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Do Banks Price their Informational Monopoly?

Abstract

Modern corporate finance theory argues that although bank monitoring is beneficial to borrowers, it also allows banks banks to use the private information they gain through monitoring to "hold-up" borrowers for higher interest rates. In this paper, we seek empirical evidence for this information hold-up cost. Since new information about a firm's creditworthiness is revealed at the time of its first issue in the public bond market, it follows that after firms undertake their bond IPO, banks with an exploitable information advantage will be forced to adjust their loan interest rates downwards, particularly for firms that are revealed to be safe. Our findings show that firms are able to borrow from banks at lower interest rates after they issue for the first time in the public bond market and that the magnitude of these savings is larger for safer firms. We further find that among safe firms, those that get their first credit rating at the time of their bond IPO benefit from larger interest rate savings than those that already had a credit rating when they entered the bond market. Since more information is revealed at the time of the bond IPO on the former firms and since this information will increase competition from uninformed banks, these findings provide support for the hypothesis that banks price their informational monopoly. Finally, we find that while entering the public bond market may reduce these informational rents, it is costly to firms because they have to pay higher underwriting costs on their IPO bonds. Moreover, IPO bonds are subject to more underpricing than subsequent bonds when they first trade in the secondary bond market.

1 Introduction

It is now well established in the modern theory of corporate finance that there are both benefits and costs to relying on bank debt. As formulated by Rajan (1992), banks have more incentive than dispersed "arm's length" debtholders to monitor borrowers. However, the private information that banks gain through monitoring allows them to "hold up" borrowers — if a borrower seeks to switch banks, it may be pegged as a "lemon" regardless of its true financial condition.[1] In this paper, we seek empirical evidence for this informational hold-up cost by comparing banks' loan pricing policies before and after borrowers gain access to public debt markets. Access to these markets gives us an opportunity to detect the informational rents because it reveals new information about firms, thereby reducing the informational advantage of incumbent banks. Our evidence suggests that banks do price their informational advantage and that informational rents are economically significant.

Early attempts to investigate the importance of the hold-up problem, including Houston and James (1996) and Farinha and Santos (2002), focused on firms' choices of funding sources. These studies build on the idea that if the hold-up problem is a concern, then it is likely to be more costly for firms with many growth opportunities. These firms are more likely to select funding choices that reduce their exposure to the hold-up costs.[2] More recently, researchers, including Santos and Winton (2007) and Schenone (2007), started to consider bank loan pricing policies to investigate the importance of the hold-up problem more directly.[3] Our paper is closer to the latter literature in that we consider bank loan pricing policies to investigate the importance of the hold-up problem, but we adopt a novel approach, focusing on how these policies vary with firms' bond IPOs.

Our departing point is the following: When a firm issues for the first time in the public bond market, new information about the firm's creditworthiness is made public. This new

[1]Rajan in turn builds on works by Diamond (1984), who models the monitoring advantages of bank loans over arm's-length debt, and Sharpe (1990), who models the informational hold-up aspect of bank loans.

[2]Using data from U.S. public firms, Houston and James (1996) find supporting evidence for this idea: Firms with a single bank relationship tend to rely less on bank debt as growth opportunities increase: however, the opposite is true for firms with multiple bank relationships. Farinha and Santos (2002) also find supporting evidence for that idea. Using data from Portuguese private firms, they find that nearly all firms start out borrowing from a single bank, but as they grow older, those with more growth opportunities are more likely to switch to multiple bank relationships. For further references, see the surveys by Boot (2000) and Ongena and Smith (2000).

[3]Schenone (2007) investigates the importance of hold-up costs by comparing the impact of lending-relationship intensity on loan spreads before and after firms' equity IPOs. Santos and Winton (2007), in turn, investigate the importance of informational hold-up costs by comparing the interest rates banks charge on their loans to bank-dependent and non-bank-dependent borrowers over the business cycle.

information arises from the documents firms have to disclose for their SEC registration, the documents investment banks publicize in their placement efforts, the scrutiny of bond analysts and bond investors, and the credit ratings assigned by rating agencies. We pay particular attention to credit ratings because there is evidence that rating agencies produce valuable information on firms and, as we will show, the vast majority of firms get their first credit rating at the time they issue their first public bond.[4]

To build our main hypothesis, we consider Rajan's (1992) result that incumbent banks are able to extract more informational rents from riskier borrowers than from safer ones because outside banks are less willing to bid on loans to borrowers that are perceived to be riskier. Specifically, we hypothesize that the information about the riskiness of firms that is made public at the time of the bond IPO increases outside banks' willingness to bid on loans to firms, in particular to firms that are revealed to be safe. As a result, informational rents should decline following a firm's bond IPO, particularly for those firms that are identified at the time of the bond IPO to be safe. To illustrate, consider a setting in which prior to the bond IPO, incumbent banks know the true risk of each firm, while outside banks know only the distribution of firm risk. After the bond IPO, firms that are identified by new information as relatively safe should be able to attract more competition from outside banks and therefore benefit from a decline in the informational rents they pay to their incumbent banks. In contrast, firms that are identified as being risky will not entice the same competition and as a result should not benefit from a similar decline in informational rents.

To test this hypothesis, we compare bank loan spreads that firms pay before and after they undertake their bond IPOs and investigate how the difference between these spreads varies with the risk level of the firm as defined by the credit rating of its IPO bond — the new source of information on firm creditworthiness — controlling for a number of loan- and firm-specific factors. To this end, we first identify the firms in Compustat for which we have information on bond IPOs. We limit our analysis to Compustat firms because we want to have accounting information on firms both before and after they undertake their bond IPOs. Therefore, our study is about publicly listed firms, since Compustat has data only on firms that have publicly traded equity. This selection criteria does not significantly affect our sample of bond IPO firms since the vast majority of firms choose to list their equity first and, only after that, start issuing in the public bond market.[5] Furthermore, since there will be less

[4]This is partly due to Moody's and S&P's policy of rating public corporate bond issuers even when issuing firms do not apply for their ratings. See Liu and Thakor (1984), Ederington, Yawitz, and Roberts (1987), and Hand, Holthausen, and Leftwich (1992) for evidence that rating agencies produce valuable information on firms.

[5]For example, during our sample period (1972-2002), while 1,427 firms issued their first public bond after their equity IPO, only 76 firms did both IPOs in reverse order.

incremental information revealed at the time of the bond IPO for publicly listed firms than for privately held firms, relying on the former sample should bias the results against finding evidence of banks' monopolistic loan pricing behavior.

We identify firms' bond IPOs by selecting the first public bond of each firm in the Securities Data Corporation (SDC) database.[6] Since the SDC's database starts in 1970, we limit our sample to firms that first appeared in Compustat after 1969 to minimize the misclassification problem that arises with firms that issued public bonds prior to 1970. Finally, we merge these firms with Loan Pricing Corporation's Dealscan database to get information on firms' loans before and after they undertake their bond IPOs.

We find that firms pay lower spreads on their bank loans after they undertake their bond IPOs. As we expected, these interest rate savings are more pronounced for firms that are identified to be more creditworthy at the time of the bond IPO. Everything else equal, firms that enter the public bond market with a bond that is rated investment grade benefit from a reduction of 35 to 50 basis points in the credit spreads they pay on their bank loans, depending on specification and the sample. In contrast, firms that enter the bond market with a bond that is rated below investment grade benefit from a reduction of only 5 to 20 basis points on their loan spreads. These findings are consistent with the hypothesis that banks do price their informational advantage when they extend loans to borrowers.

Our analysis relies on some important assumptions. One assumption is that the change in creditworthiness of safe firms at the time of their bond IPO is not significantly different from the change in creditworthiness of risky firms at the time of their bond IPO. However, it is possible that firms getting loan financing after the bond IPO, in particular those that enter the bond market with a bond that is rated investment grade, are safer. This concern is mitigated in our analysis: First, we include firm-fixed effects that would absorb any time-invariant differences across firms. Second, we use a set of proxies for firms' credit risk to control for changes in firms' creditworthiness from the time before the bond IPO to the time after the bond IPO that could affect loan spreads. Thus, the effect of bond IPO that we find is conditional on firms' credit risk.

Another assumption of our analysis is that a firm's decision to enter the public bond market is exogenous. In reality, this decision is likely to be endogenous, depending on firm-specific variables and, possibly, the conditions of the bond market. We use a matched-sample approach to control for the potential endogeneity of the set of firms that issue public bonds and the timing of their bond IPOs. Our results remain qualitatively unchanged.

[6]In our identification of IPO bonds, we did not consider Rule 144a bonds as public bonds because firms do not have to disclose the as much information when they issue these bonds because they can only be traded among qualified investors.

Finally, our test of the importance of the hold-up problem relies on the assumption that new information about firms' creditworthiness is revealed at the time of its bond IPO and that this information leads to reduction in the spreads on bank loans that firms take out after their bond IPO. We realize that there might be other mechanisms through which bond IPOs may lead to a decline in bank loan spreads. In particular, although there are important differences between bond financing and bank funding, firms that gain access to the former are likely to use it as a bargaining tool in their loan negotiations. Thus, entry to the public bond market could lead to a reduction in loan spreads for reasons other than a decline in incumbent banks' informational rents. Therefore, we conduct further tests to confirm that our findings indeed reflect the change in informational rents due to bond IPOs.

Consistent with our assumption that new information is revealed at the time of the bond IPO, we find that the vast majority of firms get their first credit rating at the time of their bond IPO. We take advantage of the presence of firms that already had a credit rating at the time of their bond IPO to isolate the effect of bond IPOs on incumbent banks' informational rents from other effects that borrowers' access to the bond market may have on banks' loan pricing policies. Specifically, we repeat our regression analysis, allowing the impact of the bond IPO on loan spreads to be different for firms that had credit ratings before their bond IPO compared to firms that get their first credit rating at the time of the bond IPO. Our results show that among safe firms, those that get their first rating at the time of the bond IPO benefit from a larger decline in loan interest rates than those that were already rated when they entered the bond market. Since more information is revealed at the time of the bond IPO on those firms that get their first credit rating at that time and since this information will likely increase competition from uninformed banks to firms that become known to be safe, these findings provide support to the hypothesis that banks do indeed price their informational monopoly.[7]

Our study only considers borrowers that have publicly traded equity. Since there is more information available on these firms, our findings suggest that privately held firms that do not have credit ratings are likely to face even higher costs from relying on bank finance. In this regard, the paper by Schenone (2006) is complementary to ours. Schenone (2006) investigates the importance of the hold-up costs by comparing the impact of lending relationship intensity on loan spreads before and after firms' equity IPOs. Since new information about a firm is likely to be revealed with its equity IPO, bank information rents should decline afterwards. Schenone finds that the impact of lending relationship intensity on loan spreads declines after

[7]In contrast, among the risky firms, we find that there is no significant difference between the interest rate savings of firms that had and that did not have credit ratings before their bond IPOs. Data limitations, however, do not allow us to fully investigate this relationship for risky firms.

the IPO, suggesting that switching costs and information rents decline after the equity IPO. While we focus on bond IPOs of listed firms, Schenone focuses on firms' equity IPOs, which are likely to have a bigger impact on the amount of information available about firms. However, because limited information is available about pre-equity IPO firms, she is restricted in the firm controls she can account for in her analysis.

Our finding that firms are able to benefit from a reduction in the interest rates they pay on the loans they take out after their bond IPO raises an important question: Why is it that only a relatively small number of firms choose to raise funding in the bond market? One possible explanation is that it is costly to enter this market. Since it is costly to float equity because of the underpricing cost and the direct compensation firms pay underwriters, it may very well be the case that it is also costly for firms to issue for the first time in the public bond market.[8]

Bond IPOs are different from equity IPOs, but some of the reasons researchers have put forward to explain the underpricing of equity IPOs are also likely to lead to the underpricing of bond IPOs.[9] Entering the public bond market may be costly because of the compensation firms have to pay the underwriters of their IPO bonds. Firms pay underwriters both for the services they provide, including the production and the distribution of information, and for the risk they carry in underwriting the firm's securities. A lack of firm's track record in the public bond market coupled with the absence of credit ratings and coverage by bond market analysts will make it more difficult for underwriters to perform their services and pose a greater risk to them when they underwrite IPO bonds, suggesting that firms will likely pay higher underwriting costs when they issue their first public bond.

We proceed by investigating whether it is costly for firms to enter the public bond market by analyzing the compensation that firms pay underwriters and the underpricing of their IPO bonds in the market. To this end, we analyze the gross spreads and *ex ante* credit spreads of IPO bonds as well as the underpricing of these bonds by comparing their *ex ante* yield spreads with their yield spreads when they first trade in the bond market.[10] The results

[8]According to Ritter (2003), the average initial return on equity IPOs ranges from 5% in Denmark to 257% in China. As for the direct compensation that firms pay underwriters, Fernando, Gatchev, and Spindt (2004) find that it is higher for the IPO than for firms' subsequent equity issues.

[9]Allen and Faulhaber (1989), Grinblatt and Huang (1989) and Welch (1989), for example, show that when issuing firms have private information about their value, underpricing may be a useful signaling device. Hughes and Thakor (1992), in turn, show that equity underpricing may be an efficient method to reduce the cost of future class action lawsuits since only investors who lose money are entitled to damages, and Chemmanur (1993), Aggarwal, Krigman, and Womack (2002), and Demmers and Lewellen (2003) show that firms may underprice because they benefit from the publicity that comes with a high first-day return.

