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The importance of track record for US corporate bond issuers: Some new evidence*

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Abstract

What influence does track record have on the probability that a firm will issue public bonds? Using a simple two-period static model we motivate our empirical study of bond issuance decisions in the United States, controlling for various sources of third-party certification of quality that can assist access to markets. After isolating seasoned issuers with high and sustained market implied bond ratings from other types of firms, we find that these firms firms are 20 per cent more likely to issue a bond than other firms. This suggests firms may have an incentive to invest in their track record in order to improve market access and lower their cost of finance.

JEL classification: E44, G31, G32
Key words: corporate bonds, information asymmetry, third-party certification, quality signals.

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1 Introduction

According to the Securities Industry and Financial Markets Association (SIFMA) over the period 1996 to 2010 the volume of US corporate bonds outstanding more than tripled from $2.1 trillion to $7.5 trillion (see Figure 1). The same body reports that the ratio of US total corporate debt to common stock issuance has risen from 2.9 times equity issues in 1996 to 5.1 times in 2010.[1] Very recently, corporate treasurers issued $1063 billion of corporate bonds in the United States in 2010 – higher than the $902 billion of corporate bonds issued in 2009, and a big increase on the $701 issued in 2008 – as interest rates fell to historic lows. But not all firms were in a position to benefit from these unusual conditions. We know that riskier firms typically have to pay more to compensate investors for the higher risk of default, which is consistent with the observation in Bernanke et al. (1999) that firms with lower creditworthiness face higher external finance premiums.[2] In general, firms that are smaller, riskier and more opaque will borrow less (Faulkender and Petersen (2006)), and may have limited options for raising external finance (Cantillo and Wright (2000)). Moreover, Erel et al. (2012) highlight how capital raising varies through the cycle with differences in the quality of borrowers affecting the type of securities offered at different stages of the business cycle. All of these factors have undermined the case for some firms to issue in US public bond markets.

To extent that firms suffer from asymmetric information problems highlighted by Diamond (1991), it is difficult for them to attract 'uninformed investors' to purchase their debt securities. So what can be done to reassure these uninformed investors? One factor that mitigates the adverse effects of information asymmetry is a track record of repayments of previous debt contracts. If firms can show they have a history of successful bond issues in

[1]This calculation does not include convertible debt, asset and mortgage backed securities which would increase the multiple even further.

[2]This is true for both bond and equity markets. For instance, Campello and Chen (2010) address risk pricing in equity markets. They report evidence that equities of financially constrained US firms in the Lehman Brothers Fixed Income Database command higher ex ante excess risk premia and these premia move countercyclically with economic and financial conditions.

the past, they may attract investors. Moreover, third-party certification of quality can assist this process, for example, Sufi (2007, 2009) shows that a loan rating helps a firm gain access to uninformed investors in the syndicated loan market. But how much does this matter and to what extent does it mitigate the effects of asymmetric information?

We intend to consider this matter by looking at several measures of track record which could influence the probability that a firm will access the public bond market.[3] We look at the financial health of the firm, reflected in the quality of its balance sheet. Then we consider the track record in related markets for external finance such as loan markets or private bond markets. Finally, we observe the firm's participation in the public bond market over recent history and the market implied rating of the bonds that were issued, which together provide information on the firm's record in the market in which it seeks to issue securities. We expect the firm to issue bonds more readily if it has an issuance history and good quality bonds, than if there is a poor history or no history to provide information to investors, therefore we compare firms that are seasoned in the public bond markets versus firms engaging in an IPO, and those with investment grade as opposed to sub-investment grade bonds.[4] An issue of particular interest to us is whether the record in the bond market matters to firms that have already acquired a record in other markets e.g. loan markets or private bond markets.

Our paper begins with a conceptual framework, based on a two-period static model similar to Holmstrom and Tirole (1997). This provides a framework for considering how a track record acquired in the first period can affect access to market finance in the second period. It is not fully dynamic, however, and one of the conclusions we draw from our empirical analysis – which shows that track record matters, and is worth investing in – is that the theoretical models used for analyzing decisions to participate in bond or other

[3]We focus on the public bond market because it is the largest of the markets for external finance, greatly exceeding private bond markets, convertible debt and equity markets, private equity and common stock. A comprehensive assessment of the choice between these markets is provided by Gomes and Phillips (2012), who document the choices that firms make between markets and between types of security. There are many similarities between their paper and our own, although this paper concentrates on the value of track record in gaining access to the public bond market.

[4]Covitz and Harrison (2004) and Gomes and Phillips (2012) have used previous exposure to the market as an explanatory variable for rating transitions and market choice respectively.

markets need to be dynamic to capture this feature.

Our empirical work is based on an assessment of the probability that a firm will issue a bond using an unbalanced panel of 983 US listed firms that issued dollar denominated bonds from 1995-2004. We merge data from different sources including Bloomberg, Datastream, Standard & Poor's CreditPro database and Thomson Financial One Banker using ISIN codes in order to link bond- or bank-specific data with accounting data for the firm. A probit model examines issuance probability for firms with different balance sheet characteristics and exposure in other markets such as loan and private bond markets. Then we separate firms using transition matrices to identify good quality issuers as those whose bonds ratings are investment grade and have not been downgraded in the sample, from others.[5] This eliminates 'fallen angels' and isolates firms with steady or improving credit ratings. There is some similarity here with the ratings upgrades and downgrades used by Covitz and Harrison (2004) to measure of changes in credit quality. Using previous exposure to the bond market and quality we find that the influence of a 'good track record' in the public bond market raises the probability of issuance, even after taking into account other influences on the decision to issue discussed previously.

The paper makes three contributions to the literature. First, we show that the track record of successful, investment-grade corporate bond issues has a very important influence on the firm's decision to issue. Second, we find that track record still matters even in the presence of other indicators of the firm's financial history in the form of a past history of repeated, successful loans under the same lead arranger, a history of private bond placements,

[5]Quality of the issues is measured by investment or sub-investment grade status in the bond market and is derived from information on downgrades of credit ratings from market implied bond ratings (MIBRs) using a method developed by Servigny and Sandow (2007). The ratings agencies such as Standard & Poors, Moody's and Fitch Ratings provide issuer default ratings based on a through the cycle methodology, that are reviewed periodically, but do not reflect current business cycle conditions. Moody's and Fitch ratings also supply market implied ratings that offer point in time measures of the rating of a firm, based on equity or CDS market information. We use market implied ratings—derived from bond market information—for their more timely nature and ability to reflect current market conditions. We anticipate that the chosen rating level for each corporate bond will be similar, and neither measure is likely to misclassify firms across the investment grade boundary. We also think that ratings downgrades will eventually be reflected in all types of ratings, but market implied ratings will give an earlier signal.

and high grade public bond issuance. Therefore we conclude that participation in markets for loans and private bonds as well as public bond issues all contribute to the certification of quality of the firm in the eyes of uninformed investors. Each level of additional information increases the probability of issuance after controlling for other factors, including the firm's issuer default rating. These findings are robust to many alternative specifications and controls. Third, firms that issue have stronger balance sheets, and consequently better ratings from the credit rating agencies, and would have had time to build a track record of success, confirming the observation by Faulkender and Petersen (2006) and Sufi (2007) that more transparent firms obtain greater debt compared to opaque firms. This also suggests that firms with positive private information behind the publicly observable balance sheets are more likely to issue than firms with negative private information, see Covitz and Harrison (2004).

