *TLCFPOT*. The higher the TLCFs relative to the operating income before depreciation, the more negative the stock-price reaction. In other words, the equity market recognizes when the security issuance choice is suboptimal from a tax perspective and penalizes the firm for issuing debt. This result dovetails well with the Mackie-Mason's (1990) conclusion that security issuance choice favors equity when TLCF is high. Additionally, our evidence indicates why managers of firms with sizable TLCFs are more likely to choose equity over debt because there are penalties in the form of equity value reductions associated with suboptimal issuance decisions.[17]

In rows 1 through 3 of Table 8, the abnormal return to the issuance is significantly positively related to *PROFITMARGIN*. The higher the earnings after taxes relative to sales, the less negative the stock-price reaction to the debt issuance. Specifically, if a large portion of each dollar of revenue flows in as taxable income, then the TLCF becomes even more valuable since the firm is able to exploit that TLCF faster and more effectively. Consequently, the firm is better off. On the other hand, if the firm converts only a small fraction of revenue into taxable income, then the TLCF will linger on for a longer time, and the present value of the tax savings it provides is now much lower. Additionally, the interaction variable, *IPDG*, has a negative and significant coefficient in all three rows. Interestingly, the coefficient is of similar magnitude and opposite in sign to the coefficient of *PROFITMARGIN*. In other words, if the borrowing firm's debt load increases, the positive effect on the stock-price reaction bestowed by the *PROFITMARGIN* variable is negated. In sum, if the funds from the debt issuance by a firm with TLCFs are used to refinance existing debt or balance out a debt ratio, the effect on the borrower is not as negative as it would be if the debt load were increased. This supports our prediction in Section 2 and provides tangential support for tradeoff theory of capital structure.

The results in the three rows also indicate that the stock-price reaction to the issuance is negatively related to *INCDEBT*. This confirms that ad-

[17] We also try adding a variable equal to the depreciation expense scaled by the operating income before depreciation and taxes to the model of row 3. This coefficient is statistically insignificant.

ditional debt usage is not optimal when the issuing firm already has large TLCFs and suggests support for the tradeoff model of capital structure.

We now control for asymmetric information using the proxy variables *LNMVE* and *PUBLIC*). In row 1 of Table 8, we see that the abnormal return is negatively related to *LNMVE*. Therefore, after controlling for the magnitude of the TLCFs, the potential to utilize the tax deductibility of the interest payments and the profitability of the firm, the coefficient of *LNMVE* is negative. Thus, high market value of equity firms with TLCFs are penalized more for issuing debt, all else equal. This is because high market value equity (i.e., large) firms have lower asymmetric information. Consequently, any issuance of debt in the face of sizable TLCFs is viewed by the equity markets not as a signal, but more as a suboptimal security issuance decision because of the inability to deduct interest expenses for tax purposes. This view is buttressed when we employ *PUBLIC* as the measure of the absence of asymmetric information in row 2. Recall that this variable is equal to one for a public issuance and zero for a private placement. In section 2, we argue that the monitoring, bonding, and signaling implications are much stronger for a private placement as opposed to a public issuance. Further in Table 5, it is evident that private placements are undertaken by significantly smaller firms and raise much smaller amounts of debt. The negative coefficient for *PUBLIC* in row 2 of Table 8 supports our earlier prediction that a firm making a public issuance will suffer a more negative stock-price reaction to the issuance than a private placement.

Lastly in row 3, we create a composite measure of the absence of asymmetric information, *NOASYINFO*, which is the product of *LNMVE* and *PUBLIC*. The logic behind this variable is as follows: a large firm (i.e., one with a large value of *LNMVE*) that makes a public issuance ($PUBLIC = 1$) is one where the mitigation of asymmetric information-related problems is least likely to be the motivation underlying the issuance. The market will then realize that the issuance is suboptimal from a tax perspective and will penalize that firm more, all else being equal. Consistent with this prediction, the coefficient of *NOASYINFO* is significantly negative. Given the above discussion, the main point to be made here is that after controlling for asymmetric information-related variables, the variable measuring the TLCF status and the ability to extinguish it in short order are both significant in determining the stock-price reaction to debt issuance irrespective of the issuance

method, which is consistent with the tradeoff theory of capital structure.