[10]Cai, Helwege, and Warga (2005) find that IPO bonds are subject to more underpricing than bonds of

of our investigation confirm that it is costly to enter the public bond market. Firms pay higher gross spreads on their IPO bonds than on the public bonds they issue afterwards. We do not find evidence that firms are compensated for these higher underwriting costs by obtaining from underwriters a more favorable guaranteed price on their IPO bonds. Our investigation of bond prices in the secondary market also shows that it is costly to enter the public bond market because IPO bonds are subject to more underpricing than non-IPO bonds. Further, we find that the costs of entering the public bond market are more pronounced for firms that enter with a bond that is rated below investment grade, but importantly they also affect firms that enter with a bond that is rated investment grade. These costs, therefore, may explain why some firms, including those that are safe, choose not to enter the public bond market, despite the advantages we find of this decision on the cost of bank funding.

The remainder of our paper is organized as follows. The next section presents our methodology and data, and characterizes our sample of bond IPO firms. Section 3 investigates the effect of bond IPOs on the interest rates firms pay on their bank loans. Section 4 investigates our hypothesis that there is new information on firms revealed at the time of the bond IPO, and section 5 investigates the cost of entering the public bond market. Section 6 concludes the paper.

2 Methodology, data, and sample characterization

2.1 Methodology

The methodology we use in this paper has three parts. The first part investigates whether firms are able to borrow from banks at lower interest rates after they enter the public bond market. The second part attempts to find supporting evidence for our hypothesis that this decline in loan interest rates is at least in part attributable to the information on firm's creditowrthiness revealed at the time of its bond IPO. The last part of our methodology investigates whether it is costly for firms to enter the public bond market. We describe next the tests we use to investigate each of these issues.

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seasoned issuers, which supports the idea that it is costly to enter the public bond market, but they do not investigate the underwriting costs firms incur to get the services of investment banks. Gande, Puri, Saunders, and Walter (1997) and Gande, Puri, and Saunders (1999), in turn, find that IPO bonds carry higher gross spreads and *ex ante* credit spreads than bonds of seasoned issuers, but they unveil these results based on pooled regressions, making it unclear whether the pricing differences they detect for IPO bonds are firm-specific or driven by differences in unobserved firm characteristics.

2.1.1 The effect of the bond IPO on the cost of bank lending

In this part, we investigate whether firms' entry to the public bond market lowers the interest rates they pay on their bank loans. To that end, we estimate the following model of loan spreads:

$$LOAN\ SPREAD_{ijt} = \alpha_i + \beta\, AFTER\ IPO_{ijt} + F'_{it-1}\,\gamma + L'_{ijt}\,\theta + O'_{it-1}\,\mu + \epsilon_{ijt}, \qquad (1)$$

where $LOAN\ SPREAD_{ijt}$ is the all-in-drawn spread over Libor at issue date for loan j issued to firm i in year t. This is a standard measure of loan pricing. $AFTER\ IPO$ is a dummy variable that takes the value 1 for the loans that firm i takes out after it undertakes its bond IPO. In some specifications, we replace this dummy variable with $AFTER\ IGRADE\ IPO$ and $AFTER\ BGRADE\ IPO$, which take the value 1 for the loans extended after the IPO of firms that enter the bond market with an investment grade and below grade rated bond, respectively. We consider these specifications to investigate our hypothesis that safer firms are likely to benefit from a larger reduction in their loan interest rates following their bond IPO than riskier firms.

We estimate the effect of entering the public bond market on loan spreads, controlling for a set of firm-specific variables, F, a set of loan-specific variables, L, and a set of other controls, O. We discuss these sets of controls next, starting with our firm variables. One subset of these variables, which includes AGE, the firm's age in years, and $ASSETS$, the firm's real assets (in millions of 1980 dollars computed with the CPI deflator), attempts to control for the firm's overall risk. A subset of these variables attempts to control for the risk of the firm's *debt*. It includes the firm's ROA, the return on assets (net income divided by assets); $INTEREST\,COV$, the interest coverage, which is a more direct measure of the firm's ability to service debt (EBITDA divided by interest expense); $LEVERAGE$, the leverage ratio (debt over total assets); and $EARNINGS\,VOL$, the earnings volatility (the standard deviation of the firm's quarterly return on assets over the last three years). The next subset of variables, which includes $TANGIBLES$, the firm's tangible assets (inventories plus plant, property, and equipment over total assets), and $ADVERTISING + R\&D$, the firm's expenses with advertising and R&D scaled by the firm's sales, in turn, controls for the size and quality of the asset base that debt holders can draw on in default.[11] We also control for $INVESTMENTS$, the firm's investments scaled by its assets, to proxy for the value the firm is expected to gain by future growth.[12] Last, we control for the firm's industry as defined by its 1-digit SIC code

[11] Given that tangible assets lose less of their value in default than do intangible assets such as brand equity, we expect the former variable to have a negative effect on spreads and the latter one to possibly have a positive effect on spreads.

[12] Although growth opportunities are vulnerable to financial distress, we already have controls for the tangi-

because each industry may face additional risks that are not captured by the list of control variables presented above.

Our next set of controls attempts to account for those loan features that are likely to affect loan spreads. This set includes the loan amount in 1980 dollars, $AMOUNT$; the loan maturity in years, $MATURITY$; dummy variables for secured loans, $SECURED$, senior loans, $SENIOR$, loans to borrowers that face dividend restrictions in connection with the loan, $DIVIDEND\ REST$, loans to borrowers with a guarantor, $GUARANTOR$, and loans to borrowers with a sponsor, $SPONSOR$. Included in this set are also dummy variables for loan renewals, $RENEWAL$, and for syndicated loans, $SYNDICATED$. Lastly, we also included in this set dummy variables to control for the loan purpose (corporate purpose, $CORPORATE\ PURP$; repay an existing debt, $REFINANCE$; finance a takeover, $TAKEOVER$; and working capital purpose, $WORKING\ CAP$) and dummy variables to control for the type of the loan contract (line of credit, $CREDIT\ LINE$; term loan, $TERM\ LOAN$; and bridge loan, $BRIDGE\ LOAN$).

The last set of variables in our loan pricing model attempts to control for other factors that are likely to affect loan spreads. Following the evidence that lending relationships affect loan interest rates, we control for the firm's relationship with the lead bank in the syndicate by including the variable $LRELATIONSHIP$, which takes the value 1 if the firm borrowed from the bank in the last year.[13] Since the conditions in the bond market may affect the interest rates banks charge borrowers, we control for the slope of the bond yield curve by including the difference in the yields of new bonds rated BBB and those rated AAA, $BBBSPREAD$. We also control for changes in the level of the interest rate used to compute the loan spreads by including in our models $LIBOR$, the level of the Libor. Last, we include a time trend $TIME\ TREND$ to account for a potential secular decline in loan interest rates.

We estimate our models after we limit the sample of the post bond IPO loans to those loans firms take out in the year immediately after they enter the bond market in an attempt to isolate the effects of the bond IPO from other developments that could affect the cost of bank credit for these firms. We also report the results when we consider all of the loans the firm takes out after its bond IPO. Since loan controls may be jointly determined with loan spreads, we estimate our models of loan spreads both with and without the set of loan controls. Since loan spreads may vary across firms, we estimate our models with firm fixed effects.

Finally, in order to mitigate the potential impact of the endogeneity of firms' bond IPO

bility of book value assets. Thus, this variable could have a negative effect on spreads if it represents additional value (over and above book value) that debt holders can in part access in the event of default.

[13]See Petersen and Rajan (1994), Berger and Udell (1995) and Santos and Winton (2007) for evidence on the importance of a lending relationship on loan interest rates.

decisions, we implement the matched sample methodology developed in the literature.[14] To create the sample of matched firms, we start with the full sample of firms and estimate the probit model of the probability of issuing an IPO bond in any given year, using as explanatory variables a set of firm characteristics described above. We construct the propensity score for each firm in each year as a predicted probability of bond IPO. Using this propensity score, we use radius matching to match IPO firms (the treatment group) with non–IPO firms (the control group) that have similar propensity scores. We drop firms, both IPO and non–IPO, that did not have close matches and firms for which the propensity score did not lie on the common support of the bond IPO firms and non–IPO firms propensity score distribution. The remaining firms constitute the matched sample for which we repeat our regression analysis described above.

2.1.2 The importance of the information revealed at the time of the bond IPO

The second part of our methodology attempts to find supporting evidence for our hypothesis that new information on firms' creditworthiness revealed at the time of the bond IPO is a contributing factor to the decline in loan interest rates that we detect in the first part of our methodology. Even though the vast majority of firms get their first credit rating at the time of their bond IPO, a small number of firms already have a credit rating at that time. We use these two sets of firms to control for other potential effects of bond IPOs on loan interest rates and to test more closely the importance of the new information revealed at the time of the bond IPO on the loan interest rates that borrowers pay afterwards.

Since rating agencies reveal new information about borrowers' creditworthiness when they announce their ratings, the information content disclosed at the time of the bond IPO is likely to be larger for firms that get their first rating at that time than for firms that had a credit rating prior to their bond IPO. To identify the expected effect of this difference in information on the spreads of loans these firms take out after the bond IPO, one needs to take into account that uninformed banks are willing to compete more aggressively to extend loans to safer firms than to riskier firms. Under these conditions, we postulate that among firms that were classified as safe by their bond IPO credit rating, those that were not rated previously should get a larger decline in the interest rates on the loans they take out after bond IPO than firms that already had a rating indicating that they were safe firms.

For firms that are rated as risky at the time of their bond IPO we should observe the opposite pattern. Compared to firms that were known to be risky (because they already had a credit rating with that information) those that are rated as risky for the first time at the time

[14] See, for example, Mayhew and Mihov (2004).

of the bond IPO may see a decline in incumbent banks willingness to bid for their loans after the bond IPO. As a result, they should not enjoy the same decline in the interest rates in the loans they take out after the bond IPO when compared to that piers that were already known to be risky.

To test these hypotheses, we start by allowing for the effect of the bond IPO on loan spreads to vary depending on whether the firm had a rating before the bond IPO by interacting the $AFTER\,IGRADE\,IPO$ and $AFTER\,BGRADE\,IPO$ dummy variables with the $RATED$ indicator which takes the value 1 for firms that already had a credit rating by the time they undertook their bond IPO. Next, since ratings have a direct effect on the loan spreads, we limit our interaction terms to take on values of 1 only when the firm was rated investment grade (below grade) before its bond IPO and it entered the bond market with a bond that was also rated investment grade (below grade). We allow for the firms that had ratings before their bond IPO but that do not fit in the above categories, for example firms that were rated below grade but entered the bond market with a bond rated investment grade or vice versa, to have a different effect of their bond IPO on loan spreads.

A concern with the previous test is that it does not account for potential differences that may exist between the rating of the firm and the rating of its IPO bond if both of these ratings fall in the investment grade or speculative grade categories respectively. For example, two firms that had an A credit rating, one may enter the bond market with a bond rated A while the other may do it with a bond rated say AA. In our previous test both of these firms are treated equally, which may bias our findings in the tests described above. To address this concern we refine our test by creating an indicator for those firms that were *both* rated BBB and entered the bond market with a bond rated BBB, the most common rating in the investment grade category, putting all the other firms that were previously rated investment grade into a separate category. In addition, we added an indicator to isolate the previously unrated firms that entered the bond market with a bond rated BBB from the remaining unrated firms that entered the bond market with a bond rated investment grade. The coefficients on these variables are important to ascertain the validity of our assumption that new information on firm credit worthiness revealed at the time of the bond IPO is a contributing factor to the decline in the loan interest rates that we detect afterwards. Specifically, they tell us, *ceteris paribus*, whether there is a difference in the interest rate effect of the BBB-rated bond IPO for firms that had a BBB rating before entering the bond market and for firms that were not rated previously. We posit that if this difference exists, it is attributable to the new information that is revealed about the firm's creditworthiness at the time of its bond IPO in connection with its credit rating. We attempted to design a similar test among the firms rated below investment grade, but were unable to do so because there were not a sufficient number of BB-rated firms,

the most common rating in the below grade category.

As in the first part of our methodology, we estimate the regressions in this part of our methodology controlling for the set of firm characteristics F and other controls O we described above. Also, as before we include a set of year fixed effects and estimate our models with firm fixed effects. Last, as in our investigation of loan spreads, we report the results of this investigation for the full sample of the firms as well as for the matched sample.

2.1.3 The cost of a bond IPO

The last part of our methodology investigates whether it is costly for firms to enter the public bond market. To this end, we investigate the gross spreads and *ex ante* credit spreads of IPO bonds as well as the underpricing of these bonds by comparing their *ex ante* yield spreads with their yield spreads when they first trade in the bond market. We think that it is important to look at these three measures because they all affect the cost of accessing the public bond market and are potentially interrelated. For instance, underwriters may try to offset the extra costs of bringing IPO bonds to the market by raising their yields (and lowering the prices paid to the issuers) in order to increase the probability that they will sell out these issues. Also, if investors demand a higher yield to buy IPO bonds than equivalent bonds of seasoned issuers, this will be reflected in the price that underwriters guarantee the issuers, adding to the cost of first accessing the public bond market.