The next section presents a modelling framework that motivates our empirical work in the sections that follow. Section three describes the data, methodology, and data characteristics. Section four reports the estimation results and robustness checks and section five concludes.

2 Conceptual framework

There are several models that study the role of net worth in the choice between alternative modes of finance as for example in Holmstrom and Tirole (1997), Repullo and Suarez (2000), Hoshi et al. (1993). Other researchers have examined the co-existence of bank and bond financing (see for example Bensanko and Kanatas (1993)) and the choice between bank loans, direct debt and equity finance (see Bolton and Freixas (2000)). The decision to issue public debt is a financially significant step for the firm that provides new opportunities for financial flexibility (see Rajan (1992) and Pagano et al. (1998)) and lowers the cost of bank finance, but it also weakens monitoring capability since public debt is arms-length finance (Leland and Pyle (1977)) and this can send a negative signal to markets (Datta et al. (2000))

reducing the share value. The decision to make this step is made by balancing the positive and negative effects, and for certain types of firms e.g. older and larger firms or those with growth opportunities (see Chemmanur and Fulghieri (1994), Datta et al. (2000)) there are significant benefits from issuing bonds. Diamond (1991) has argued that a track record of repeated borrowing from banks improves the likelihood that a firm will be more inclined to offer public debt in the market.[6] Alternatively, establishing a track record from successful issues in the bond market may provide yet another informational advantage to the issuer in the sense of establishing and maintaining a signal of quality in the eyes of investors.

2.1 An illustrative two-period static model

Since our main goal is to illustrate the role of quality signals on market finance we present an illustrative two-period model similar to Holmstrom and Tirole (1997) in which the outcome of the first period influences the financing outcome of the subsequent period (hence a role for quality signals).[7]

Corporate sector. Suppose there is a continuum of firms with net worth A. The set of all firms is described by a cumulative distribution function $F(A)$. Each firm owner is risk neutral and has an investment project that costs I to implement. Projects can be undertaken at any scale, i.e. $I \in [0, +\infty)$, but I always exceeds A. The project has the following *characteristics*. It succeeds with probability p generating a return $R(I) = RI$ (i.e. proportional to I), and fails with probability $1 - p$ generating zero income, where the probability of success p depends on the diligence of the owner. Consequently, $p = p_h$ if the firm owner manages the project to the best of her abilities, and $p = p_l < p_h$ otherwise. In

[6] Altman et al. (2010) confirm that banks, as insiders, have superior information to public debt holders, especially when loans are traded on secondary markets, and therefore information acquired from the loan market may be a good signal of quality for bondholders.

[7] With two periods, the link between them is that finance in the second period depends on the outcome of the first period i.e. whether the project is successful and the return to the bond holder is positive. If this is the case finance is made available in the second period. This introduces a role for building "reputation" from quality signals because repeat issuance occurs when a firm does not default on the bond in the earlier periods. Moreover firm characteristics are also important since initial access to finance depends on whether the net worth of the firm exceeds some cutoff level. This is however a step short from a fully dynamic model in which the firm's continuation value increases with greater "reputation".

the latter case the firm owner enjoys a private benefit. We assume the owner can choose between a project with a high probability of success, p_h that yields no private benefit, and a project with a low probability of success, p_l that yields a private benefit. The private benefit is proportional to investment scale I, that is, $(B(I) = BI, b(I) = bI)$ with $B > b > 0$ and is private information to the firm owner. All other details of the economic environment are common knowledge between all parties.

Financial sector. There is a continuum of lenders. Lenders can either be bond holders (investors) or intermediaries (banks).[8] Lenders are risk neutral. Perfect competition among lenders ensures firms face a perfectly elastic supply of funds and lenders just break even.

Financing projects. Given $A < I$ the firm needs to raise $I - (A - c)$ from investors (through directly placed issues) or $I - A$ from intermediaries (intermediated finance), where c is a fixed cost assumed to be independent of issue size. We assume that bond holders (the "market") demand an expected rate of return equal to r_m. Intermediaries demand a rate of return per unit loaned equal to $r_b \geq r_m$, which exceeds r_b due to monitoring costs i.e. resources spent on monitoring the firm's management.[9] An implication of monitoring is that banks can reveal whether the firm is b or B type. On the other hand, c captures the (fixed) underwriters' fees that are normally associated with public debt issues. For our purposes the assumptions on the cost of finance (r_m, r_b, c) create a choice between bank or market finance. For relatively small financing needs firms are most likely to use a bank in order to avoid the fixed cost, while for large scale finance issuing directly is preferable.

Beliefs and signals of quality. We now come to the role of signals from various financial markets. In contrast to intermediaries, investors only observe the firms' track record (success or failure) but not the private benefit (B or b). They form (and update) a belief – equivalently a *rating* – about firm reliability based on this information. We can

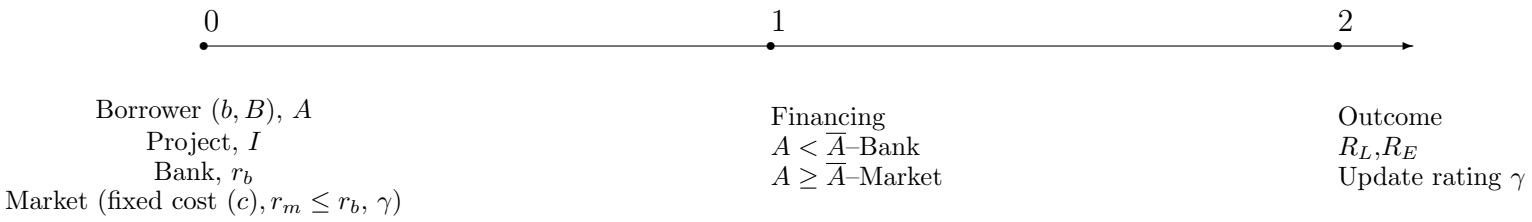
[8] We use the terms investor and bond holder interchangeably.

[9] A higher cost of bank finance can also be rationalized with auditing costs paid by banks to verify project returns (in the spirit of Townsend (1979)). In our model however returns are verifiable, and we have chosen to sidestep this additional source of adverse selection (i.e. project returns) that would not offer any additional insights.

assume that the bond holder has (in period 1) a prior belief about firm type (b or B). This is given by a probability equal to γ that the firm is the b-type (high-reliability), and $1-\gamma$ that is the B-type (low-reliability). Investors of course prefer high reliability borrowers since they are more likely to manage their projects competently if offered identical compensation to the low reliability ones. As we shall see the belief about the quality of the firm can be updated using firm-specific information, loan histories, and market information from ratings and past issuance.[10]

This information has been shown by Sufi (2007, 2009) to help a firm gain access to less well informed investors, and draws on the same reasoning from the same Holmstrom and Tirole (1997) framework that we use here. In particular, Sufi argues that intermediaries and the loan rating agencies act as informed investors that can send signals to less informed investors, such as those in the public debt markets. The intermediaries and rating agencies certify that projects have been successful and confirming the quality of the borrower, through updating of information on default risk. They also monitor the project by deciding on whether to invoke covenant requirements, changing or seizing the collateral posted to the project and so on.