5 Conclusions

The stock market reaction to public straight debt issuances is typically insignificant. Shyam-Sunder (1991) and Chaplinsky and Hansen (1993) suggest that the main reason for this finding is that debt issuances are predictable. To negate the problem of predictable debt issues, we examine the stock market reaction to issuances of debt by firms with sizable tax loss carryforwards. Our motivation comes from Mackie-Mason (1990), who reports that firms with tax loss carryforwards are more likely to issue equity as opposed to debt. Mackie-Mason (1990), thus, is the first study to report that security issuance decisions are predicated on tax considerations. Given that firms with sizable tax loss carryforwards are not expected to issue debt, we are able to surmount the problem noted by Shyam-Sunder (1991) and Chaplinsky and Hansen (1993) that debt issuances are predictable. We find that the equity market reacts negatively to unexpected public debt issuances. This evidence supports the Chaplinsky and Hansen (1993) results and demonstrates that their results are not driven by the logit model they use to determine debt issuance predictability.

More importantly, using our unique debt issuance sample, we draw conclusions about the relation between capital structure and corporate tax status. We observe that private debt placements by firms with sizable tax loss carryforwards are not received as negatively as public issuances. This result suggests that asymmetric information effects are at work in such private placements. Furthermore, after controlling for asymmetric information-related variables, the stock market reaction is more negative when (a) the amount of the loss carryforward is larger, (b) debt usage following the issuance increases, and (c) the ability to fully exploit the tax loss carryforward is lower. This constitutes strong evidence that when asymmetric information is not a problem, that firms deviating from the prescriptions of the tradeoff theory could suffer a loss in value.

References

Akhigbe A., J. C. Easterwood, and R. R. Pettit, 1997. Wealth effects of corporate debt issues: The impact of issuer motivations, *Financial Management* 26, 32-47.

Allen, D. S., R. Lamy, and G. Rodney Thompson, 1990. The shelf registration of debt and self selection bias, *Journal of Finance* 45, 275-288.

Atiase, R., 1985. Predisclosure information, firm capitalization, and security price behavior around earnings announcements, *Journal of Accounting Research* (Spring), 21-36.

Auerbach A. and J. M. Poterba, 1986. Tax loss carryforwards and corporate tax incentives, *Working Paper*, Dept. of Economics, MIT.

Barclay, M.J. and C.W. Smith, 1995a. The maturity structure of corporate debt, *Journal of Finance* 50, 609-631.

Barclay, M.J. and C.W. Smith, 1995b. The priority structure of corporate liabilities, *Journal of Finance* 50, 899-917.

Belsley, D. A., E. Kuh, and R. E. Welsch, 1980. Regression Diagnostics: Identifying Influential Data and Sources of Collinearity (John Wiley and Sons, New York).

Blackwell, D. W., M. W. Marr, and M. F. Spivey, 1990. Shelf registration and the reduced due diligence argument: Implications of the underwriter certification and the implied insurance hypotheses, *Journal of Financial and Quantitative Analysis* 25, 245-260.

Byoun, S., 2008. How and when do firms adjust their capital structures toward targets? *Journal of Finance*, Forthcoming.

Chaplinsky, S. and R.S. Hansen, 1993. Partial anticipation, the flow of information and the economic impact of corporate debt sales, *Review of Financial Studies* 6, 709-732.

Collins, D. W. and S.P. Kothari, 1989. An analysis of intertemporal and cross-sectional determinants of earnings response coefficients,*Journal of Accounting and Economics* 11, 143-181.

Cowan, A. R., 1992. Nonparametric event study tests, *Review of Quantitative Finance and Accounting* 2(4), 343-358.

Datta, S., M. Iskander-Datta, and A. Patel, 2000. Some evidence on the uniqueness of initial public debt offers, *Journal of Finance* 55, 715-743.

DeAngelo, H. and R. Masulis, 1980. Optimal capital structure under corporation and personal taxation, *Journal of Financial Economics* 9, 3-27.

Denis, D. J. and V. T. Mihov, 2003. The choice among bank debt, non-bank private debt, and public debt: evidence from new corporate borrowings, *Journal of Financial Economics* 70, 3-28.