Gross spreads

We use the following model to investigate if IPO bonds carry higher gross spreads.

$$GROSS\ SPREAD_{ijt} = \alpha_i + \beta\ IPO_{ijt} + F'_{it-1}\,\gamma + B'_{ijt}\,\theta + O'_{ijt}\,\mu + \epsilon_{ijt}, \tag{2}$$

where $GROSS\ SPREAD_{ijt}$ is the gross spread of bond j issued by firm i in year t, measured as the difference between the offered amount and the proceeds to the issuer, expressed as a percentage of the offered amount (issue size). This is a standard measure of the costs of bond issuance which is due to underwriters. IPO is a dummy variable that takes the value 1 for the IPO bonds. In some specifications, we add the dummy variable $SECOND$, which takes the value 1 for the second public bond issued by our bond IPO firms, to investigate whether underpricing persists beyond the IPO bond. Since we hypothesize that safer firms benefit from a larger reduction in loan spreads than riskier firms after the bond IPO, we also investigate whether underpricing varies with the credit rating of the IPO bond. To this end we add to our model a dummy variable $IGRADE$, which takes the value 1 for the investment-grade bonds, and the interaction of this variable with our IPO variable.

We investigate whether IPO bonds pay higher gross spreads controlling for the set of firm-specific variables F, which we discussed above. These variables determine the risks of the firm. These risks are important because they affect the underwriter's chances of success and consequently the price the underwriter will charge the firm to bring its IPO bond to the market.

We also control for a set of bond features, B, including the size of the issue, $AMOUNT$, and the maturity of the issue, $MATURITY$, that are likely to affect underwriting costs. If economies of scale are prevalent in the underwriting business, we would expect larger issues to pay lower underwriting costs. In contrast, the additional risk of longer maturity bonds may lead banks to demand a higher compensation to underwrite these bonds.

In addition, we control for a set of other variables, O, known to affect bond underwriting costs. Following Yasuda's (2004) finding that firms that have lending relationships with their bond underwriters pay lower gross spreads, we include in our model $BK\ RELATIONSHIP$, which is a dummy variable that takes the value 1 if the bond IPO underwriter also acquired the firm's last private placement or extended to the firm its last loan prior to its IPO bond. Following the finding of Livingston and Miller (2000), Yasuda (2004), and others, that underwriters with better reputation charge lower bond underwriting fees, we control for the reputation of the underwriter by adding to our model the variable $BK\ MKT\ SHARE$, which measures the market share of the underwriter. Following Gande, Puri, and Saunders' (1999) finding that commercial banks' entry to the bond underwriting business in the late 1980s lowered the costs of bond underwriting, we include in our model the dummy variable $AFTER\ 1988$, which takes the value 1 for the bonds issued in the period after 1988.[15] Last, we include a dummy variable, $RECESSION$, which takes the value 1 if the bond was issued during a recession, as the additional difficulties of placing bonds during recessions may lead underwriters to demand a higher compensation from firms that issue during downturns, and a time trend, $TIME\ TREND$, to control for a possible secular decline in gross spreads.

Since bond characteristics, B, may be jointly determined with the bond's gross spreads, we estimate our model of gross spreads with and without these controls. Also, because the gross spreads on IPO bonds may vary across firms, we estimate our models with firm fixed effects.

Ex ante credit spreads

[15]The restrictions in the Glass–Steagall Act, which prohibited commercial banks from offering underwriting services, began to erode in 1988 with the Fed's permission for bank holding companies to offer bond underwriting services through a nonbank subsidiary.

We proceed to investigate whether IPO bonds have higher ex ante credit spreads. To this end we estimate the following model of ex ante credit spreads:

$$CREDIT\ SPREAD_{ijt} = \alpha_i + \beta\, IPO_{ijt} + F'_{it-1}\,\psi + B'_{ijt}\,\nu + O'_{ijt}\,\mu + \epsilon_{ijt}, \tag{3}$$

where $CREDIT\ SPREAD_{ijt}$ is the percentage point difference between the ex ante yield to maturity of the bond j issued by firm i in year t and the yield on an equivalent maturity U.S. Treasury bond. We estimate this model following the same approach and using the same set of firm and bond controls that we used in our investigation of the gross spreads of bonds. We expand the set of bond controls, though, to distinguish callable bonds, $CALLABLE$, bonds with a sinking fund, $SINKING\ FUND$, shelf issues, $SHELF$, and bonds with a put option, $PUT\ OPTION$, as these covenants affect the risk of the bond and, consequently, its credit spread.

Last, we account for a set of other variables, O, known to affect bond credit spreads. This set includes $AAA\ YIELD$ (Moody's index on the yield of triple-A rated bonds) and $BBB - AAA\ SPREAD$ (difference between the Moody's indexes of the yields of triple-A and triple-B rated bonds) to account for the state of the bond market at the time of the debt IPO, and $TREASURY\ SLOPE$ (the difference between the yields of Treasuries with 30-year and 5-year maturities) to account for the state of the economy at the time of the debt IPO. Following the findings of Fama and French (1989), Santos (2006), and others, that recessions increase the credit spreads of bonds, we include in our model the dummy variable $RECESSION$, which takes the value 1 if the bond was issued during a recession. Following Fang's (2004) finding that reputable banks obtain lower *ex ante* yields on the bonds they underwrite, we control for the market share of the underwriter, $BK\ MKT\ SHARE$, our proxy for bank reputation. Since firms' relationships with banks will likely alleviate information frictions and consequently make it easier for underwriters to place these firms' bonds, we include in this set of controls the dummy variable $BK\ RELATIONSHIP$, which takes the value 1 if the bond IPO underwriter also acquired the firm's last private placement or extended the firm its last loan prior to its IPO bond.

As in the case of the gross spreads, and for the same reasons, we estimate our model of *ex ante* credit spreads with firm fixed effects. Further, we estimate this model with and without bond controls.

Abnormal credit spreads

Finally, we investigates whether IPO bonds suffer from more underpricing than public bonds of seasoned issuers. To this end, we estimate the following model:

$$ABN\ SPREAD_{ijt} = c + \beta\, IPO_{ijt} + F'_{it-1}\,\psi + B'_{ijt}\,\nu + O'_{ijt}\,\mu + \epsilon_{ijt}, \tag{4}$$

where $ABN\ SPREAD_{ijt}$ is the percentage point difference between the ex ante yield spread on the bond j issued by firm i in year t, and the secondary market yield spread on this bond when it first trades, provided this occurs within one month after the issuance date. These spreads are computed over the Moody's daily bond yield index with the same rating of the bond.

We estimate this model following the same approach and controlling for the same set of firm, bond, and other variables that we used in our model of ex ante credit spreads. Given that our spreads are now computed over an index of bond yields with the same bond rating, however, we do not control in this test for the yields of triple-A rated bonds, $AAA\ YIELD$. Since our data source on market yields starts only in the mid-1990s and because not all bonds trade within one month after their issuance date (at least according to our data source), we do not have enough observations to test whether the underpricing of bond IPOs is different from the underpricing of public bonds subsequently issued by the same firms. In other words, we do not have enough observations to identify our key variables with firm fixed effects. For this reason, when we investigate the underpricing of IPO bonds we rely only on pooled regressions.

2.2 Data

The data for this project come from several sources. We use the SDC Domestic New Bond Issuances database to identify the nonfinancial firms that issued bonds in the United States since 1970, and to select the first nonconvertible public bond issued by these firms, that is, the firm's IPO bond.[16] We also use this database to gather the information on bonds relevant to our study, and to identify firms' investment banking relationships with the underwriters of their IPO bonds. We complement the information we gather from the SDC database with secondary market bond prices from the National Association of Insurance Commissioners (NAIC) to investigate whether IPO bonds are subject to more underpricing in the secondary market than bonds of seasoned issuers.[17]

We use the Loan Pricing Corporation's (LPC) Dealscan database to identify which bond IPO firms borrow from banks during the sample period.[18] We also use this database to

[16]This database contains information on virtually all public bonds issued in the United States since 1970.

[17]This database includes prices of all purchases and sales of publicly traded bonds by insurance companies since 1995. Several researchers have used this database to investigate the pricing of bonds because it reports secondary market prices, not trader quotes. See Campbell and Taksler (2003), Krishnan, Ritchken, and Thomson (2005), and Cai, Helwege, and Warga (2005) for other studies of bond prices that use the NAIC data.

[18]This database contains information on some non-syndicated loans, but most of its entries are syndicated loans. It goes as far back as the beginning of the 1980s. In the first part of that decade the database has a somewhat reduced number of entries, but its comprehensiveness has increased steadily over time.

obtain information on the individual loans that these firms took out and to collect information on the lending syndicate. Last, we rely on the LPC database to identify firms' bank lending relationships.

We use Compustat to gather information on firms' balance sheets and to identify firms' industries, as defined by their 1-digit SIC codes. We exclude financial firms and firms for which our control variables are missing in Compustat. We also use Compustat to determine the age of firms at time of their bond IPOs. We determine this age by subtracting the date when the firm first appeared in Compustat from the date when it issued its first public bond.

We use data from the Center for Research on Securities Prices (CRSP) to link companies and subsidiaries that are part of the same firm, and to link companies over time that went through mergers, acquisitions, or name changes. We then use these links to merge the LPC-SDC-Compustat-IBES databases.

Finally, we use the Moody's yield indexes on seasoned corporate bonds to control for pricing changes in the bond market, and we use the peaks and troughs identified by the National Bureau of Economic Research (NBER) Business Cycle Dating Committee to identify the periods of recession during our sample period.[19]

2.3 Sample characterization

Table 1 characterizes our sample of firms. The top panel compares our sample of 817 bond IPO firms the year before they issue their first public bond with these same firms one year after the IPO. The middle panel compares instead our sample of bond IPO firms at the end of the sample period with a set of firms that by then had not yet undertaken their bond IPOs. The bottom panel limits the same comparison the middle panel to our set of matched firms.

As we can see from the top panel of the table, immediately after firms' entry to the public bond market, their assets and sales grow significantly. Bond IPOs seem to have a negative impact on firms' risk. These IPOs increase firms' leverage and reduce their interest coverage. They further increase these firms' earnings volatility and lower their returns on assets, though by amounts that are not statistically different from zero.

Given these changes, our results in the middle panel of Table 1 showing that by the end of the sample period bond IPO firms are larger (both in assets and sales) than firms which had not yet undergone their bond IPOs is not surprising. In contrast with the changes we detected at the time of the bond IPO, by the end of the sample period, firms that underwent their bond IPOs have higher returns on assets and lower earnings volatility than firms that have not yet issued their first bond in the public bond market.

[19]The Moody's indexes track the performance of US dollar–denominated corporate debt issued in the U.S. domestic bond market.

Looking at the bottom panel of Table 1 we see that differences between the IPO firms and non-IPO firms in the matched sample are less pronounced and are no longer significant for all the variables except those directly related to the firm size. This is encouraging in that it suggests that our matching technique indeed limits the sample to similar firms and the relationship between the bond IPO, and the loan spreads and analyst coverage we find below is likely to be causal.

Overall these results seem to suggest that firms which enter the public bond market do so to finance growth, but as a result they become riskier at least in the short term. Their profitability increases in the long run, but not immediately after their bond IPO.

3 Do bond IPOs lower the cost of bank funding?

We investigate whether entering to the public bond market lowers the cost of bank funding by comparing the interest rates on the loans that firms take out before and after their bond IPO. We first investigate the impact of bond IPOs on the cost of bank funding through a univariate analysis and subsequently through a multivariate analysis. After that, we investigate whether our results continue to hold when we employ the matched sample approach to account for the bond IPO endogeneity.

3.1 Univariate analysis

To investigate whether firms are able to borrow at lower interest rates once they enter the public bond market, we compare the interest rates on the loans they took out before entering the public bond market with the interest rates on the loans they take out immediately after their bond IPOs. We also compare the former interest rates with the average interest rate on the loans firms take out after they enter the public bond market. Since, according to our hypothesis, the effect of the IPO will vary with the creditworthiness of the firm disclosed at the time of the bond IPO, we compare the spreads on the loans the firms took before their bond IPO with those they took after entering the public bond market for firms that entered with an investment–grade bond separately from those that entered with a below–grade rated bond.

The results of these interest rate comparisons, which are reported in Table 2, provide us with two important insights. First, on average, after firms enter the public bond market they are indeed able to borrow from banks at lower interest rates. Second, as we hypothesized, only safe firms, that is, firms that enter the public bond market with a bond rated investment grade benefit from that reduction. For these firms, the bond IPO results in an immediate savings of 104 basis points on the spread over Libor of their bank loans. Importantly, these benefits are

not limited to the loans firms take out immediately after the bond IPO; they persist in time.

It remains to be seen whether these insights continue to hold when we account for all of the variables that help explain loan spreads, and also whether or not they are derived from differences across firms. It also remains to be seen what effect, if any, the endogeneity of bond IPO decision has on these insights. We investigate these issues next.