Figure 2. Timeline



We assume there are two periods as described in Figure 2. In period 1 the firm owner seeks finance from lenders to undertake the project. If the project succeeds, the firm owner receives R_E and the bond holder (or intermediary) R_L, where $R(I) = R_E + R_L$. If the

[10]We refer to this indicator as a 'rating' in the remainder of the paper, but we have in mind a that wide range of information is used to determine its value, including official ratings, but also signals from other sources.

project fails each receive zero (i.e. we assume limited liability). The project has a positive net present value (NPV) when the firm owner manages diligently but negative otherwise: $p_h R - (1 + r_i) > 0 > p_l R - (1 + r_m) + B$, $i = m, b$. For simplicity we can assume the parameters of the model, $p_h, p_l, B, b, R, I, r_b, r_m, c$ are identical across periods.

Solution. Our main objective is to illustrate the role of signals of quality and their influence on the likelihood and scale of market finance. In what follows therefore we focus on the implications of the model when firms opt for market finance. Given our assumptions on bank finance, it is easy to show that both types will obtain finance from banks and the B-type will never opt for market finance. Note that the structure of this model is similar to Holmstrom and Tirole (1997), with the addition of a second period. However, we assume that the outcome (of financing and investment) in any given period does not specify anything (financing and investment) for the subsequent period, that is we assume finance is project specific. We can therefore solve the model as a game with period by period maximization keeping track of the evolution of beliefs from lenders. Essentially the assumptions we make imply the only link between the two periods is the firms' track record (success or failure), and the associated updating of the rating, γ. We use backward induction to solve for a separating equilibrium in which the b-type firm manages the project diligently while the B-type firm does not. The solution of the model determines the optimal investment scale, I, the division of the project's return between the borrower, R_E, and lender, R_L and the level of net worth, $\overline{A}$, that determines the mode of finance, i.e. market or intermediated finance. We present the details of the solution in the Appendix. In the remainder of this section we state the period 1 maximization problem of the b-type firm and summarize the main results that we use below in the empirical sections. The period 2 maximization problem is identical (except for the rating γ which is updated to γ' when the firm has received market finance in period 1).

The firm's problem in period 1 is given by $U(A) = \max\{U^m, U^b\}$ where, $U^b = p_h R_E^b - (1 + r_b)A$ and $U^m = p_h R_E^m - (1 + r_b)A$ denote the net utilities to the firms' owner when the

project receives intermediary and market finance respectively, subject to:

Division of the project return between borrower, R_E, and lender, R_L.

$$R_E^i + R_L^i = RI \quad \text{for i = m,b}$$

Incentive compatibility constraint for the firm owner,

$$p_h R_E^i \geq p_l R_E^i + bI \quad \text{for i =m,b}$$

Participation constraints for the lender,

$$\text{market finance:} \quad \gamma p_h(RI - \frac{bI}{\Delta p}) + (1-\gamma)(p_l(RI - \frac{bI}{\Delta p})) \geq (1+r_m)(I+c-A)$$

$$\text{intermediary finance:} \quad p_h(RI - \frac{bI}{\Delta p}) \geq (1+r_b)(I-A)$$

Holmstrom and Tirole (1997) show that in equilibrium all the constraints will bind, the firm will use its entire net worth into the project and the lenders will finance the rest, i.e. $I-A$, $I-(A-c)$ in the case of intermediary and market respectively. Using the lender's participation constraints we can compute the optimal investment level.

Optimal investment scale.

$$(A-c)\kappa_m = I \tag{1}$$

$$A\kappa_b = I \tag{2}$$

where $\kappa_m = \frac{1+r_m}{(1+r_m)-(R-\frac{b}{\Delta p})\rho}$ $\kappa_b = \frac{1+r_b}{(1+r_b)-(R-\frac{b}{\Delta p})p_h}$, define the multipliers on net worth and $\rho = \gamma p_h + (1-\gamma)p_l$ is the probability of success as perceived by the investor. Equations (1) and (2) define the effective technology the firm has available to implement investment projects.

Definition of net worth threshold. The threshold is computed as the solution, $A = \overline{A}$ to the three equations,

$$U^b = U^m, \quad I = \kappa_b A, \quad I = \kappa_m (A - c)$$

In the Appendix we show $\frac{\partial \overline{A}}{\partial \gamma} < 0$, that is the threshold declines when the rating improves.

2.2 Implications

There are many implications of this illustrative model, such as the likelihood that market finance increases in net worth, A. We would expect high collateralized firms with strong balance sheets have a higher likelihood of obtaining market finance compared to those with weaker balance sheets. Our focus is on the value of a better track record or signal of quality.

The fact that $\kappa_m > 1$ means that a firm can lever its net worth and κ_m can be interpreted as the multiplier (c.f. Tirole (2006), p.127). Hence for the same value of net worth, firms can increase the scale of their investment projects with an improvement in ratings, and demand more market finance. Equivalently it implies that firms can increase their leverage with a positive updating of their rating (that follows a successful outcome in the previous period). This is analogous to the argument proposed by Faulkender and Petersen (2006), who suggest that the volume of lending will increase on the supply-side as perceived quality of the borrower improves, but also, since the price of debt is lower in markets compared to loans from intermediaries that incur monitoring costs, the demand for debt may also be higher. Boot et al. (2006) argue that a good quality signal (in the form of a rating) could prove to be an 'information equalizer', enlarging the investor base and expanding the ability to borrow. In addition, through the effect on $\overline{A}$, less well collateralized firms can access a greater volume of market finance. This effect is discussed by Cantor and Packer (1996) and Boot et al. (2006) when they identify the role of ratings as a minimum quality standard that allows certain types of investors to purchase securities. The cutoff between investment grade and sub-investment grade ratings is particularly important for pension funds, savings

and loans institutions and money market mutual funds, for example. The combined effect implies that the likelihood of obtaining market finance increases with the perceived signal of quality from a successful track record in loan, private and public bond markets.

Although the Holmstrom and Tirole (1997) framework is essentially static, it illustrates the point that firms have an incentive to invest in a track record (in period 1) in order to obtain (greater) access to finance (in period 2). There is a growing body of evidence that suggests signals of quality of various kinds benefit the firm that seeks market finance.

2.3 Empirical Evidence

Sufi (2007) and Faulkender and Petersen (2006) have shown that more transparent firms, with publicly-available audited accounts and third-party certification of quality from a rating agency, are able to access uniformed investors more easily than firms that are more opaque. Similarly, Sufi (2009) has shown that obtaining a loan rating helps a firm gain access to less well informed investors, and as a result increase their debt usage and investment. In a somewhat similar exercise to our own, Sufi (2009) investigates firms that previously had no signal of quality in the form of an issuer default rating prior to the emergence of loan ratings, positing that these firms could benefit from a loan rating in the absence of any signal of quality from an issuer default rating. His identification scheme exploits the emergence of loan ratings provides the third-party certification that certain firms lacked before loan ratings were made available by Moody's and S&P in 1995. Other covariates in the model control for firm characteristics such as age, size, earnings, market-to-book and debt levels that might account for borrower quality and demand effects. His empirical findings confirm that previously unrated firms have greater gains from loan ratings and experience an increase in the change in debt level and leverage ratios, and firms with lower credit quality have the greatest gains.[11]

[11] A related paper by Hale and Santos (2008) addresses the *timing* of the firm's decision to issue a debt IPO. They argue that the firms' creditworthiness and standing in financial markets influences the decision and timing to issue public bonds. Their paper uses leverage, profitability, and the Z-score to assess cred-

In a branch of the literature that discusses the choice between markets and securities of different types, Gomes and Phillips (2012) show that asymmetric information is a major determinant of securities issuance. Debt is preferred over equity in public markets as information asymmetry increases, while equity and covertibles are preferred over debt in the private markets under the same circumstances. They also discuss the types of securities chosen by public and private firms, showing public firms tend to increase private issues when information asymmetry increases. Finally, they examine the behavior of firms that issue multiple times, finding that the effects of asymmetric information are compounded for these firms i.e. firms are even more likely to issue particular securities within markets if they are multiple issuers. Erel et al. (2012) investigates the effects of macroeconomic conditions on the volume and type of securities issued. Firms of different credit quality are shown to issue different type of securities (e.g. equity, loans, convertible, private and public bonds) and that low quality firms are shut out of capital markets during downturns. Importantly, high quality borrowers are shown to issue public bonds countercyclically, highlighting the importance of a high bond rating for continuous access to the market.