Frank, M.Z. and V.K. Goyal, 2003. Testing the pecking order theory of capital structure, *Journal of Financial Economics* 67, 217-248.

Graham, J. R., 1996. Proxies for the corporate marginal tax rate, *Journal of Financial Economics* 42, 187-221.

Graham, J. R., 2005. Taxes and corporate finance, Forthcoming in B. Espen Eckbo (ed.), Handbook of Corporate Finance: Empirical Corporate Finance (Handbooks in Finance Series, Elsevier/North-Holland), Chapter 5.

Howton, S., S. Howton, and S. Perfect, 1998. The market reaction to straight debt issues: The effects of free cash flow, *Journal of Financial Research* 21, 219-228.

James, C., 1987. Some evidence on the uniqueness of bank loans, *Journal of Financial Economics* 19, 217-236.

Kish, R. J., 1997. Does the market react to surprise issues of callable and noncallable debt? *Journal Of Financial And Strategic Decisions* 10, 27-38.

Klein, L. S., T. J. O'Brien, and S. R. Peters, 2002. Debt vs. equity and asymmetric information: A review. *The Financial Review* 37, 317-349. http://www3.interscience.wiley.com/journal/118919696/abstract

Kwan, S. and W. Carleton, 1998. Financial contracting and the choice between private placement and publicly offered bonds. Working Paper, University of Arizona.

Mackie-Mason, J. K., 1990. Do taxes affect corporate financing decisions?, *Journal of Finance* 45, 1471-1494.

Mikkelson, W. H. and M. M. Partch, 1988. Withdrawn security offerings, *Journal of Financial and Quantitative Analysis* 23(2), 119-134; Errata, 1988, 23(4), 487.

Ritter, J. R., 2005. Investment banking and securities issuance, Working draft of Chapter 5 of Handbook of the Economics of Finance, Edited by G.M. Constantinides, M. Harris and R. Stulz, Elsevier Science B.V., see: http://bear.cba.ufl.edu/ritter/pbritter.htm

Sherman, A. E., 1999. Underwriter certification and the effect of shelf registration on due diligence, *Financial Management* 28, 5-19.

Shyam-Sunder, L., 1991. The Stock Price Effect of Risky Versus Safe Debt, *Journal of Financial and Quantitative Analysis* 26, 549-558.

Shyam-Sunder, L. and S.C. Myers, 1999. Testing static trade-off against pecking order models of capital structure, *Journal of Financial Economics* 51, 219-244.

Smith, C. W., Jr., 1986. Investment banking and the capital acquisition

process, *Journal of Financial Economics* 15(1/2), 3-29.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity, *Econometrica* 48(4), 817-838.

Table 1
Chronological distribution of debt issuances

The sample consists of debt issuances by corporations with sizeable tax-loss carryforwards. The sample is from the 2006 Compustat annual database and the SDC Global New Issues database and spans January 1983 through December 2003.

Year	Number of events		
	Regular registrations	Shelf registrations	Private placements
1983	1	0	0
1984	5	0	6
1985	3	0	7
1986	2	0	10
1987	2	0	10
1988	1	0	11
1989	1	1	12
1990	0	0	5
1991	2	1	6
1992	6	1	2
1993	7	2	10
1994	2	0	5
1995	2	5	6
1996	2	4	3
1997	5	6	0
1998	0	5	6
1999	0	9	5
2000	0	2	3
2001	0	4	2
2002	0	3	2
2003	0	9	0
All years	41	52	111

Table 2
Industry membership of firms issuing debt

The sample of debt issuances by firms with sizeable tax loss carryforwards is from the 2006 Compustat annual data file and the SDC Global New Issues database and spans January 1983 to December 2003.