3.2 Multivariate analysis

Table 3 reports the first set of multivariate tests we conduct to investigate the impact of the bond IPO on the interest rates firms pay on their bank loans. Model 1 compares the interest rates firms used to pay before their bond IPO with the interest rates they pay on the loans they take out during the year after the IPO. Model 2 tests whether the impact of the bond IPO on loan interest rates varies with the creditworthiness of the firm. Model 3, in turn, tests whether the short–term effect of the bond IPO on loan interest rates persists over time. Models 1 through 3 investigate these effects controlling for our set of firm characteristics, F, and our set of controls unrelated to firm and bond characteristics, O. Models 4 though 6 investigate what happens when we expand these controls to account for our set of loan controls L.

The results reported in Table 3 show that the *average* firm is able to borrow from banks at lower interest rates after its bond IPO, but the interest rate savings it gets are not statistically different from zero. This result arises because the effect of bond IPOs on loan interest rates depends critically on the creditworthiness of the firm. Firms that enter the public bond market with a bond rated investment grade do benefit from a reduction in the interest rates they pay to borrow from banks. This reduction in loan spreads ranges from 22 to 35 basis points, depending on the model we consider, and is statistically significant. These savings start immediately after firms enter the public bond market and are more pronounced then, as the coefficient on our $AFTER\ IGRADE\ IPO$ dummy variable is larger when we limit our post bond IPO loans to those taken out by firms in the year following their entry to the public bond market than when we look at all loans the firm takes through the end of the sample period (compare models 2 and 5 with models 3 and 6, respectively). However, these differences in coefficients are not statistically significant.

In contrast, firms that enter the public bond market with a bond rated below investment grade do not benefit from a reduction on their loan interest rates. The coefficient on $AFTER\ BGRADE\ IPO$ is always negative but is only statistically significant when we consider all of the loans these firms take out after the bond IPO and account for loan controls, but even then it is significant at only the 10% level.

With respect to the firm controls we use in our models, most of them do not have a statistically significant effect on loan spreads, which was to be expected since we estimated

our models with firm fixed effects. The controls that retain significance, including returns on assets, advertising and R&D expenses, fixed assets and interest coverage, have the predicted effects on loan spreads.

All of the controls we consider that are not related to firm and loan characteristics appear to affect loan spreads. They indicate that firms benefit from an interest rate discount when they borrow from banks that they have a lending relationship with. They confirm that loan spreads are higher in recessions and when the bond yield curve is steeper. These controls also show that there is a secular increase in loan spreads.

Finally, with respect to our loan controls, we find that larger loans have lower spreads. This could reflect economies of scale in loan size, but it may also reflect the fact that larger firms, which tend to be safer, take larger loans. This is consistent with the decrease in the coefficient and the decline in significance of the coefficient on firm assets when we account for the size of the loan. Among the loan-purpose variables, our results show that corporate purpose loans and working capital loans as well as loans to refinance carry lower spreads. With respect to loan types, credit lines have lower spreads than term loans, which in turn are not nearly as risky as bridge loans. Most of the loan features that aim to increase loan safety (dividend restrictions, secured interest and sponsors) generally have positive effects on spreads. This is consistent with the well-established result that banks tend to require these features for riskier credits (see for example Berger and Udell (1990)). Last, loan maturity and whether the loan is syndicated or not do not appear to have an effect on the loan spread once we control for the risk of the borrower and the remaining features of the loan.

In sum, the results of our multivariate analysis confirm our earlier univariate findings: after entering the public bond market firms, in particular those that enter the bond market with a bond rated investment grade, are able to borrow from banks at lower interest rates.

3.2.1 Accounting for IPO endogeneity

Since bond IPOs are unlikely to be exogenous, this may raise some concerns with our previous findings on the impact of bond IPOs on loan interest rates. To address these concerns we used the matched sample techniques that have been developed in the literature. Specifically, we estimate the probit model of the probability to issue the IPO bond in any given year, using as explanatory variables a set of firm characteristics, described above, as follows:

$$\mathrm{I}_{it}(IPO) = \alpha + F'_{it-1}\delta + \epsilon_{it},$$

where $\mathrm{I}_{it}(IPO)$ is an indicator of whether firm i issued an IPO bond in year t, F is a vector of firm characteristics described above, and ϵ_{it} are i.i.d. gaussian standard errors. Using estimated values of α and δ we can then construct the propensity score for each firm i in year t as a

predicted probability of debt IPO. Next, using this propensity score, we use radius matching to match IPO firms to those that have not yet issued a public bond. We do not force each IPO firm to have a matching non-IPO firm, but rather we drop those bond IPO firms for which there is no close match from the sample. We also drop non-IPO firms that were not found to be closely matched to IPO firms. Our matched sample then consists of only the firms that are similar in the probability of issuing a public bond. In such a sample, the coefficient on our IPO dummy variable can be reliably interpreted as a causal effect of bond IPOs.

Table 4 reports the same tests as Table 3, but this time estimated on the matched sample. Our results are qualitatively very similar to those found in the full sample and reported in Table 3, partly because fixed effects specification ensures that the effects we measure are identified by the variation of loan spreads *within each firm*. There are some quantitative differences: we find that the decline in loan spreads after the investment grade bond IPO is even larger in the matched sample than in the full sample, although it falls into the same confidence interval.[20] As we would expect, the impact of our firm control variables on loan spreads is no longer statistically significant, because we constructed the matched sample based on the similarity of a linear combination of these variables. Overall, we are assured that the results we found in the full sample are not due to endogeneity of the IPO decision, but rather represent a causal relationship.

The results we unveiled in this section regarding the effect of bond IPOs on loan interest rates are consistent with our hypothesis that banks price the informational advantage they have vis-à-vis their borrowers. That said, a natural question to ask is whether the decline in loan spreads following the bond IPO is not driven instead by sample selection or by some unobserved firm characteristics that change with bond IPO or simply by the bargaining power that borrowers gain from their access to this alternative source of funding. In the next section we present the results of some tests we perform to support our interpretation that the new information on firms' creditworthiness revealed at the time of the bond IPO is a contributing factor for the decline in the interest rates that firms pay on the loans that they take out after their bond IPO.

[20]The significant increase in spreads after the non-rated IPO that we found in column (2) of Table 3 now disappears, suggesting that it was probably driven by outliers, especially given the fact that this effect was no longer there once we controlled for loan characteristics.

4 Do bond IPOs reduce incumbent banks' information advantage?

We begin the investigation into this issue by looking more closely at our sample of bond IPO firms in order to reduce concerns that sample selection may be driving our findings. As we can see from the middle and lower panels of Table 1, while there are slight differences in the risk measures for the firms that did and firms that did not undertake their bond IPO at the end of our sample period when we consider full sample, these differences disappear in the matched sample. Since our regression results are qualitatively similar in full and matched samples and because we control for firm fixed effects and for credit risk measures in our regressions, we believe the decline in loan spreads cannot be fully attributed to selection. Moreover, we do not find differences between non–IPO firms' and IPO firms' risk measures to be significantly different for firms with investment grade as opposed to below grade bond IPO, which suggests that firm selection is not a key driver of our findings. These findings nonetheless do not prove that there was new information about firms' creditworthiness revealed at the time of the bond IPO and that this change in information drives the decline in loan spreads following bond IPO.

We have argued that bond IPOs lead to the release of new information on firms' creditworthiness because of the information firms have to disclose in order to issue their bonds, the scrutiny of both bond analysts and investors, and finally the role of rating agencies. The literature on credit ratings shows that rating agencies produce valuable information about firms.[21] Credit ratings of IPO bonds are likely to be particularly informative because most firms get their first credit rating at the time of their bond IPO. Our investigation into this issue shows that 86% of our bond IPO firms did not have a credit rating two years prior to their bond IPO, and 81% of them were still without a credit rating in the year prior to their bond IPO. Thus, as we postulated, the vast majority of firms get their first credit rating only at the time when they issue their first bond in the public bond market. This rating is likely to contain valuable information about the firm's creditworthiness.

We take advantage of the existence of some firms with a credit rating prior to their bond IPO to investigate whether the information about firms' creditworthiness made public at the time of the bond IPO through credit ratings is a driver of our findings on loan interest rates. As we argued in the methodology section, if the decline in incumbent banks' informational rents is a contributing factor for our loan interest rate findings, then we would expect that, among firms that enter the bond market with an investment grade bond, firms that were not rated previously would experience a larger impact on the loan interest rates than firms that

[21] See Liu and Thakor (1984), Ederington, Yawitz, and Roberts (1987), and Hand, Holthausen and Leftwich (1992) for evidence that rating agencies produce valuable information on firms.

already had an investment grade rating at that time. The reasons are that the IPO rating is more informative for the former firms than the latter ones and that an indication that the firm is safe would increase competition to extend loans to the firm from uninformed banks. In contrast, since uninformed banks will likely reduce their competition to extend loans to firms that become known to be risky, we would expect that, among the firms that enter the bond market with a speculative grade bond, firms that did not have a credit rating before would experience less of a decline in loan spreads than firms that already had a speculative rating at the time.[22]

To test this hypothesis we consider a specification similar to that in column (2) of Tables 3 and 4, which accounts for whether the IPO bond was rated investment grade or below grade. We expand this specification to include the interaction terms for the dummy variable which indicates whether the firm had a credit rating before its bond IPO and our set of dummy variables that account for the rating of the firm's IPO bond. The results of this regression for the full sample are reported in columns (1)-(3) of Table 5. Columns (4)-(6) of that table report the results for the matched sample. As before, we continue to control for firm characteristics as well as other factors that may explain loan spreads, and include firm fixed effects and the trend to account for any initial conditions of the firms and any time variation common to all firms.

We start by identifying all firms that were already rated two years before their bond IPO, regardless of the rating they had at the time of their bond IPO.[23] According to the results of these models, reported in columns (1) and (4) of Table 5, firms that were *not* rated before their bond IPO experienced about 44 basis points decline in their loan spread after the IPO if they entered the bond market with an investment grade bond and a decline of about 24 basis points in their loan spread after the IPO if they entered the market with a speculative grade bond (although that latter coefficient is only significant at a 10% level). To see whether the effect of bond IPO was different for firms with prior ratings, we look at the interaction terms. According to our results, firms that were rated prior to their bond IPO and entered the bond market with an investment grade bond experienced a smaller decline in their loan spreads afterwards, as we conjectured. We do not find, however, that rated firms that entered the bond market with a bond rated below investment grade experienced a larger decline in spreads

[22]In fact, if information about creditworthiness was the only effect of the bond IPO, we would actually expect spreads on bank loans to increase for firms that were not previously rated but entered the bond market with a bond rated below investment grade.

[23]While there is not much difference between the ratings two years prior to bond IPO and only on year prior to bond IPO, we chose to report the results with ratings firms had two years prior to bond IPO to avoid any effects on ratings the preparation of the bond IPO might have.

than unrated firms that also entered the market with a bond rated below investment grade. Recall that for the unrated firms entering with a below grade bond the release of information on their creditworthiness may be detrimental since it may reduce the competition from those banks that were previously uninformed about their creditworthiness.

The previous specification accounts for the firms that were already rated at the time of their bond IPO, but it does not account for the effect of the ratings of these firms on loan spreads. Since firm ratings have a direct effect on loan spreads, we proceed with our investigation by distinguishing whether firms were rated investment grade or below grade before their bond IPO. We further identify firms that were rated investment grade and entered the bond market with a bond rated investment grade, and those firms that were rated below investment grade and entered that market with a bond rated below investment grade. We included all the other rated firms that did not have similar matchings in a separate category.

The results of this investigation are reported in columns (2) and (5) of Table 5. The new results are consistent with our earlier findings. This was expected because most firms that were rated before their bond IPO received a rating within the same IGRADE and BGRADE categories in their IPO bond, i.e. there are not many observations that fall under the $SWITCH\ IGRADE/BGRADE$ category. Thus, we continue to find that firms that were rated investment grade and entered the bond market with a bond also rated investment grade benefit from a smaller decline in their loan spreads than unrated firms that entered the bond market with a bond rated investment grade. We still do not find that rated firms that entered the bond market with a bond rated below investment grade experienced a larger decline in spreads than unrated firms that also entered the market with a bond rated below investment grade.

While restricting our analysis to broad rating categories makes the firms we compare more similar, except for their rating status prior to the bond IPO, this approach still leaves opportunities for important differences across firms within the two groups. For instance, there may be important differences in the rating composition within the investment grade and below grade categories of IPO bonds of previously rated and unrated firms. Indeed, firms in our sample of unrated firms that enters the market with an investment grade IPO bond are riskier, in the sense that this sample has a higher portion of the lower rated bonds in that category, than our sample of rated firms that enters the bond market with an investment grade bond. The same is true for the sub-samples of firms that enter the bond market with a bond rated below investment grade. In addition, there may also be differences in the rating of the firm and the rating of its IPO bond even when we restrict the analysis to cases in which both ratings belong to same category (IGRADE or BGRADE). Indeed, when we consider whole ratings, we find that 21% of the firms that were rated investment grade and 32% of the firms that were

rated below investment grade prior to their bond IPO entered the bond market with a bond that had a rating different from the firm's rating.