Diamond (1991), Petersen and Rajan (1994), Yasuda (2005), Schenone (2004), Hale and Santos (2008) demonstrate the importance of lending relationships on the timing and pricing of bond IPOs, equity prices, or underwriting fees, which suggests previous access to loans contributes to initial access to the public bond market. Survival of multiple rounds of bank loans with successful outcomes establishes creditworthiness of the borrower. Altman et al. (2010) argue that banks, as insiders, have superior information due to privileged information they can access in contrast to the public information available to public debt holders. Bank loan renewal is considered a positive signal about the borrower's quality, to which the market reacts favorably in terms of increased equity prices (see Lummer and McConnel (1989)).

Similarly, access to private bond markets may signal firms as potential future issuers of pubic bonds. Hale and Santos (2008) find that issuing under private bonds delays the

itworthiness, which we might refer to as balance-sheet measures. The track record in loan markets is then determined from evidence that the firm has successfully obtained multiple loans using the same underwriter.

timing of a firm's bond IPO although they argue that private and public bonds are not close substitutes for regulatory reasons. Erel et al. (2012) and Hertzel and Smith (1993), both argue that lower quality firms rely on private placements (especially during downturns) instead of public offerings. Kwan and Carleton (2010) show that private placement bonds are more likely to have greater restrictions in terms of covenants compared to public bonds. Private placement bonds tend be issued by smaller and riskier firms, and they find that less than investment-grade borrowers rarely issued bonds in the public market. In this case we expect a negative coefficient.

In the following sections we consider firms that have varying degrees of third-party certification in the form of a past history of repeated, successful loans under the same lead arranger, a history of private bond placements, and finally reliable public bond issuance inferred from the market-implied bond rating and the previous issuance history. We also control for borrower quality and demand effects, before we explore the impact of different third-party indicators of creditor quality. Empirically, we are able to show that at each level the additional information enhances the perception of quality and increases the probability of issuance after controlling for other factors. This suggests that the financial track record has value for the firm, presenting a challenge for theorists to build dynamic models in which firms have an incentive to invest in signals of quality that improve access to financial markets.

3 Data, methodology and sample characteristics

3.1 Data set

We construct our dataset using several data sources. These have been combined in a new way to cast light on the impact of track record reputation from implied bond ratings on the firm's probability to access the bond market. We first use the Datastream database to gather profit and loss and balance sheet data. This database provides information on US listed companies for the period 1995-2004. The analysis includes both firms that issued

domestic corporate US dollar denominated bonds with Datastream coverage, and firms that are non-issuers. Datastream is used to identify bond issuers and bond characteristics.[12] Following selection criteria which are common in the literature, we excluded companies that did not have complete records on our explanatory variables, and firm-years with negative sales. To control for the potential influence of outliers, we excluded observations in the 0.5 percent from upper and lower tails of the distribution of the regression variables.

Data on firm (issuer) ratings are taken from the Standard & Poor's CreditPro database. This database provides information on the long-term issuer default rating assigned to each firm as well as the date that the rating became available. Thus we record the continuous rating history on each firm. Our sample spans 10 years, from 1995 to 2004 and the entire ratings spectrum, including investment grade and speculative grade firms. In keeping with the normal practice in the literature, we categorize our firms into rating categories without consideration of notches (i.e + or -).

To compute market implied bond ratings we have used two sources. First, data on corporate and government bond yields come from Datastream. Second, the S&P corporate bond yield index is taken from Bloomberg for various combinations of credit ratings and maturities. The firm specific bond ratings we compute span 6 categories (AAA, AA, A, BBB, BB, B), again without considering notches. We are particularly interested in point in time ratings from the bond market, which rules out the use of market implied ratings from equity or CDS markets, that refer to the quality of the firm rather than the bond that it issues.

We rely on Thomson Financial One Banker to collect information on firms' bank relationships. This database reports data on firms' lead bank managers who acted as underwriters in the closed loan deals as well on the description of the loan yield. We are therefore able to observe whether a particular underwriter has been engaged with the same firm more than

[12] Datastream uses Merrill Lynch as a data source for bond information. See Chen et al. (2007) for a description of the Datastream database with bond coverage. In our sample bond issuers issue bonds most of which are actively traded in the secondary market.

once and in addition we are able to see whether the loan yield was classified as investment grade or sub-investment grade.

Our combined sample contains data for 983 firms that actively operated between 1995 and 2004 in a variety of sectors such as manufacturing, utilities, resources, services and financials.[13] The panel has an unbalanced structure with the number of observations on each firm varying between three and ten.

3.2 Methodology

We model the probability of a firm deciding to issue corporate bonds and following Pagano et al. (1998), Datta et al. (2000) we consider a probit model of bond issuance as a function of a vector of determinants.[14] We use similar variables to those in the literature to allow for the effects of information asymmetries through firm-specific variables (Faulkender and Petersen (2006), Erel et al. (2012), Gomes and Phillips (2012)), firm issuer default ratings (c.f. Cantor and Packer (1996), Boot et al. (2006), and Sufi (2007, 2009)), the firm's financial history in loan and private bond markets (c.f. Sufi (2007), Hale and Santos (2008)), and market implied bond ratings to capture the quality signals from the bond market.

3.2.1 Indicators of firm size and creditworthiness

The decision of a firm to access bond markets is driven in part by the demand for the funds for investment purposes, and by the willingness of investors to hold the debt of the issuer. Thus the fundamental decision to issue is determined by firm characteristics such as its size, growth of business, its existing debt and credit quality. Here we rehearse the arguments for

[13] Our sample includes both non-financial and financial firms to ensure comparability with previous studies (e.g Datta et al. (2000)). However, non-financial firms dominate in our dataset; for example, only 20.8 percent of the observations in our sample correspond to financials, insurance, investment and real estate firms. We later test our model excluding financial firms and find our results are robust to this exclusion.

[14] Using a similar methodology Erel et al. (2012) and Gomes and Phillips (2012) focus instead on the choice firms make over multiple securities.

including these variables, before we consider the additional influence that a track record may have on that decision.

Public debt has been found to be positively related to size, which we measure as the logarithm of real total assets (SIZE). The likelihood of access to bond markets increases in size, since leverage opportunities improve, and as size increases firms are more likely to need the level of resources that markets can offer at lower cost (see Graham et al. (1998) and Faulkender and Petersen (2006)). In addition SIZE may also control for the fact that smaller firms find public debt too costly given underwriting, filing, legal and bond rating fees, for these reasons Faulkender and Petersen (2006) argue that this is a critical variable for access to public debt markets.