Industry (as per SDC designation)	Regular registrations	Shelf registrations	Private placements
Agriculture	0	1	0
Construction	2	1	4
Healthcare	1	0	0
Investment bank	0	0	1
Leisure	1	0	2
Manufacturing	16	13	39
Natural resources	5	23	10
Other utility	2	0	1
Pers, bus, rep svc	0	2	10
Radio/TV/Telecom	7	3	11
Restaurant/Hotel	2	2	3
Retail	1	1	5
Sanitation	1	1	1
Telephone communications	0	2	1
Transportation	3	1	19
Wholesale	0	2	4
All	41	52	111

Table 3
Issuer and issue characteristics for regular registrations

The sample consists of regularly registered debt issuances by firms with sizeable tax loss carryforwards. All balance sheet and income statement items are extracted from 2006 Compustat as of the fiscal year-end immediately preceding the event date. OIBD is the operating income before depreciation, EAT is earnings after taxes, CA is current assets, CL is current liabilities, and YTM is the yield-to-maturity of the debt at initial issuance. To compare the regular registration sample against the shelf offerings listed in Table 4, we use nonparametric Wilcoxon Rank Sum tests. The sample sizes in the rows vary due to availability of data.

[a] NS means no significant difference and H (L) means higher (lower) than the shelf registration sample value.

Variable	N	Mean	Median	σ	Relative to shelf[a]
Panel A. Issuer characteristics					
Total assets, TA (in $million)	41	595.7	358.3	612.6	L ***
saless (in $million)	41	433.3	292.1	433.4	L ***
Market value of equity (in $million)	39	379.3	120.8	742.7	L ***
Preissue debt ratio (Total debt/TA)	34	0.397	0.381	0.315	NS
Profit margin (EAT/Sales)	41	-0.047	-0.003	0.346	L ***
Times interest earned (OIBD/Int expense)	41	2.69	1.55	5.83	L ***
Current ratio (CA/CL)	40	1.72	1.29	1.62	NS
Loss carryforward/OIBD	41	8.91	2.12	28.24	H ***
Altman Z-score	32	2.6	1.79	3.09	NS
Panel B. Debt issue characteristics					
Amount issued (in $million)	41	134.4	119.6	100.7	L ***
Offer YTM (%)	36	11.74	11.94	1.98	H ***
Maturity in years	41	10.12	10	4.08	NS
Amount issued divided by total assets	41	0.37	0.28	0.33	H ***

*, **, *** indicate significance at the .1, .05, and .01 levels, respectively.

Table 4
Issuer and issue characteristics for shelf takedowns

The sample consists of shelf registered debt issuances by firms with sizeable tax loss carryforwards. All balance sheet and income statement items are extracted from Compustat as of the fiscal year-end immediately preceding the event date. OIBD is the operating income before depreciation, EAT is earnings after taxes, CA is current assets, CL is current liabilities, and YTM is the yield-to-maturity of the debt at initial issuance. The sample sizes in the rows vary due to availability of data.

Variable	N	Mean	Median	σ
Panel A. Issuer characteristics				
Total assets, TA (in $million)	52	2892.5	2453.6	1954.6
saless (in $million)	52	1950.7	935.2	2180.6
Market value of equity (in $million)	52	2362.3	1695.2	1999.9
Preissue debt ratio (Total debt/TA)	52	0.378	0.376	0.163
Profit margin (EAT/Sales)	52	0.035	0.041	0.246
Times interest earned (OIBD/Int expense)	52	5.4	4.5	4.2
Current ratio (CA/CL)	51	1.55	1.19	1.08
Loss carryforward/OIBD	52	0.78	0.63	1.18
Altman Z-score	50	5.45	2.45	19.33
Panel B. Debt issue characteristics				
Amount issued (in $million)	52	273.1	245.6	147.3
Offer YTM (%)	50	7.95	7.51	1.56
Maturity in years	52	13.62	10	10.21
Amount issued divided by total assets	52	0.12	0.09	0.07

Table 5
Issuer and issue characteristics for private placements

The sample consists of private placements of straight debt by firms with sizeable tax loss carryforwards. All balance sheet and income statement items are extracted from 2006 Compustat as of the fiscal year-end immediately preceding the event date. OIBD is the operating income before depreciation, EAT is earnings after taxes, CA is current assets, and CL is current liabilities. To compare the private placement sample against the public debt issuance sample (consisting of the regular and shelf offerings; see Tables 3 and 4), we use nonparametric Wilcoxon Rank Sum tests. The sample sizes in the rows vary due to availability of data. [a] NS means no significant difference and H (L) means higher (lower) than the public issuance sample value.