To alleviate concerns with these differences and attempt to identify the "pure" information effect of the rating announced at the time of the bond IPO, we further limit our comparison between the unrated firms and the rated firms by selecting firms that have the same whole rating and not just the same rating category (IGRADE or BGRADE) for their firm rating and for their bond IPO. More specifically, for the investment grade rated firms we identify the most common rating (BBB), separate all the firms that enter the bond market with a BBB-rated bond from firms with other investment grade rated bonds, and then interact our new $AFTER\ BBB\ IPO$ and $AFTER\ NON-BBB\ IGRADE\ IPO$ indicators with $BBB\ RATED$ and $OTHER\ IGRATED$ indicators, respectively. We were not able to perform a similar refining of our earlier test for the firms that were rated below investment grade because only a small number of such firms entered the bond market with a bond having the same rating as the firm rating and none of these firms took out loans within one after the bond IPO.[24]

The results of this test are reported in columns (3) and (6) of Table 5. We continue to find that firms that had credit ratings before their bond IPO do not experience as large a decline in loan spreads after their bond IPO as do the unrated firms. In particular, among the firms that entered the public bond market with a BBB-rated bond, those that did not have a rating before experienced a 50 basis points decline in the loan spreads, while those that already had a BBB rating experienced the decline of only 16 basis points. This finding is consistent with our hypothesis that the information revealed on firms' creditworthiness at the time of the bond IPO is likely to reduce loan spreads.

As we noted above, we do not find supporting evidence for our hypothesis on the role of this information in the case of risky firms. It is unclear, though, whether this lack of supporting evidence among risky firms arises because the result is not in the data or because data limitations prevent us from using our stricter test to identify the effect of the information on firms' creditworthiness released at the time of the bond IPO for these firms. It is worth noting that even if there were no data limitations, our latest test would still be less informative for these risky firms since the firm ratings appear to have a lower predictive power of the bond IPO ratings for these firms than for safe firms. Note that, as we indicated above, while 79% of the firms rated investment grade enter the bond market with an IPO that has the same rating as the firm, only 68% of the firms rated below investment grade enter the bond market with a bond that has the same rating as the firms, looking at whole rating categories.

In sum, the decline in loan spreads after the bond IPO, especially for those firms that

[24]To be more precise, we do not have loan spreads within one year of the bond IPO for any of these firms.

enter the public bond market with a bond rated investment grade, appears to be consistent with our hypothesis that the release of new information about the firm's creditworthiness at the time of its bond IPO reduces the informational rents of incumbent banks.

5 Are bond IPOs costly to firms?

As we noted above, our finding that safer firms are able to benefit from a reduction in the loan interest rates after they enter the public bond market raises an important question: why is it that many of these firms never issue a public bond? A possible explanation for this puzzle is that public bond financing is only economically viable when the firm has large needs for external funding. Blackwell and Kidwell (1988), and Krishnaswami, Spindt, and Subramaniam (1999) for example, argue that the flotation costs of public placements make public bond financing unattractive for firms with small needs for external funding. Another possible explanation for this puzzle is that it is costly for firms, even the safer firms, to enter the public bond market. We investigate this hypothesis next. We begin by investigating whether underwriting costs are higher for IPO bonds. After that, we investigate whether underpricing in the bond market, which is another source of the costs firms incur to enter the public bond market, is also higher for IPO bonds. In both instances we investigate if these costs affect all firms, including those that enter the bond market with a bond rated investment grade.

5.1 Do firms pay higher underwriting costs on their IPO bonds?

We attempt to answer this question by comparing the gross spreads firms pay on their IPO bonds with the gross spreads they pay on their subsequent bonds. For reasons which we will explain below we also compare the *ex ante* credit spreads of IPO bonds with the *ex ante* credit spreads on the bonds that firms issue subsequently.

5.1.1 Do IPO bonds carry higher gross spreads?

Table 6 reports the results of our investigation on the gross spreads of bonds issued by our bond IPO firms. Recall that we want to ascertain if gross spreads, which are a measure of the costs of bond underwriting, are higher for IPO bonds than for the subsequent bonds these firms issue as this shows that firms incur a cost to first enter the public bond market. We attempt to identify this effect by controlling first for the set of firm characteristics F, and the set of controls unrelated to firm and bond characteristics, O, (models 1 through 3). We then expand these controls to account for the bond features, B, that are likely to play a role in underwriting costs, (models 4 through 6). As we explained above, we choose to introduce the latter controls separately because they may be determined jointly with gross spreads.

Model 1 investigates whether IPO bonds carry higher gross spreads by including the IPO dummy variable in our model of bond gross spreads. According to this model, everything else equal, firms pay on average 19 more basis points on the gross spread of their IPO bonds than on the public bonds they issue afterwards. Model 2, which adds the dummy variable $SECOND$ to our previous model of gross spreads to investigate whether such costs persist beyond the IPO, confirms that underwriting costs are higher for IPO bonds. According to this model, the second public bond the firm issues also carries higher gross spreads than its subsequent bond issues, but not by as much as its IPO bond. On average, the difference in the gross spreads between the IPO bond and the second bond the firm issues in the public bond market is 11 basis points, which is statistically significant at all of the usual confidence levels.

Model 3 investigates whether the underwriting costs of entering the public bond market as measured by the gross spreads of bonds vary with the creditworthiness of firm. To this end, we add to model 2 the $IGRADE$ dummy variable, which takes the value 1 for bonds rated investment grade, and the interaction of this variable with our IPO variable. The results of this model show that the premium in the gross spreads that firms pay on their IPO bonds does not vary significantly with the credit rating of the IPO bond. Even though the coefficient on the interaction of our IPO dummy variable with the $IGRADE$ dummy variable is negative, it is not statistically significant. Indeed, we can confirm by an F-test, shown at the bottom of the table, that the firms that enter the public bond market with an investment grade bond, pay higher gross spreads on their IPO bonds than on the bonds that they issue afterwards. In other words, these firms also pay a premium on the gross spreads they pay underwriters when they issue their first public bond.

Comparing models 1 through 3 with models 4 through 6, which add to the previous models the size of the bond issue and its maturity, we see that the inclusion of these controls does not change the thrust of our earlier findings. The new models continue to show that it is costly to enter the public bond market because IPO bonds carry higher gross spreads than the bonds firms issue subsequently, and this cost affects all firms irrespective of their credit rating. Furthermore, we continue to find that even those firms that enter the public bond market with bonds rated investment grade pay a premium on the gross spread of their IPO bonds.

Regarding the coefficients of the control variables that we use in these models, they are generally consistent with the discussion given in the methodology subsection and with the findings of the earlier literature, so we skip their analysis in the interest of space.[25]

In sum, our results show that IPO bonds carry higher gross spreads than the subsequent

[25]The bank relationship dummy variable drops out because our models are estimated with fixed effects and this variable does not vary over time. Recall that this dummy variable is equal to 1 if the firm issued a public bond to or took a syndicated loan from a bank that participated in the underwriting syndicate of its bond IPO.

bonds that these firms issue. Our results also show that firms continue to pay a gross spread premium on the second bond they issue in the public bond market, but this premium is not as large as that they pay on their IPO bonds. Finally, our results show that firms entering the public bond market with an investment grade rated bond pay a lower "entry" premium than those that do so with a below grade rated bond, but the difference between the two is not statistically significant.

5.1.2 Do IPO bonds carry higher *ex ante* credit spreads?

We interpreted in the previous subsection the gross spread premium firms pay the underwriters of their IPO bonds as evidence that it is costly to first enter the public bond market. It is possible, however, that underwriters compensate firms for this extra cost by guaranteeing them a higher price on their IPO bonds than the price they guarantee firms on their subsequent issues. We do not have information on the price that underwriters guarantee firms. However, by looking at the *ex ante* yield spreads on IPO bonds, and indirectly on the offer prices of these bonds, we can ascertain whether there is such a substitution effect.

To this end, we next investigate the *ex ante* credit spreads (over Treasuries with the same maturities) of IPO bonds. The results of this investigation are reported in Table 7. As in our investigation of bond gross spreads, and for the same reasons, the first set of regressions in the table controls for the firm characteristics F and our set of controls unrelated to firm and bond characteristics O. The second set of regressions adds to these regressions our set of bond controls B.

According to model 1, on average, the ex ante credit spreads of IPO bonds are 52 basis points higher than the credit spreads of the bonds subsequently issued by these firms. As we can see from model 2, this premium is limited to the IPO bond. Note that the coefficient on the dummy variable for the second bond the firm issues in the public bond market, $SECOND$, is not statistically significant. Further, according to model 3, the credit spread premium applies only to risky firms. Importantly, firms that enter the public bond market with a bond rated investment grade do not get a discount on the yield they pay on their IPO bonds. According to model 3, the coefficient on the interaction of the IPO bond dummy variable with the investment grade dummy variable is negative but not statistically significant. However, since the coefficients on IPO and IPOx$IGRADE$ are not independent, we can obtain additional information from testing the joint hypothesis that for the investment grade bonds, the effect of the IPO is zero. The F-test, presented in the bottom of Table 7 confirms that we cannot reject the hypothesis that firms entering the public bond market with a bond rated investment grade pay the same *ex ante* credit spread on their IPO bonds as on their subsequent bonds.

Comparing models 1 through 3 with models 4 through 6, which add to the previous

models our set of bond–specific controls, we see that while the magnitude of the IPO effects is now smaller, adding these controls does not change the thrust of the key findings we identify based on the former models.

The coefficients on the firm control variables we use in these models are generally insignificant, which was to be expected given that models are estimated with firm fixed effects. With respect to the bond–related controls and our controls for the economy and the state of the bond market, they show results that are consistent with our discussion in the methodology section, and so we skip their discussion in the interest of space.

In conclusion, according to our findings, IPO bonds carry higher *ex ante* credit spreads than the bonds firms issue subsequently in the public bond market. Our results also show that this yield premium is limited to IPO bonds; it is not present for the second bond that firms issue in the public bond market. Further, our results show that the yield premium is larger for IPO bonds rated below investment grade than for investment grade IPO bonds. These results are very similar to our findings in the previous subsection on gross spreads. This parallelism is important because it disproves the possibility that higher gross spreads on IPO bonds do not translate into higher costs to firms because underwriters compensate issuers by offering them higher guaranteed prices on their IPO bonds. While safer firms pay a premium on the gross spreads of their IPO bonds they do not appear to be charged a premium on ex-ante credit spreads of these bonds. In contrast, riskier firms pay a premium on both of these spreads on their IPO bonds. The results of these two subsections, therefore, show that the additional compensation firms have to pay underwriters to issue their IPO bonds alone makes it costly to them to first enter the public bond market. They also show that while this cost affects predominantly firms rated below investment grade, it also affects investment grade firms.

5.2 Do IPO bonds suffer from more underpricing in the secondary market?

The costs of entering the public bond market may not be limited to the additional compensation firms have to pay bond underwriters. As with the decision to float the equity, entering the public bond market may also be costly because of the underpricing firms have to offer in order to attract demand for their IPO bonds. To investigate whether IPO bonds suffer from more underpricing in the bond market than public bonds of seasoned issuers, we estimate our model of the difference between the spreads in the primary market and the spreads in the secondary market when IPO bonds first trade. We compute these spreads over the Moody's index of bond yields with the same rating of the bond on the issuance day and first trading day, respectively. We consider in this test only bonds whose first trade is within one month of the issue date and for which we have all the necessary data to compute the bond's yield at that time.

These requirements, in conjunction with the low trading frequency of bonds and the

fact that our data source on market prices goes back only to 1995, leaves us with a much smaller sample of bonds (63 IPO bonds and 296 non-IPO bonds). For this reason, in this section we investigate whether IPO bonds suffer from more underpricing based on pooled regressions alone. Therefore, unlike in our previous analysis, these results are most likely driven by differences between firms rather than differences between bond issues of the same firm. Nevertheless, we find the results presented below informative in that they show the difference in underpricing on IPO vs. subsequent bonds. Moreover, we control for a number of firm characteristics, to minimize their influence on our results.

The results of our model on market underpricing are reported in Table 8. We follow the same approach adopted in the previous subsections, that is, we first investigate if market underpricing is higher for IPO bonds than for seasoned bonds controlling for the set of firm characteristics, F, and the set of additional controls that is unrelated to bond characteristics, O (models 1 through 3). The second set of regressions in the table (models 4 through 6) adds to these controls our set of bond controls, B.

As the results of model (1) of Table 8 show, IPO bonds suffer from more market underpricing than seasoned public issues but the difference between them is not statistically significant.[26] Model 2 shows, however, that when we account separately for the pricing of the second bond that firms issue in the public bond market, we find evidence of IPO underpricing, as the coefficient on our IPO dummy variable becomes positive and statistically significant. Given that the coefficient on our second bond dummy, $SECOND$, is not statistically significant, the results of model 2 indicate that underpricing is highest for IPO bonds and starts to decline with the next bond that firms issue after they enter the public bond market.

Model 3 investigates whether the underpricing of IPO bonds varies with the bond's credit rating. According to the results of this model, firms that enter the public bond market with a bond rated investment grade suffer from less underpricing than those that do it with a bond rated below grade, but the difference in underpricing between these bonds is not statistically significant. Again, we rely on the F-test to determine whether the difference between *ex ante* and market yields is statistically significant for firms that enter the market with investment grade bonds. As with the *ex ante* spreads above, we cannot reject the hypothesis that firms entering the public bond market with an investment grade bond experience no underpricing with respect to secondary markets.