Our model also suggests that balance sheet variables will be informative about the firm's creditworthiness, and previous literature has typically controlled for these effects before assessing other signals of quality.[15] Here we use many of the same variables to measure creditworthiness of the firm including leverage, profitability, interest coverage and capital expenditure, and in robustness checks we include other variables such as a Z-score based risk measure, age, collateral assets and an indicator of growth opportunities. Leverage (LEV), defined as total debt over total assets, is used as a measure of firms' indebtedness, in previous empirical work by Pagano et al. (1998), Datta et al. (2000), and Dennis and Mihov (2003). They suggest that the opportunity to access the public bond market should improve for firms with high leverage since these firms are successful and have higher borrowing capacity which is realized in the form of higher debt to assets ratios. In this case one would expect a positive relationship between leverage and the probability to issue bonds. Faulkender and Petersen (2006) and Santos and Winton (2008) find that leverage increases with access to public bond markets, which they argue reflects the relaxation of credit constraints for firms

[15]Hale and Santos (2008) evaluate the impact of profitability, leverage, risk based on a broadly defined Z-score and growth opportunities on the hazard rate for bond issuance. Santos and Winton (2008) evaluate the benefits of bond market access on the loan spreads faced by firms after controlling for firm creditworthiness measured by age, profitability, interest coverage, leverage, Z-score, collateral assets in total assets, growth opportunities and other indicators of the need for finance based on the extent of working capital available and levels of expenditure to sales.

with a market finance opportunity.

We take the profitability ratio (PROF), defined as earnings before interest and taxes to total assets, as a measure of revenue generation after costs, as an indicator of the availability of internal funds. A healthier net earnings position adds to net wealth which enhances the ability of the firm to obtain arm's length finance, lowering the threshold for market access and improving leverage Faulkender and Petersen (2006). Dennis and Mihov (2003) and Santos and Winton (2008) argue that more profitable firms prefer to issue public debt rather than access further bank finance. We expect therefore the probability to access the bond market to increase for firms with greater ability to generate revenue.

The coverage ratio (COV), measured as earnings before interest and taxes over interest payments, has been used in earlier studies (Dennis and Mihov (2003) and Santos and Winton (2008)), as a measure of creditworthiness since it indicates the ability of the firm to service its existing debt. We might expect that a higher coverage ratio gives a positive signal of a healthy balance sheet, but, as we have discussed, successful firms are sometimes more indebted (more highly levered) than less successful ones, and since interest payments grow with the level of debt and with the interest rate, we may find a lower coverage ratio for successful firms (Berens and Cuny (1995), Andrade and Kaplan (1997) and Faulkender and Petersen (2006)).

We include a measure of current investment (CAPEX), defined as capital expenditure over total asset, to proxy for the firm's financing needs following (Pagano et al. (1998); Gomes and Phillips (2012) and Datta et al. (2000)). Faulkender and Petersen (2006) and Santos and Winton (2008) included a more focused measure of spending using the ratio R&D expenditure to sales. Our model suggests that as firms require more funds they may be forced to seek finance from the markets, we therefore expect firms with greater financing needs will have a higher probability to issue bonds.

In addition to these firm-specific variables on the creditworthiness of the potential issuer, we also measure the extent of the external finance obtained from sources other than the bond

market. The bank finance variable (BANKFIN), defined as short-term debt to total assets, indicates the amount of bank loan finance obtained by the firm and the equity finance variable (EQFIN), defined as shareholders' equities over total assets, measures the outstanding equity of the firm relative to its assets. As we will explain in the next sub-section, we control for the effect of access to successive bank loans so we anticipate that the access to bank finance and equity finance measures used here will indicate the demand-side influences on the probability of issuance in the bond market. If the firm can obtain sufficient finance from bank loans or equity issues it may not seek additional funding in the bond market, the effects are then expected to be negative on the probability of issue. But if bank funding and equity finance are used in combination with bond finance then the effects are expected to be positive on the probability of issue. This is ultimately an empirical matter.

Having controlled for firm-specific variables that influence demand for debt, the variables in the remaining two sub-sections are unlikely to proxy for demand factors, and instead measure the influence of quality signals on supply.

3.2.2 Controls for access to private bonds and loans

Previous literature such as Diamond (1991), Petersen and Rajan (1994), Yasuda (2005), Schenone (2004), Hale and Santos (2008) has argued for and demonstrated the importance of lending relationships on the timing and pricing of bond IPOs, equity prices, or underwriting fees. We therefore expect that previous successful lending relationships to assist the firm in accessing the public bond market. Sufi (2007, 2009) has shown that third-party certification of quality is an important signal to uniformed investors, that improves access to financial markets. In particular, the degrees of information available to uninformed investors has a significant effect on the willingness of those investors to purchase the debt. We use two alternative measures to control for this effect.

First, we consider previous private bond placements issued under SEC Rule 144A (RULE144A).[16]

[16]Rule144A issues can be traded without restrictions in the secondary market among 'qualified institutional buyers'. Rule144A offers several advantages to issuing firms such as limited information disclosure at the time

RULE 144A is a dummy equal to one if the bond has been issued in the private market under the 144A rule which we expect to provide an information benefit to the first time issuer from the private bond market and hence increase the probability of a public issue. We might expect that some firms access the private bond markets in order to advertise themselves and make the pubic bond issuance more viable. For example Hale and Santos (2008) find that issuing under this rule delays the timing of a firm's bond IPO. Hence these placements may help to establish some recognition before entering the public market for the first time by enhancing visibility in the private market. However, among firms that issue bonds included in this particular sample, private bond issuance may have a negative effect on the probability of issuing *public* bonds. Private bonds are not as marketable as public bonds, and a firms would not choose this option over public bond issuance unless there was a reason that public bond issuance was unattainable at reasonable cost. Consistent with this interpretation Erel et al. (2012) and Hertzel and Smith (1993), both argue that lower quality firms rely on private placements (especially during downturns) instead of public offerings. If the two types of bonds are substitutes, a firm issuing private bonds would be unlikely to also issue public bonds, and vice versa. But Hale and Santos (2008) argue that private and public bonds are not close substitutes for regulatory reasons based on SEC determined conditions for trading. If they are not substitutes and private bond issues are regarded as an inferior form of issue, private bonds send a signal of weakness among other issuers. Using non-Rule 144A information about private placements issued before the SEC adopted rule 144A in 1990, Kwan and Carleton (2010) show that private placement bonds are more likely to have greater re-

of issuance and expedited issuance. Rule 144A issues represent a substantial portion of private placements (Dennis and Mihov (2003)). Some authors suggest that bonds issued under Rule 144A are more similar to public bonds, while private placement bonds are different (see Gomes and Phillips (2012)). According to their data, smaller firms issue a small proportion of Rule 144A bonds compared to medium and larger firms in the second, third and fourth quartiles of the distribution. However, Hale and Santos (2008) argue that Rule144A bonds and public bonds are not similar for regulatory reasons based on SEC determined conditions for trading. If this is the case, they may be regarded as an inferior form of issue by the markets, which would provide some signal of track record but not as favorable as a public issue if both options were available to the firm. For our purposes, where Rule144A bonds appear on the spectrum of private and public bond issues is not as important as the fact that they potentially offer some signal of quality for firms that previously never issued bonds.

strictions in terms of covenants compared to public bonds. Private placement bonds tend be issued by smaller and riskier firms, and they find that less than investment-grade borrowers rarely issued bonds in the public market. In this case we expect a negative coefficient.