Variable	N	Mean	Median	σ	Relative to public issuances[a]
Panel A. Issuer characteristics					
Total assets, TA (in $million)	111	381.00	158.10	589.90	L***
saless (in $million)	111	360.45	130.40	654.00	L ***
Market value of equity (in $million)	111	262.19	95.25	413.83	L ***
Preissue debt ratio (Total debt/TA)	91	0.417	0.287	0.968	L **
Profit margin (EAT/Sales)	111	-0.107	0.011	0.370	L **
Times interest earned (OIBD/Int expense)	110	2.489	2.492	8.593	NS
Current ratio (CA/CL)	103	1.631	1.485	1.032	NS
Loss carryforward/OIBD	111	0.212	1.113	12.529	NS
Altman Z-score	95	4.330	2.750	6.485	H *
Panel B. Debt issue characteristics					
Amount issued (in $million)	111	55.9	35	66.1	L ***
Maturity in years	98	8.77	7.96	5.08	L *
Amount issued divided by total assets	111	0.263	0.169	0.263	NS

*, **, *** indicate significance at the .1, .05, and .01 levels, respectively.

Table 6
Stock-price responses to public debt issuances

The sample of public issuances is composed of both regular registrations as well as shelf takedowns by firms with sizeable tax loss carryforwards. The event date is the date on which the market first learns of the issuance. For regular registrations, the event date (day 0) is the earlier of two dates: filing date of the registration statement or the date on which the newswire services reported on the issuance. For shelf takedowns, the event date is the earlier of two dates: offer date of the shelf takedown as provided in the SDC Global New Issues database or the date on which the newswire services reported on the issuance. Two proxies for the market index are used for estimating the market model. The estimation period spans a 255-day period ending on day -51 relative to the event date.

Event window	Mean abnomal return	Number of positive to negative abnormal returns	Z-statistic for abnormal return	Z-statistic to test ratio of positive to negative abnormal returns
Panel A. Combined regular registrations and shelf takedowns				
CRSP equally weighted index as proxy for market portfolio				
(-50,-1)	-2.78%	41:52	-1.391	-0.447
(0)	-0.28%	42:51	-1.084	-0.239
(+1)	-0.66%	29:64	-2.774***	-2.942***
(0,+1)	-0.94%	35:58	-2.475**	-1.695*
(+2,+50)	-1.06%	48:45	-0.684	1.008
CRSP value weighted index as proxy for market portfolio				
(-50,-1)	-2.53%	37:56	-0.683	-1.349
(0)	-0.32%	40:53	-1.067	-0.726
(+1)	-0.67%	32:61	-2.696***	-2.389**
(0,+1)	-0.99%	30:63	-2.408**	-2.804***
(+2,+50)	-1.83%	45:48	-0.694	0.313

Table 6 continued

Event window	Mean abnomal return	Number of positive to negative abnormal returns	Z-statistic for abnormal return	Z-statistic to test ratio of positive to negative abnormal returns
Panel B. Regular registrations				
CRSP equally weighted index as proxy for market portfolio				
(-50,-1)	-1.28%	17:24	-0.500	-0.433
(0)	-0.55%	16:25	-1.431	-0.748
(+1)	-0.70%	13:28	-2.042**	-1.690*
(0,+1)	-1.26%	13:28	-2.266**	-1.690*
(+2,+50)	-0.09%	21:20	-0.459	0.823
CRSP value weighted index as proxy for market portfolio				
(-50,-1)	-0.34%	15:26	-0.070	-1.040
(0)	-0.55%	15:26	-1.325	-1.040
(+1)	-0.58%	17:24	-1.887*	-0.412
(0,+1)	-1.13%	11:30	-2.084**	-2.296**
(+2,+50)	-2.32%	17:24	-1.033	-0.412
Panel C. Shelf takedowns				
CRSP equally weighted index as proxy for market portfolio				
(-50,-1)	-3.96%	24:28	-1.436	-0.218
(0)	-0.06%	26:26	-0.367	0.337
(+1)	-0.63%	16:36	-1.988**	-2.440**
(0,+1)	-0.69%	22:30	-1.472	-0.774
(+2,+50)	-2.08%	27:25	-0.430	0.615
CRSP value weighted index as proxy for market portfolio				
(-50,-1)	-4.27%	22:30	-0.899	-0.881
(0)	-0.14%	25:27	-0.426	-0.049
(+1)	-0.75%	15:37	-2.051**	-2.823***
(0,+1)	-0.88%	19:33	-1.565	-1.713*
(+2,+50)	-1.83%	28:24	-0.091	0.784

*, **, *** denote significance at the 0.1, 0.05, and 0.01 levels, respectively, in a two-tail test.