These findings continue to hold when we control for bond characteristics (models 4 though 6). Note that adding these controls increases the statistical significance of our IPO

[26]This result differs from Cai, Helwege and Warga (2005) in that they find that underpricing is statistically significantly higher for IPO bonds than for non-IPOs, a difference which may be attributable to the larger share of speculative grade bonds that they have in their sample of IPO bonds (more on this difference below).

dummy variable, therefore confirming our initial finding that IPO bonds suffer more from underpricing in the bond market than public bonds of seasoned issuers.

With respect to the controls we consider in the multivariate analysis, most of them are not statistically significant, which was to be expected given the nature of our dependent variable. Those that are significant show that underpricing increases with the maturity of the bond and the slope of the bond yield curve (as determined by the difference between the spread of the triple-B rated bonds and that of triple-A rated bonds). These effects are likely due to the fact that the Moody's yield indexes we use to compute bond spreads in the primary and secondary markets do not perfectly match the credit rating and maturity of the bonds in our sample.[27] Our results also show that underpricing is higher for bonds with a sinking fund and bonds underwritten by banks with a smaller share of the market. The sinking fund effect is also likely due to the fact that our dummy variable for the existence of a sinking fund does not capture all the different aspects that characterize these funds. Since the market share tends to correlate with the reputation of the underwriter, that result suggests that IPO bonds brought to the market by underwriters with better reputations suffer from less underpricing.

As a final note, when we allow for the small subset of firms that had ratings prior to their bond IPO to have different degree of underpricing,[28] to parallel our study of loan spreads, we find that firms that had an investment grade rating two years before their bond IPO do not experience any underpricing in terms of ex–ante or gross spreads, while firms that had a below grade rating before their bond IPO experience even higher underpricing on ex–ante spreads and the same degree of underpricing in terms of gross spreads compared to the firms that did not have a rating before. We did not find a significant difference in underpricing in terms of secondary market spreads between firms that did and that did not have rating before their bond IPO.

Summing up, the results we unveiled in this section portray a very clear picture of the costs firms have to incur to first enter the public bond market. These costs arise from both the extra compensation they have to pay underwriters of their IPO bonds and from the additional underpricing their IPO bonds face in the secondary bond market. Another robust result of our analysis is that these costs are higher for firms that enter this market with a bond rated below investment grade. Firms that enter the market with an investment grade bond, though, also incur these costs. This is particularly evident in the gross spreads they pay to issue their IPO bond. Thus, while the latter firms benefit from a reduction in the informational rents they

[27]Moody's has individual yield indexes only for whole credit ratings. In addition, Moody's individual yield indexes are not broken down by bond maturity.

[28]The results of these additional tests are not reported in the interests of space but are available from authors upon request.

pay banks after they enter the public bond market, they also incur some costs to first access this market. These costs are a contributing factor in reducing the number of firms that rely on bond financing despite our evidence on the benefits of accessing the bond market and the other benefits that researchers have identified with firms' access to bond funding.

6 Final remarks

In this paper, we compare bank loan spreads for borrowers before and after they gain access to the public bond market. We find that these spreads decline, particularly for safer firms, after firms issue for the first time in the public bond market. Our results are both economically and statistically significant, and they continue to hold when we control for firm- and loan-specific factors and for the endogeneity of firms that undertake their bond IPOs.

Our findings are consistent with a model in which banks earn informational rents, such as Rajan (1992): Informational rents should decline when new information identifying the firms' creditworthiness is made public, increasing outside banks' willingness to bid on loans to these firms, particularly the safer firms. Our investigation of the difference between the impact of bond IPOs experienced by the firms that had a credit rating prior to the bond IPO and the firms that were not rated produces results consistent with our hypothesis that new information about the firm is made public at that time, thereby, reducing the informational advantage of incumbent banks. Finally, our findings that it is costly to first issue in the public bond market, even for firms that enter with a bond rated investment grade, provides a potential explanation of why not all safe firms opt for entering the public bond market.

Our work opens up several avenues for additional research. As we have noted, our sample focuses on relatively large, often syndicated loans taken out by publicly listed firms. Since information problems are typically thought to be greater for smaller, privately held firms, investigating the behavior of loan spreads for such firms when they first gain access to the public bond market might afford greater insight into the size of any informational rents that banks earn. Even though we rely on publicly listed firms, we still find that new information on a firm is revealed when it issues its first public bond. Since this informational effect of the bond IPO is likely to be larger for privately held firms or in connection with the firm equity IPO, particularly for firms that have not accessed the public bond market, an investigation of which market firms choose to enter first also appears to be a fruitful area for future research.

Table 1. Sample characterization[a]

Firm changes resulting from the bond IPO				
Variables	1 year before debt IPO	1 year after debt IPO	Difference	T-stat
L ASSETS	5.72	6.26	0.54***	6.06
L SALES	5.53	5.90	0.37***	3.60
ROA	0.022	0.011	-0.011	1.56
EARNINGS VOL	0.031	0.032	0.001	0.12
LEVERAGE	0.37	0.47	0.10***	6.14
TANGIBLES	0.61	0.63	0.02**	1.99
ADVERTISING+R&D	0.15	0.019	-0.13	1.02
INVESTMENTS	0.10	0.098	0.002	0.43
INTEREST COV	29.8	1.4	-28.4**	-2.06
Firms that issued a debt IPO vs. firms that did not issue a debt IPO[b]				
	Debt IPO firms	Non IPO firms	Difference	T-stat
L ASSETS	7.97	5.27	2.70***	34.1
L SALES	7.70	5.28	2.42***	31.1
ROA	0.012	-0.034	0.046***	5.49
EARNINGS VOL	0.039	0.079	-0.040**	2.10
LEVERAGE	0.37	0.31	0.06***	3.65
TANGIBLES	0.68	0.51	0.17***	17.8
ADVERTISING+R&D	0.09	0.51	-0.42*	1.89
INVESTMENTS	0.050	0.049	0.001	0.08
INTEREST COV	11.0	15.3	-4.3	0.46
Firms that issued a debt IPO vs firms that did not issue a debt IPO: matched sample[c]				
	Debt IPO firms	Non IPO firms	Difference	T-stat
L ASSETS	7.38	6.25	1.12***	10.5
L SALES	7.04	6.28	0.76***	6.68
ROA	-0.029	-0.017	-0.012	0.66
EARNINGS VOL	0.027	0.029	-0.001	0.32
LEVERAGE	0.39	0.38	0.0086	0.44
TANGIBLES	0.68	0.61	0.075**	2.15
ADVERTISING+R&D	0.085	0.099	-0.014	0.16
INVESTMENTS	0.69	0.69	-0.001	0.060
INTEREST COV	19.8	6.02	13.7	1.05

[a] $L\ ASSETS$ Log of real assets in millions of 1980 dollars computed with the CPI deflator; $L\ SALES$ real sales in millions of 1980 dollars computed with the CPI deflator; ROA returns on assets (net income divided by assets); $EARNINGS\ VOL$ earnings volatility (the standard deviation of the firm's quarterly return on assets over the last three years); $LEVERAGE$ leverage ratio (debt over total assets); $TANGIBLES$ tangible assets (inventories plus plant, property, and equipment over total assets); $ADVERTISING + R\&D$ expenses with advertising and R&D scaled by the firm's sales; $INVESTMENTS$ investments scaled by its assets; $INTEREST\ COV$ the interest coverage (EBITDA divided by interest expense).

[b] Comparison performed at the end of our sample period (2002).

[c] Comparison performed at the end of our sample period (2002) with only firms from the matched sample included.

Source: Authors' computations.

Table 2. Impact of the bond IPO on loan spreads: Univariate analysis[a]

	Avg. spread before vs Avg. sprd within 1 year			Avg. spread before vs Avg. sprd after		
	Avg. before	Avg. 1 year	Diff	Avg. before	Avg. after	Diff
	(Obs)	(Obs)	(T-stat)	(Obs)	(Obs)	(T-Stat)
All IPOs	194.2	177.5	-16.7***	194.2	167.0	-27.2***
	(12835)	(951)	(4.60)	(12835)	(2293)	(11.1)
IGrade IPOs	194.2	90.3	-103.9***	194.2	85.3	-108.8***
	(12835)	(223)	(18.2)	(12835)	(589)	(28.6)
BGrade IPOs	194.2	206.5	12.3***	194.2	206.2	12.1***
	(12835)	(577)	(3.11)	(12835)	(1130)	(4.20)

[a] Loan spread is the all-in-drawn spread over Libor at origination. $IGRADE\ IPOS$ IPO bonds rated investment grade by Moody's. $BGRADE\ IPOS$ IPO bonds rated below grade by Moody's.

Source: Authors' computations.

Table 3. Impact of the bond IPO on loan spreads: Multivariate analysis.[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
AFTER IPO	-9.77			-12.35		
	(9.98)			(8.88)		
AFTER IGRADE IPO		-35.39***	-26.20***		-33.02***	-22.28**
		(10.43)	(10.02)		(10.91)	(10.28)
AFTER BGRADE IPO		-18.04	-18.28		-17.99	-18.30*
		(13.96)	(12.14)		(12.01)	(10.82)
AFTRE NR IPO		43.79**	20.73		26.04	10.22
		(17.60)	(15.39)		(19.46)	(15.32)
L AGE	14.32	14.23	16.19*	10.92	10.94	15.52*
	(9.46)	(9.49)	(9.00)	(9.05)	(9.09)	(8.57)
L ASSETS	-7.49*	-7.49*	-7.30**	-3.64	-3.72	-4.18
	(4.08)	(4.06)	(3.70)	(4.05)	(4.05)	(3.64)
ROA	-61.89***	-63.08***	-57.10***	-47.11**	-48.12**	-42.59**
	(22.80)	(22.75)	(21.28)	(21.64)	(21.65)	(20.27)
EARNINGS VOL	2.36	2.35	2.33	2.19	2.19	2.23
	(2.42)	(2.42)	(2.44)	(2.77)	(2.76)	(2.79)
LEVERAGE	12.01	12.65	12.62	22.61*	23.04*	24.56**
	(13.74)	(13.73)	(12.96)	(12.94)	(12.95)	(12.35)
TANGIBLES	-20.78**	-19.19*	-23.13**	-15.93*	-14.76	-19.83**
	(10.11)	(9.95)	(9.52)	(9.52)	(9.45)	(9.21)
INVESTMENTS	2.79	2.65	4.75	-2.00	-2.06	0.30
	(15.77)	(15.94)	(15.11)	(14.78)	(14.85)	(14.16)
ADVERTISING+R&D	-1.06***	-1.06***	-1.04***	-0.55***	-0.55***	-0.61***
	(0.07)	(0.07)	(0.07)	(0.14)	(0.14)	(0.13)
INTEREST COV	-5.79**	-5.70**	-7.25***	-6.31***	-6.23***	-7.91***
	(2.35)	(2.34)	(2.25)	(2.21)	(2.21)	(2.20)
TREND	5.75***	5.78***	5.18***	5.65***	5.69***	4.55***
	(1.32)	(1.32)	(1.30)	(1.27)	(1.27)	(1.22)
RECESSION	20.74***	20.87***	18.83***	20.38***	20.45***	19.13***
	(4.73)	(4.75)	(4.34)	(4.57)	(4.57)	(4.16)
BBB—AAA SPREAD	-40.06***	-40.06***	-40.14***	-29.31***	-29.48***	-29.25***
	(6.97)	(6.91)	(6.30)	(6.64)	(6.62)	(6.13)
LRELATIONSHIP	-5.24**	-5.51**	-7.30***	-4.77*	-4.97**	-5.78**
	(2.57)	(2.58)	(2.45)	(2.47)	(2.48)	(2.43)
L AMOUNT				-4.07*	-3.94*	-4.35*
				(2.33)	(2.31)	(2.26)
L MATURITY				0.29	0.15	-0.03
				(2.11)	(2.10)	(1.94)
SECURED				25.73***	25.51***	25.42***
				(5.50)	(5.48)	(5.35)
SENIOR				-13.39**	-13.36**	-8.91
				(6.65)	(6.63)	(6.02)
CORPORATE PURP				-10.13**	-9.99**	-9.30**
				(4.92)	(4.90)	(4.54)

Continues on the next page.