Second, we consider the loan market. It is well documented in the literature that survival of multiple rounds of bank loans with successful outcomes establishes creditworthiness of the borrower. Altman et al. (2010) argue that banks, as insiders, have superior information due to privileged information they can access in contrast to the public information available to public debt holders. Bank loan renewal is regarded as a positive signal of the borrower's quality, to which the market reacts favorably in terms of increased equity prices (see Lummer and McConnel (1989)). Given that banks actively monitor loans, and are generally more informative about the borrowers, it should allow a multiple borrower to more readily enter the public market than a firm without a track record of loans. Certainly, evidence from the syndicated loan market reported by Sufi (2009) suggests that firms that have repeat access to the market have more success in obtaining wider investor participation. Therefore to control for bank loans we create two dummy variables. First, we construct a dummy (RELATIONSHIP) which takes the value of one if the firm has used the same lead bank manager in their loan deals more than one time and zero otherwise. Having repeated relationships with the same loan underwriter enhances perceived quality in the loan market.[17] In addition, we create a dummy which takes the value one if the firm's loan yields are always classified as investment grade (LOAN YIELD) and zero otherwise.

3.2.3 Quantifying the importance of market implied bond ratings

Our main objective in this study is to establish the importance of track record in the bond market on a firm's decisions to issue bonds. To argue that previous issuing history explains the decision to issue in the present is not simply to push the question back to a previous year. We have already argued that demand and supply considerations, driven to a large extent

[17] A related concept used by Hale and Santos (2008) identify bank "reputation" when the firm has used the same lead bank in the syndicate loan in the previous year.

by a firm's characteristics, determine the willingness to seek bond finance on the demand side and the access to finance on the supply side. Fundamentally these variables determine whether a firm can issue, but track record in the market can contribute to the assurance that investors seek, therefore, we include indications of previous participation in the market and the quality of the bonds indicated by spread-implied ratings.

To assign ratings for individual bonds we calculate spread-implied ratings from corporate bond yields using the procedure developed by Servigny and Sandow (2007). The necessary ingredients for this procedure are: (i) corporate bond spreads and (ii) a market spread for each different maturity and rating in order to map corporate bond spreads onto market spreads and infer the appropriate market implied bond rating.

To compute corporate bond spreads we take the difference between yield to maturity for corporate and government bond, i.e. $SPREAD = YTM^{corp}_{t,T} - YTM^{gov}_{t,T}$, where $YTM^{corp}_{t,T}$ represents the yield to maturity at time t of a corporate bond that matures at time T and $YTM^{gov}_{t,T}$ the yield to maturity of a government bond with the same maturity. To compute market spreads for each maturity and rating we rely on an index which provides a summary yield for bonds in each rating category taken from S&P. Using this index we construct a family of market spreads by maturity and rating. Having this family of market spreads we can then assign a market implied rating for each corporate bond. We then employ a simple distance measure to identify the market spread curve that is closest to the firm specific spread and the rating that corresponds to this closest spread curve is the market implied bond rating.[18] The ratings we compute span 6 categories (AAA, AA, A, BBB, BB, B). Once we have created implied ratings for all corporate bonds, we construct transition matrices of

[18]Specifically, define $y(\tau_j, i)$ as the market spread for maturity τ_j and rating i, and $s(\tau_j)$ the firm specific spread for maturity τ_j. In this notation, $i = 1 \ldots M$ denotes ratings and $j = 1 \ldots N$ denotes maturities. In order to compute an implied bond rating for each firm at each point in time from the market spread curves we find the curve that is closest to the firm specific spreads with the distance measured in terms of the sum of square differences at the various observed maturities. Thus, the implied rating is given by:

$$Rating^{implied} = arg \quad min_{i=1\ldots M} \sum_{j=1}^{N} [s(\tau_j) - y(\tau_j, i)]^2$$

implied ratings for each firm.

We define as "steady issuers" those firms whose bonds' implied ratings with at least two years of issuance that have not been downgraded at any time in the sample. Sufi (2007) shows that previous access to the syndicated loan market is an important marker for future access to the market. The argument is based on the advantage a firm obtains from being "known" by potential participants in the syndicated loan; a similar argument is used by Faulkender and Petersen (2006) for access to debt markets more generally.[19] Other firms that do not have this characteristic will have been downgraded at least one time during the sample period. A "fallen angel" with a recently downgraded credit rating will therefore be identified through this indicator, which will allow us to account for the fact that they face a higher hurdle in the market when considering the prospect of issuing bonds than a firm with a steady or improving credit rating. Therefore, we define $STEADY\_RECORD_{it}$ as a dummy variable that takes the value one for firms that have previously issued bonds and have not been downgraded, and zero otherwise. These have a reliably constant track record in previous issues, that increases the likelihood that the firms will issue bonds compared to a firm without this benefit.

A potential weakness of this measure is that it is not necessarily an indicator of a good quality issuer. A firm with a sub-investment grade market implied bond rating that is not downgraded will have a steady track record, while an investment grade issuer that has been downgraded to a lower investment grade rating will not. To address this concern we redefine our measure to require the firm (i) to have never been downgraded during the sample period and (ii) to have an investment grade bond rating. We define this as $GOOD\_RECORD_{it}$. This refinement is quite important as demonstrated in recent work by Erel et al. (2012) and Kahle and Stulz (2010) who find issuers with an investment grade rating are (a) more likely to issue public bonds (and do so very strongly during downturns) and (b) have been

[19]Boot et al. (2006) note that evidence in Weinstein (1977), Ederington and Yawitz (1987), Cornell et al. (1989), Hand et al. (1992), Goh and Ederington (1993), and Dichev and Piotroski (2002) shows there is a significant, detectable influence of a bond market downgrade on the stock price of the firm, but no evidence of an upgrade on the stock price.

relatively unaffected from the credit crunch during the recent financial crisis compared to non-investment grade borrowers.

A further concern with the use of these definitions for all firms— including both issuers and non-issuers—is that firms that have never issued bonds are included in the category of firms with no track record. While it is true that these firms cannot acquire a record without issuing bonds in the market, we may want to ensure that we consider new issuers or low grade issuers against those that are seasoned and high grade. For this reason we exclude non-issuers from our sample. The remaining firms issue at some point in the sample, but not all firms issue in every period, so there is still a binary decision about issuing bonds in any period. This reduces the sample size but gives us a clean test of the value of repeated issuance and maintenance of a strong quality signal among issuers.

3.3 Summary statistics

A summary of the basic statistics of the variables included in our empirical analysis as well as additional firm-specific variables is provided in Table 1. When describing the data, we are interested in two comparisons, first, between those firms with access to bond markets versus those with no bonds (issuers and non-issuers in columns 2 and 3), and second, between firms with a good track record in the market and those without ("good record" and "poor record" in columns 5 and 6).

There are notable differences in the financial variables between issuers and non-issuers as can be seen from the p-values of the differences in the means between categories. We find that firms with access to bond markets are larger, older, more profitable, are more highly leveraged, have greater financing needs, are more collateralized and have lower coverage ratios than firms that are non-issuers. The characteristics of issuers in our sample are in line with those reported in Erel et al. (2012) who examine the impact of macroeconomic conditions on the volume and choice of assets issued. Notice that we include both a long term firm specific rating and a bond implied rating in Table 1. We can observe that issuers

have a better firm specific rating compared to non-issuers, where a higher value is associated with a lower rating and the same is true for steady quality issuers. It remains to be seen, though, whether these findings continue to hold when we control for a number of factors which are expected to play a role in the firm's decision to issue bonds. In the sections that follow we formally test whether market implied bond ratings have a statistically significant influence on the firm's decision to issue bonds.