Table 7
Stock-price responses to private debt placements

The sample consists of private debt placements by firms with sizeable tax loss carryforwards. The event date, day 0, is the offer date of the private placement as provided in the SDC Global New Issues database or the date on which the newswire services reported on the issuance, whichever is earlier. Two proxies for the market index are used for estimating the market model. The estimation period spans a 255 day period ending on day -51 relative to the event date.

Event window	Mean abnomal return	Number of positive to negative abnormal returns	Z-statistic for abnormal return	Z-statistic to test ratio of positive to negative abnormal returns
		CRSP equally weighted index as proxy for market portfolio		
(-50,-1)	1.56%	61:50*	0.767	1.860*
(0)	-0.21%	49:62	-0.638	-0.425
(+1)	0.40%	60:51*	1.733*	1.669*
(0,+1)	0.19%	55:56	0.888	0.717
(+2,+50)	3.76%	59:52	1.730*	1.479
		CRSP value weighted index as proxy for market portfolio		
(-50,-1)	1.52%	63:48*	0.689	2.088**
(0)	-0.22%	51:60	-0.613	-0.194
(+1)	0.39%	59:52	1.687*	1.327
(0,+1)	0.16%	56:55	0.9	0.757
(+2,+50)	4.49%	61:50*	1.991**	1.708*

*, **, *** denote significance at the 0.1, 0.05, and 0.01 levels, respectively, in a two-tail test.

Table 8
Cross-sectional determinants of abnormal return

The dependent variable in the ordinary least squares regressions is the abnormal stock return over days (0,+1) where day 0 is when the market first learns of the debt issuance. The estimation is performed on the combined sample of 93 informationally clean public debt issuances (regular registrations and shelf takedowns), and 111 private debt placements undertaken by firms with sizeable tax loss carryforwards. *TLCFPOT* is measured as the net operating loss carryforward scaled by the net operating income before depreciation as of the fiscal year-end preceding the issuance. *PROFITMARGIN* is computed as net income scaled by sales as of the fiscal year-end preceding the issuance. *IPDG* is an interaction variable computed as the product of *PROFITMARGIN* and an indicator variable which is equal to one if the amount of debt scaled by total assets is higher in the quarter following the issuance relative to its value in the quarter preceding the issuance. *INCDEBT* is the fractional increase in debt usage from the fiscal quarter-end preceding the debt issuance to the fiscal quarter-end following the issuance. *LNMVE* is the natural log of the market value of equity obtained as the shares outstanding multiplied by the share price 10 trading days before the event date. *PUBLIC* is an indicator variable that is equal to one for a public issuance and zero for private placements. *NOASYINFO* is a measure of the absence of asymmetric information-related problems and is computed as the product of *LNMVE* and *PUBLIC*. For the regression coefficients, p-values for significance in a two-tail test appear in parenthesis below the estimates.

Row	Regression coefficient and p-value in parentheses								Adjusted R^2 (p-value for F-statistic)
	Intercept	*TLCFPOT*	*PROFITMARGIN*	*IPDG*	*INCDEBT*	*LNMVE*	*PUBLIC*	*NOASYINFO*	
1	0.0391 (.0487)	-0.0006 (.0002)	0.0543 (<.0001)	-0.0585 (.0003)	-0.0038 (.0534)	-0.00308 (.0517)	-	-	0.1182 (<.0001)
2	0.0063 (.0869)	-0.0006 (.0010)	0.0542 (<.0001)	-0.0571 (.0004)	-0.0037 (.0580)	-	-0.01188 (.0272)		0.1230 (<.0001)
3	0.0066 (.0724)	-0.0006 (.0009)	0.0547 (<.0001)	-0.0573 (.0004)	-0.0037 (.0606)	-	-	-0.0009 (.0190)	0.1258 (<.0001)