Table 3 (Continued).[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
REFINANCE				-14.81***	-15.14***	-15.00***
				(4.40)	(4.39)	(4.15)
TAKEOVER				9.97*	9.37*	11.01**
				(5.46)	(5.45)	(5.12)
WORKING CAPITAL				-14.62***	-14.85***	-11.46**
				(5.13)	(5.12)	(5.03)
TERM LOAN				16.07***	15.88***	14.93***
				(4.17)	(4.15)	(4.01)
CREDIT LINE				-11.93***	-11.92***	-12.93***
				(4.16)	(4.14)	(3.99)
BRIDGE LOAN				54.67***	52.99***	48.62***
				(14.33)	(14.27)	(13.35)
GUARANTOR				5.50	4.18	2.01
				(6.84)	(6.97)	(6.67)
SPONSOR				48.17***	48.03***	45.02***
				(8.53)	(8.70)	(8.38)
RENEWAL				-1.75	-1.59	3.41
				(8.74)	(8.78)	(8.58)
DIVIDEND REST				3.24	3.16	6.07*
				(3.40)	(3.41)	(3.30)
SYNDICATED				-4.39	-4.75	-2.28
				(4.59)	(4.57)	(4.57)
Constant	68.79***	67.91***	72.97***	151.04***	149.01***	151.38***
	(20.10)	(20.32)	(18.08)	(33.44)	(33.58)	(32.03)
Observations	8499	8499	9564	7950	7950	8942
R^2	0.76	0.76	0.76	0.79	0.80	0.79

[a] Dependent variable is $LOAN\ SPREAD$, the loan spread at origination over Libor; $AFTER\ IPO$ is a dummy variable that takes the value 1 for the loans taken out after the firm's bond IPO; $AFTER\ IGRADE\ IPO$ is a dummy variable that takes the value 1 for the loans taken out after the firm's bond IPO that are rated investment grade; $AFTER\ BGRADE\ IPO$ is a dummy variable that takes the value 1 for the loans taken out after the firm's bond IPO that are rated below grade; $AFTER\ NR\ IPO$ is a dummy variable that takes the value 1 for the loans taken out after the firm's bond IPO for which the rating on the first public bond the firm issues is missing. See definitions of firm controls in Table 1. $RECESSION$ is a dummy variable which takes the value 1 if the bond was issued during a recession; $BBB - AAA\ SPREAD$ is the difference between the Moody's indexes on the yields of triple-A and triple-B rated bonds; $LRELATIONSHIP$ is a dummy variable which takes the value 1 if the firm borrowed from the lead underwriter(s) in the loan syndicate at least once in the year prior to the loan; $L\ AMOUNT$ is the log of loan amount in 1980 dollars; $L\ MATURITY$ is the log of loan maturity in years; $SECURED$ is a dummy variable that takes the value 1 if the loan is secured; $SENIOR$ is a dummy variable that takes the value 1 if the loan is senior; $CORPORATE\ PURP$ is a dummy variable that takes the value 1 if the loan is for corporate purposes; $REFINANCE$ is a dummy variable that takes the value 1 if the loan is to repay existing debt; $TAKEOVER$ is a dummy variable that takes the value 1 if the loan is to finance a takeover; $WORKING\ CAP$ is a dummy variable that takes the value 1 if the loan is for working capital; $TERM\ LOAN$ is a dummy variable that takes the value 1 for term loans; $CREDIT\ LINE$ is a dummy variable that takes the value 1 for credit lines; $BRIDGE\ LOAN$ is a dummy variable that takes the value 1 for bridge loans; $GUARANTOR$ is a dummy variable that takes the value 1 if the borrower has a guarantor; $SPONSOR$ is a dummy variable that takes the value 1 if the borrower has a sponsor; $RENEWAL$ is a dummy variable indicating if the loan is a renewal of an existing loan;. $DIVIDEND\ REST$ is a dummy variable that takes the value 1 if the borrower faces dividend restrictions in connection with that loan; $SYNDICATED$ is a dummy variable that equals one if the loan is syndicated. Models estimated with firm fixed effects. Robust standard errors clustered on company in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' computations.

Table 4. Impact of the bond IPO on loan spreads: Multivariate analysis with matched sample.[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
AFTER IPO	-7.66			-4.55		
	(14.42)			(12.82)		
AFTER IGRADE IPO		-51.54**	-34.56**		-45.86**	-23.21
		(20.81)	(16.48)		(18.84)	(17.02)
AFTER BGRADE IPO		-4.32	-3.42		2.86	4.84
		(17.57)	(16.71)		(15.83)	(15.46)
AFTER NR IPO		15.26	-5.55		6.69	-12.23
		(33.27)	(25.09)		(31.13)	(23.24)
L AGE	31.36*	30.20*	29.37*	30.56*	30.10*	30.76**
	(18.29)	(18.03)	(16.04)	(16.95)	(16.65)	(14.72)
L ASSETS	-9.48	-9.16	-8.04	-10.44	-10.02	-9.52
	(7.84)	(7.78)	(6.55)	(7.31)	(7.23)	(6.00)
ROA	-13.36	-12.19	4.80	-33.45	-32.91	-8.58
	(39.32)	(38.71)	(31.48)	(39.65)	(39.10)	(30.88)
EARNINGS VOL	0.48	0.47	0.33	0.15	0.14	0.05
	(0.31)	(0.31)	(0.27)	(0.32)	(0.32)	(0.27)
LEVERAGE	21.30	20.27	19.51	26.05	24.89	24.20
	(28.74)	(28.35)	(25.51)	(26.04)	(25.76)	(24.13)
TANGIBLES	-5.43	-3.35	-17.55	-13.60	-11.62	-26.27
	(19.04)	(18.88)	(17.97)	(16.70)	(16.70)	(16.33)
INVESTMENTS	-37.01	-35.94	-34.76	-40.06	-39.30	-33.41
	(37.55)	(38.68)	(34.25)	(32.54)	(33.08)	(29.23)
ADVERTISING+R&D	-39.00	-32.67	-88.93	-55.94	-51.89	-120.30
	(111.79)	(110.29)	(98.96)	(108.42)	(105.65)	(98.51)
L INTEREST COV	-13.28**	-13.34***	-15.83***	-13.60***	-13.64***	-16.37***
	(5.17)	(5.11)	(4.08)	(4.54)	(4.48)	(3.85)
TREND	5.04**	5.16**	3.89*	4.74**	4.80***	2.66
	(2.28)	(2.22)	(2.08)	(1.87)	(1.82)	(1.79)
RECESSION	20.31**	20.23**	18.65**	17.52**	17.23**	16.68**
	(8.27)	(8.28)	(7.42)	(7.60)	(7.64)	(6.55)
BBB—AAA SPREAD	-26.04*	-27.84**	-24.45**	-21.60*	-23.74**	-19.28*
	(13.64)	(13.66)	(11.81)	(11.85)	(11.85)	(10.49)
LRELATIONSHIP	-1.00	-1.27	-7.56	-2.15	-2.20	-6.96
	(5.01)	(5.04)	(4.94)	(4.72)	(4.74)	(4.94)
L AMOUNT				-3.44	-3.80	-2.23
				(3.99)	(4.02)	(4.34)
L MATURITY				1.43	1.12	-3.06
				(3.99)	(4.01)	(3.65)
SECURED				24.06**	23.26**	27.28***
				(9.98)	(9.88)	(9.76)
SENIOR				-2.16	-1.83	3.78
				(11.13)	(11.25)	(9.75)
CORPORATE PURP				-15.04*	-15.75*	-13.84*
				(8.38)	(8.44)	(7.71)

Continues on the next page.

Table 4 (Continued).[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
REFINANCE				-16.11**	-17.06**	-15.16**
				(8.20)	(8.21)	(7.67)
TAKEOVER				4.59	3.59	8.91
				(9.41)	(9.40)	(8.55)
WORKING CAPITAL				-20.84*	-22.01**	-9.52
				(10.79)	(10.82)	(10.28)
TERM LOAN				41.10***	40.39***	42.06***
				(8.65)	(8.66)	(7.95)
CREDIT LINE				10.58	9.59	11.86
				(8.68)	(8.67)	(7.83)
BRIDGE LOAN				77.00***	74.32***	66.25***
				(23.35)	(23.18)	(25.64)
GUARANTOR				6.90	6.36	7.85
				(12.32)	(12.47)	(12.12)
SPONSOR				67.66***	67.39***	58.74***
				(13.17)	(13.22)	(11.79)
RENEWAL				9.34	9.69	12.01
				(13.71)	(13.84)	(12.69)
DIVIDENT REST				2.83	2.47	6.56
				(5.88)	(5.91)	(6.28)
SYDNICATED				6.18	6.14	9.09
				(9.38)	(9.38)	(9.96)
Constant	74.36	72.68	103.91***	104.39	108.35	112.94*
	(46.19)	(46.45)	(37.68)	(65.63)	(66.12)	(61.27)
Observations	2363	2363	2859	2363	2363	2859
R^2	0.85	0.85	0.83	0.87	0.88	0.86

[a] Dependant variable is *LOAN SPREAD*, the loan spread at origination over Libor. Models estimated on our sample of bond IPO firms and our sample of matched firms. See the Methodology section for a description of our matched sample. See Table 3 for the definitions of control variables. Models estimated with firm fixed effects. Robust standard errors clustered on company in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' computations.

Table 5. Impact of the bond IPO on loan spreads: effect of firm ratings.[a]

Variables	Full sample			Matched sample		
	(1)	(2)	(3)	(4)	(5)	(6)
AFTER IGRADE IPO	-44.52***	-40.41***		-59.89***	-55.85***	
	(10.76)	(11.10)		(22.28)	(20.93)	
AFTER BBB IPO			-49.92***			-69.66**
			(15.52)			(31.12)
AFTER NON-BBB			-24.96*			-43.96*
IGRADE IPO			(15.15)			(24.84)
AFTER BGRADE IPO	-23.72*	-21.71	-20.13	-18.89	-11.55	-15.58
	(14.33)	(13.63)	(14.39)	(27.50)	(24.07)	(26.96)
AFTER NR IPO	50.30**	41.23**	40.85**	24.55	11.27	8.22
	(20.11)	(18.03)	(18.19)	(29.23)	(25.50)	(25.67)
RATED*AFTER	45.01***			47.99**		
IGRADE IPO	(16.84)			(22.46)		
RATED*AFTER	11.59			4.10		
BGRADE IPO	(27.24)			(30.85)		
RATED*AFTER	-35.51			-68.53*		
NR IPO	(33.94)			(40.70)		
IGRATED*AFTER		27.89**			45.23**	
IGRADE IPO		(11.94)			(21.63)	
BGRATED*AFTER		8.94			-2.01	
BGRADE IPO		(32.88)			(39.44)	
FIRMS THAT		2.71			-14.06	
SWITCH IG/BG		(18.96)			(22.86)	
BBB-RATED*AFTER			34.30**			59.40*
BBB IPO			(15.93)			(32.23)
OTHER IGRATED			3.10			41.8
AFTER IG IPO			(26.50)			(42.26)
FIRMS THAT			4.15			-1.30
SWITCH RATING			(22.76)			(26.99)
L AGE	15.09	14.72	14.66	12.44	11.60	12.48
L ASSETS	-7.98**	-7.84*	-7.76*	-7.76	-7.62	-7.51
ROA	-62.60***	-62.59***	-62.74***	-41.02	-43.22	-41.80
EARNINGS VOL	2.36	2.36	2.36	0.64**	0.65**	0.65**
LEVERAGE	14.29	14.03	13.83	-0.55	-0.71	0.19
TANGIBLES	-18.87*	-19.30*	-19.25*	-18.94	-21.00	-20.28
INVESTMENTS	2.45	3.02	3.10	-16.51	-11.42	-9.50
ADVERTISING+R&D	-1.05***	-1.06***	-1.06***	-104.98	-113.29	-113.16
L INTEREST COV	-5.66**	-5.68**	-5.68**	-12.40**	-12.26**	-12.29**
TREND	5.79***	5.79***	5.79***	7.05***	7.09***	6.98***
RECESSION	20.65***	20.92***	20.93***	11.49	12.20	12.10
BBB-AAA SPREAD	-39.88***	-39.95***	-39.81***	-43.53***	-43.41***	-43.16***
LRELATIONSHIP	-5.32**	-5.33**	-5.34**	-3.21	-3.10	-3.18
Observations	8495	8495	8495	2619	2619	2619
R^2	0.76	0.76	0.76	0.84	0.84	0.84

See notes for Table 4. Standard errors for control variables are omitted in the interest of space. $RATED$ indicates a firm had a credit rating before its bong IPO. $IGRATED$ indicates a firm had an investment grade rating before its bong IPO. $BGRATED$ indicates a firm had an below grade rating before its bong IPO. $SWITCH$ indicates a firms' rating before bond IPO did not conform with its bond IPO rating (38 observations).