4 Results

4.1 The baseline model

We begin with the baseline specification that allows the balance sheet characteristics of the firm and information from loans and private bond markets:

$$\begin{aligned} Pr(BOND_{it} = 1) = F(a_0 + a_1 LEV_{i(t-1)} + a_2 PROF_{i(t-1)} + a_3 COV_{i(t-1)} \\ + a_4 CAPEX_{i(t-1)} + a_5 SIZE_{i(t-1)} + a_6 BANKFIN + a_7 EQFIN + a_8 RULE144A_{it} \\ + a_9(RELATIONSHIP_{it} \text{ or } LOANYIELD_{it}) + u_j + u_t) \quad (3) \end{aligned}$$

where $BOND$ is a dummy variable that equals 1 if firm i issued a bond in year t, and 0 otherwise. Our specification includes regressors evaluated at time $t-1$, a full set of time dummies, u_t, intended to capture common trends and business cycle effects [20] ; and u_j, a full set of industry dummies to control for fixed effects across industries.[21] All other variables have been defined in the previous section.

Table 2 reports estimates from the baseline model reporting the effects of balance sheet

[20] In an earlier version we have also included the slope of the Treasury yield curve as defined by the difference between 30-year and 5-year Treasury bonds to control the effect of future expectations about future rates on firms' decision to issue bonds. The results reported in remainder of the paper, which are not reported for brevity, were broadly similar.

[21] We corroborate our findings using regressors at time t. The empirical results are qualitatively and quantitatively similar. These results are not reported for brevity, but are available upon request.

variables, private rule 144 bond issues and from loan markets in two different columns.[22] The results also control for the demand side since we measure bank and equity finance obtained by the firm. We use a sample of firms that are all issuers at some point in the sample, we exclude those firms that are non-issuers. [23]

The dominating firm characteristic is *SIZE*. This has a positive effect on the probability of issue, and for each percentage point increase in size, the probability of issue increases by approximately 0.11. The theoretical model makes the proposition that real assets will be a critical factor in determining access to bond markets and this is what we find.

Other firm specific characteristics are also significant, such as the capital expenditure ratio ($CAPEX$), which provides a useful indicator of current investment. As in Datta et al. (2000) and Santos and Winton (2008) where capital expenditure is taken as a proxy for financing needs, we expect a greater probability of bond issuance for firms that have high capital expenditures. We find that this is the case. Similarly, profitability raises the probability of issuing. The coverage ratio (COV) has a negative effect on issuance, but this is consistent with the view that successful firms often hold more debt and this raises their interest payments, lowering the coverage ratio.[24] A number of studies report a similar result including Hale and Santos (2008) and Santos and Winton (2008). Leverage (LEV) has a small positive effect on the probability of issue. This result is line with Hale and Santos (2008) who found that firms with higher levels of leverage enter the public bond market earlier as well as with Faulkender and Petersen (2006) and Santos and Winton (2008) who found that leverage increases with access to public bond markets.

The *BANKFIN* and the *EQFIN* variables have small negative effects on the probability of issue. If either source of funds is an alternative in the external finance mix of the firm

[22]The model reported here has been selected from a number of alternative specifications that we do not report due to space constraints.

[23]We did examine all our results for the full sample including all issuers, and the results are qualitatively very similar. Among the firm characteristics, all the variables have a comparable influence on the probability to issue bonds, and the impact of signals from the private bond market and the loan market is stronger. These results are available from the authors on request.

[24]Additional debt for successful firms is also consistent with the relaxation of credit constraints as argued by Faulkender and Petersen (2006)).

to bond finance then we expect a negative sign. This is a demand side effect resulting from access to bank and equity finance. Bank finance has a small but significant negative marginal effect on bond issuance, while equity has an insignificant effect, diminishing the probability of a bond issue for firms in our sample. In the remaining tables of results we drop the *EQFIN* variable but retain *BANKFIN*.

Observing firms that comply with the Rule 144A shows that firms with these private bond offerings had a lower probability of issuing public bonds, the marginal effect was -0.12. Issuing private 144 bonds is an inferior option to offering public bonds if this option is available at reasonable cost, therefore this is a negative signal for firms that are all issuers. The negative effect of this signal is substantial, equal in its marginal effect to a percentage point increase in size.

When we consider the loan market our econometric specification controls for two dimensions reported in two different columns. In the first column of results we add a dummy which captures the firm's relationships with lead bank managers in underwriting bank loans (*RELATIONSHIP*): if a firm uses the same underwriter more than once it is expected to have a positive effect. We find it is more likely to issue bonds since the coefficient is highly significant, with a marginal effect that raises the probability of issue by 0.10. The role of multiple previous relationships with a lead bank manager corresponds closely with the multiple loan arrangements found to improve the investor participation in loan syndicates by Sufi (2007). In the second column of results we add a dummy which captures the history of loan yields (*LOAN YIELD*). Given that we control for the effects of bank loans as a substitute or complement to bond finance through the use of the *BANKFIN* variable we consider these variables to be a pure measure of the quality of the borrower. We observe that firms with loan yields that are always classified as investment grade will have greater access to the bond market, since the coefficient is highly significant, and the marginal effect is 0.16. This is an example of third-party certification in the loan market that enhances access to debt finance; while Sufi (2007) finds that this signal improves further access to the

syndicated loan market, we find it is also important in promoting access to the bond market. Both controls confirm the result from the loan market previously documented by Hale and Santos (2008). Both private bond placements and previous bank relationships or history of loan yields are extremely important factors and have a positive influence on the decision of firms to go public. In the next section we take up the main question in the paper. What is the role of signals from market implied bond ratings after controlling for these effects?

4.2 The effect of track record on bond issuance

In this section we assess whether track record in the bond market itself influences a firm's decision to issue controlling for variables shown to be important in the previous section. Our theoretical model predicts that the probability of obtaining market finance increases with a better signal of quality acquired in the bond market. To test this implication, we augment the baseline specification with a measure of the direct indicators of quality from the market implied bond ratings, and the issuance history of the firm. The specification is:

$$\begin{aligned} Pr(BOND_{it}=1) = F(a_0 + a_1 LEV_{i(t-1)} + a_2 PROF_{i(t-1)} + a_3 COV_{i(t-1)} + a_4 CAPEX_{i(t-1)} \\ + a_5 SIZE_{i(t-1)} + a_6 BANKFIN + a_7(STEADY\_RECORD_{it} \text{ or } GOOD\_RECORD_{it}) \\ + a_8 RULE144A_{it} + a_9(RELATIONSHIP_{it} \text{ or } LOANYIELD_{it}) + u_j + u_t) \quad (4) \end{aligned}$$

We report estimation results in Table 3. The impact of the variables discussed in the previous section is very similar in magnitude and level of significance and in the interest of space we do not discuss them here. We find a large positive coefficient on *STEADY_RECORD* that is significant at the one percent level. The marginal effect of track record suggests that changing the status of the firm from an issuer without signals to a "reliably constant quality" issuer would increase the probability of bond finance by 0.19, after allowing for all

the effects discussed in Table 2. This is an important result, considering the arm's length nature of bond finance and the prevalence of uninformed investors. One would expect that the marginal impact of this variable after the first bond IPO would not be as important for subsequent issues, but track record in the bond market counts. This verifies that the 'known quantity' effect identified by Faulkender and Petersen (2006) and Sufi (2007) is also an important factor in the bond market. This result shows that the market implied bond rating is very influential in determining the probability of bond issuance even after we control for other variables in our empirical specifications.