Table 6. Gross spreads of IPO bonds.[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
IPO[(1)]	0.19**	0.31***	0.27***	0.17**	0.28***	0.20***
	(0.08)	(0.10)	(0.09)	(0.07)	(0.09)	(0.08)
SECOND		0.20***	0.16***		0.17***	0.12***
		(0.06)	(0.05)		(0.06)	(0.05)
IGRADE			-0.86***			-0.92***
			(0.08)			(0.08)
IPO x IGRADE[(2)]			-0.11			-0.08
			(0.10)			(0.09)
L AGE	0.08	0.13	-0.03	0.02	0.07	-0.11
	(0.14)	(0.14)	(0.11)	(0.12)	(0.12)	(0.09)
L ASSETS	-0.08	-0.07	-0.05	-0.07	-0.06	-0.04
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.04)
ROA	0.17	0.26	0.93	0.12	0.22	0.89
	(0.64)	(0.66)	(0.65)	(0.57)	(0.58)	(0.55)
EARNINGS VOL	-0.07	0.11	-0.02	0.11	0.27	0.12
	(0.38)	(0.42)	(0.41)	(0.38)	(0.42)	(0.37)
LEVERAGE	0.17	0.17	-0.04	0.20	0.20	-0.02
	(0.21)	(0.20)	(0.19)	(0.20)	(0.20)	(0.18)
TANGIBLES	-0.01	-0.02	0.04	-0.03	-0.04	0.01
	(0.17)	(0.16)	(0.10)	(0.17)	(0.16)	(0.10)
ADVERTISING+R&D	0.67	1.27	1.10	0.03	0.55	0.61
	(1.53)	(1.50)	(1.48)	(1.47)	(1.42)	(1.28)
INVESTMENTS	0.15	0.15	0.18	0.22	0.22	0.21
	(0.31)	(0.31)	(0.28)	(0.28)	(0.28)	(0.24)
L INTEREST COV	-0.08	-0.09	-0.07	-0.11*	-0.12**	-0.10**
	(0.06)	(0.06)	(0.05)	(0.06)	(0.06)	(0.05)
TIME TREND	-0.01	-0.01	0.00	-0.00	-0.00	0.01
	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.02)
RECESSION	0.13***	0.13***	0.08*	0.15***	0.15***	0.12**
	(0.05)	(0.04)	(0.05)	(0.05)	(0.05)	(0.05)
AFTER 1988	-0.20	-0.20	-0.09	-0.20	-0.19	-0.10
	(0.12)	(0.12)	(0.11)	(0.12)	(0.12)	(0.11)
BK MKT SHARE	-0.65	-0.74*	-0.64**	-0.34	-0.42	-0.28
	(0.40)	(0.38)	(0.33)	(0.45)	(0.43)	(0.36)
L AMOUNT				0.07	0.08	-0.03
				(0.17)	(0.17)	(0.15)
L MATURITY				0.31***	0.30***	0.32***
				(0.04)	(0.04)	(0.03)
CONSTANT	0.12	-0.11	0.45	-0.71*	-0.91**	-0.28
Observations	1,191	1,191	1,169	1,186	1,186	1,164
R^2	0.79	0.80	0.81	0.83	0.83	0.85
P value for (1)+(2)=0			0.064			0.120

[a] Dependent variable is $GROSS\ SPREAD$, the underwriting spread of a debt issue measured as the difference between the offered amount and the proceeds to the issuer, expressed as a percentage of the offered amount (issue size); IPO is a dummy variable that takes the value 1 for the IPO bonds; $SECOND$ is a dummy variable which takes the value 1 for the second public bond issued by debt IPO firms; $IGRADE$ is a dummy variable which takes the value 1 for the investment-grade bonds. See definitions of firm controls in Table 1. $RECESSION$ is a dummy variable which takes the value 1 if the bond was issued during a recession; $AFTER$ 1988 is a dummy variable which takes the value one for the bonds issued in the period post 1988; $BK\ MKT\ SHARE$ is the market share of the underwriter based on the volume of issues; $L\ AMOUNT$ is the log of the issue amount; $L\ MATURITY$ is the log of the issue maturity. Models estimated with firm fixed effects. Robust standard errors clustered on company in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' computations.

Table 7. *Ex ante* credit spreads of IPO bonds.[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
IPO[(1)]	0.52***	0.59***	0.69**	0.37**	0.34*	0.47*
	(0.19)	(0.21)	(0.30)	(0.16)	(0.18)	(0.28)
SECOND		0.12	0.04		-0.04	-0.08
		(0.12)	(0.11)		(0.11)	(0.11)
IGRADE			-1.58***			-1.32***
			(0.26)			(0.24)
IPO x IGRADE[(2)]			-0.53			-0.44
			(0.33)			(0.31)
L AGE	0.22	0.26	0.11	0.33**	0.32**	0.18
	(0.16)	(0.17)	(0.15)	(0.14)	(0.15)	(0.13)
L ASSETS	0.06	0.06	0.14	-0.00	-0.00	0.08
	(0.10)	(0.10)	(0.11)	(0.09)	(0.09)	(0.10)
ROA	-1.80	-1.73	-0.26	-1.78	-1.81	-0.61
	(1.22)	(1.22)	(1.24)	(1.15)	(1.16)	(1.25)
EARNINGS VOL	-1.67**	-1.55*	-1.83*	-0.97	-1.01	-1.34
	(0.84)	(0.89)	(1.06)	(0.91)	(0.90)	(1.04)
LEVERAGE	0.91	0.92	0.60	0.53	0.52	0.38
	(0.70)	(0.70)	(0.55)	(0.70)	(0.70)	(0.58)
TANGIBLES	-0.59	-0.60	-0.45	-0.61*	-0.60*	-0.50*
	(0.38)	(0.38)	(0.30)	(0.32)	(0.32)	(0.26)
ADVERTISING+R&D	-1.77	-1.39	0.42	-4.00	-4.14	-1.93
	(3.50)	(3.62)	(3.62)	(3.11)	(3.17)	(3.30)
INVESTMENTS	0.07	0.09	0.30	0.24	0.23	0.43
	(0.67)	(0.68)	(0.63)	(0.59)	(0.59)	(0.56)
L INTEREST COV	-0.08	-0.09	-0.06	-0.08	-0.08	-0.05
	(0.13)	(0.13)	(0.10)	(0.11)	(0.12)	(0.10)
RECESSION	0.33***	0.33***	0.31***	0.39***	0.39***	0.35***
	(0.10)	(0.10)	(0.08)	(0.10)	(0.10)	(0.08)
TREASURY SLOPE	-0.03	-0.03	-0.03	-0.08	-0.08	-0.07
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
AAA YIELD	-0.06	-0.06	-0.08	-0.13**	-0.13**	-0.12**
	(0.05)	(0.05)	(0.06)	(0.05)	(0.05)	(0.06)
BBB-AAA SPREAD	0.80***	0.79***	0.71***	0.60***	0.60***	0.55***
	(0.19)	(0.19)	(0.16)	(0.18)	(0.18)	(0.17)
BK MKT SHARE	-1.11*	-1.16*	-1.09*	-0.85	-0.83	-0.83
	(0.66)	(0.67)	(0.60)	(0.62)	(0.62)	(0.58)
L AMOUNT				0.54**	0.53**	0.37
				(0.24)	(0.24)	(0.24)
L MATURITY				0.01	0.01	0.05
				(0.05)	(0.05)	(0.04)
CALLABLE				0.61***	0.61***	0.44***
				(0.12)	(0.12)	(0.10)
SINKING FUND				0.55	0.55	0.44
				(0.35)	(0.35)	(0.31)
SHELF				-0.17	-0.18	-0.10
				(0.11)	(0.11)	(0.09)
PUT OPTION				-0.70***	-0.71***	-0.68***
				(0.12)	(0.12)	(0.12)
CONSTANT	1.05	0.93	2.33**	1.49*	1.54*	2.37***
Observations	1,328	1,328	1,308	1,328	1,328	1,308
R^2	0.84	0.84	0.87	0.87	0.87	0.88
P value for (1)+(2)=0			0.327			0.833

[a] Dependent variable is $CREDIT\ SPREAD$, the *ex ante* credit spread over Treasury with the same maturity of the bond; IPO is a dummy variable that takes the value 1 for the IPO bonds; $SECOND$ is a dummy variable which takes the value 1 for the second public bond issued by debt IPO firms; $IGRADE$ is a dummy variable which takes the value 1 for the investment-grade bonds. See definitions of firm controls in Table 1. $RECESSION$ is a dummy variable which takes the value 1 if the bond was issued during a recession; $TREASURY\ SLOPE$ is the difference between the yields of Treasuries with 30 year and 5 year maturities; $AAA\ YIELD$ is the Moody's index on the yield of triple-A rated bonds; $BBB-AAA\ SPREAD$ is the difference between the Moody's indexes on the yields of triple-A and triple-B rated bonds; $BK\ MKT\ SHARE$ is the market share of the underwriter based on the volume of issues; $L\ AMOUNT$ is the log of the issue amount; $L\ MATURITY$ is the log of the issue maturity; $CALLABLE$ is a dummy variable which takes the value 1 for callable bonds; $SINKING\ FUND$ is a dummy variable which takes the value 1 for bonds with a sinking fund; $SHELF$ is a dummy variable which takes the value 1 for shelf bonds; $PUT\ OPTION$ is a dummy variable which takes the value 1 for bonds with a put option. Models estimated with firm fixed effects. Robust standard errors clustered on company in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' computations.

Table 8. Difference between *ex ante* yields and market yields at the time of the first trade.[a]

Variables	(1)	(2)	(3)	(4)	(5)	(6)
IPO[(1)]	0.10	0.13*	0.26*	0.11*	0.15**	0.28*
	(0.07)	(0.07)	(0.15)	(0.06)	(0.06)	(0.16)
SECOND		0.07	0.10		0.10	0.12
		(0.07)	(0.07)		(0.09)	(0.09)
IGRADE			0.10			0.06
			(0.07)			(0.07)
IPO x IGRADE[(2)]			-0.23			-0.20
			(0.18)			(0.18)
L AGE	-0.03	-0.02	-0.03	-0.02	-0.02	-0.02
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
L ASSETS	-0.02	-0.02	-0.01	0.01	0.02	0.02
	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
ROA	0.05	0.07	-0.03	-0.02	0.01	-0.02
	(0.38)	(0.38)	(0.38)	(0.36)	(0.35)	(0.35)
EARNINGS VOL	0.21	0.17	0.42	0.38	0.43	0.58
	(0.63)	(0.63)	(0.73)	(0.69)	(0.69)	(0.74)
LEVERAGE	0.01	0.01	0.04	0.10	0.12	0.12
	(0.10)	(0.09)	(0.10)	(0.12)	(0.12)	(0.13)
TANGIBLES	0.02	0.03	0.04	0.01	0.02	0.02
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
ADVERTISING+R&D	0.41	0.36	0.49	0.75	0.69	0.67
	(1.15)	(1.18)	(1.15)	(1.17)	(1.21)	(1.18)
INVESTMENTS	0.09	0.08	0.10	0.12	0.11	0.11
	(0.13)	(0.13)	(0.12)	(0.12)	(0.12)	(0.12)
L INTEREST COV	-0.01	-0.02	-0.02	-0.00	-0.01	-0.01
	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)	(0.03)
RECESSION	-0.08	-0.08	-0.09	-0.07	-0.07	-0.07
	(0.19)	(0.19)	(0.19)	(0.18)	(0.18)	(0.19)
TREASURY SLOPE	-0.10	-0.10	-0.10	-0.14	-0.14	-0.14
	(0.11)	(0.11)	(0.11)	(0.11)	(0.11)	(0.12)
BBB-AAA SPREAD	0.22	0.22	0.24	0.29*	0.29*	0.29*
	(0.15)	(0.15)	(0.15)	(0.16)	(0.15)	(0.15)
BK MKT SHARE	-1.15**	-1.18**	-1.13**	-0.91*	-0.97*	-1.02*
	(0.55)	(0.53)	(0.54)	(0.53)	(0.51)	(0.54)
BK RELATIONSHIP	-0.08	-0.08	-0.07	-0.07	-0.07	-0.07
	(0.07)	(0.07)	(0.07)	(0.06)	(0.05)	(0.06)
L AMOUNT				-0.15	-0.16	-0.16
				(0.09)	(0.10)	(0.10)
L MATURITY				0.15**	0.16**	0.15**
				(0.06)	(0.06)	(0.06)
CALLABLE				0.05	0.04	0.01
				(0.05)	(0.06)	(0.07)
SINKING FUND				1.03***	1.06***	0.00
				(0.10)	(0.11)	(0.00)
SHELF				0.01	0.03	0.03
				(0.06)	(0.06)	(0.06)
PUT OPTION				-0.16	-0.15	-0.14
				(0.10)	(0.10)	(0.10)
CONSTANT	0.09	0.05	-0.00	-0.45	-0.51	-0.49
Observations	359	359	357	358	358	356
R^2	0.00	0.00	0.01	0.05	0.06	0.04
P value for (1)+(2) = 0			0.643			0.262

[a] Dependent variable is $ABN\ SPREAD$, the percentage point difference between the *ex ante* yield spread and the secondary market yield spread when the bond first trades provided this occurs within one month from the issuance date, where these spreads are computed over the Moody's daily bond yield index with the same rating of the bond; IPO is a dummy variable that takes the value 1 for the IPO bonds; $SECOND$ is a dummy variable which takes the value 1 for the second public bond issued by debt IPO firms; $IGRADE$ is a dummy variable which takes the value 1 for the investment-grade bonds. See definitions of firm controls in Table 1. $RECESSION$ is a dummy variable which takes the value 1 if the bond was issued during a recession; $TREASURY\ SLOPE$ is the difference between the yields of Treasuries with 30 year and 5 year maturities; $BBB - AAA\ SPREAD$ is the difference between the Moody's indexes on the yields of triple-A and triple-B rated bonds; $BK\ MKT\ SHARE$ is the market share of the underwriter based on the volume of issues; $BK\ RELATIONSHIP$ is a dummy variable which takes the value 1 if the bond IPO underwriter also acquired the firm's last private placement or extended the firm its last loan prior to its IPO bond); $L\ AMOUNT$ is the log of the issue amount; $L\ MATURITY$ is the log of the issue maturity; $CALLABLE$ is a dummy variable which takes the value 1 for callable bonds; $SINKING\ FUND$ is a dummy variable which takes the value 1 for bonds with a sinking fund; $SHELF$ is a dummy variable which takes the value 1 for shelf bonds; $PUT\ OPTION$ is a dummy variable which takes the value 1 for bonds with a put option. Robust standard errors clustered on company in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Source: Authors' computations.

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