Given the large role for the market implied bond rating, we investigate the robustness of our results by replacing our *STEADY_RECORD* variable with the alternative *GOOD_RECORD* for investment grade firms only, in Table 4. We find that firms with an investment grade implied rating that has been maintained have a higher probability of issuing bonds around 0.20, a very similar magnitude to the effect estimated in Table 3.

Once a firm has acquired this record from repeated high-grade issues in the market it has a strong incentive to continue to issue and maintain this signal. Its own history in the market makes it an issuer known for high quality by investors in the public bond market. In fact, recent work by Erel et al. (2012), using a similar methodology, suggests that, in addition to firm level characteristics, maintaining an investment grade bond rating is very important in accessing the market during downturns.[25] It is important to note that the significance of track record for bond issuance are robust to including a number of additional right hand side variables previously found (see e.g. Hale and Santos (2008) and Santos and Winton (2008)) to be important determinants of bond market access.[26]

[25]It is interesting to note that when we include an NBER recession dummy, we find, consistent with the evidence in Erel et al. (2012) that in recessions, steady quality issuers are three times more likely to issue bonds compared to firms who lack this quality signal.

[26]Specifically, these variables are the Z-SCORE intended to capture firm specific risk , firms' growth opportunities, age and collateral assets. We do not report these results here for brevity but are available upon request.

4.2.1 Excluding financial firms

Excluding financial firms reduces our firm-year observations to 3482 but it makes virtually no difference to the results. Table 5 provides the estimated coefficients with their significance and marginal effects, and these differ hardly at all compared to results reported in Table 3. The impact of indicators from the balance sheet, loan market, private bond market and previous public issues have the same impact on the probability of issuing for non-financials as they do for the whole sample. We conclude that our results are not driven by the unique behavior of financial firms.

4.2.2 Allowing for firm specific ratings

It is possible that the measure of quality in the bond market based on a market implied bond rating for the bonds being issued is in fact proxying for the default risk of the entire firm. To address this issue we include in the reported results in Table 8 the findings of our model when we include the lagged Standard and Poor's long term default rating for the firm in our regression equation (*S&PRATING-LAGGED*).[27] We find that the lagged rating is significant and has a marginal effect that reduces the probability of issuance by 0.03. It does not alter the marginal impact of other variables that remain significant and preserve their rank order of importance. The negative sign may suggest that, as the firm's issuer default rating in general improves, the firm substitutes away at the margin from public bond finance to other forms of finance such as equity finance.

In addition to these robustness checks we allow for the potential endogeneity of regressors and for the choice of alternative sample periods, and none of these changes alters our results.[28]

[27] As an alternative test we have included a set of dummy variables, one for each rating category. Our results, not reported for brevity, were broadly unchanged.

[28] The findings are available on request.

5 Conclusion

More corporate bonds have been issued in the last decade than in any other, and the market has more than tripled in the volume of bonds outstanding, but it long been known that not all firms are in a position to take advantage of these unusual conditions. Firms are heterogeneous and have differing degrees of financial status which influences their ability to access external markets for debt. We are not primarily interested in the choice between securities of different types, but rather on the effect of signals of quality on the probability of access to public bond markets. Data from our study, and the recent work of Erel et al. (2012), shows that issuers of public bonds are typically older, more profitable, more collateralized, and they have better ratings from the credit rating agencies. Their age allows them to have built relationships with banks over time, which gives them a further advantage over firms with poorer histories, or no histories, on which to base an assessment of their quality. The quality of the borrower is a critical matter, since there is a very marked distinction in access to bond markets between investment grade and non-investment grade issuers, especially during downturns (Erel et al. (2012)).

The recent literature on public bond issuance has sought to measure the gains from a good track record in loan markets. For example, Sufi (2007, 2009) shows that third-party certification of quality is an important consideration for participants in loan syndicates that are relatively uninformed compared to the lead arranger, while Hale and Santos (2008) analyze the positive signal from using the same underwriter repeatedly in the loan market, and also record those firms that may have issued private bonds prior to going public. This tends to confirm the more general conclusion of Faulkender and Petersen (2006) who find that more transparent firms obtain more debt than opaque firms.

Our paper builds on these foundations, but focuses on the public bond market. Motivated by a conceptual model similar to Holmstrom and Tirole (1997) we find in our empirical evidence that track record in public bond, private bond and loan markets increases the likelihood of firms issuing in the public debt market taking all other things into account.

Our results from a panel of 983 US firms from 1995-2004 shows that firms with a strong market implied bond rating and a history of previous issuance have a higher probability of issuing bonds even after controlling for creditworthiness, loan history and private bond issuance than firms without this record. This result is robust to a large number of alternative specifications. The contribution to the literature is, first, to show that this record is one of the most important influences on the decision to issue bonds, and, second, that other forms of verification from the loan market and private bond issues continue to influence the decision to issue public bonds even in the presence of the bond market signal. It may also explain why firms are willing to incur costs to build a good track record, since a seasoned issuer with high-grade bonds is less likely to find itself shut out of the bond market (Passov (2003); Erel et al. (2012)) in difficult times. The evidence in this paper and other literature we have cited is beginning to stack up. This poses an interesting challenge for theorists who might formulate truly dynamic models in which the value of the reputational gain has an influence on the market value of the firm, creating an incentive for firms to invest in signals of quality as a means to access market finance at lower cost.

References

Altman, E., Gande, A. and Saunders, A.: 2010, Bank debt versus bond debt: Evidence from secondary market prices, *Journal of Money Credit and Banking* **42**, 755–767.

Andrade, G. and Kaplan, S.: 1997, How costly is financial (not economic) distress? Evidence from highly leveraged transactions that became distressed, *Journal of Finance* **53**, 1443–1494.

Bensanko, D. and Kanatas, G.: 1993, Credit market equilibrium with bank monitoring and moral hazard, *Review of Financial Studies* **6**, 213–232.

Berens, J. and Cuny, C.: 1995, The capital structure puzzle revisited, *Review of Financial Studies* **8**, 1185–1208.

Bernanke, B., Gertler, M. and Gilchrist, S.: 1999, The financial accelerator in a quantitative business cycle framework, *in* J. Taylor and M. Woodford (eds), *Handbook of Macroeconomics*, Vol. 1C, Elsevier Science, North Holland.

Bolton, P. and Freixas, X.: 2000, Equity, bonds, and bank debt: Capital structure and financial market equilibrium under asymmetric information, *Journal of Political Economy* **108**, 324–351.

Boot, A., Milbourn, T. and Schmeits, A.: 2006, Credit ratings as coordination mechanisms, *Review of Financial Studies* **19**, 81–118.

Campello, M. and Chen, L.: 2010, Are financial constraints priced? Evidence from firm fundamentals and stock returns, *Journal of Money, Credit and Banking* **42**, 1185–1198.

Cantillo, M. and Wright, J.: 2000, How do firms choose their lenders? an empirical investigation, *Review of Financial Studies* **13**, 155–189.

Cantor, R. and Packer, F.: 1996, Multiple ratings and credit standards: Differences of opinion in the credit rating industry, *Staff Report 12*, Federal Reserve Bank of New York.

Chemmanur, T. and Fulghieri, P.: 1994, Reputation, renegotiation, and the choice between bank loans and publicly traded debt, *Review of Financial Studies* **7**, 673–692.

Chen, L., Lesmond, D. and Wei, J.: 2007, Corporate yield spreads and bond liquidity, *Journal of Finance* **62**, 119–149.

Cornell, B., Landsman, W. and Shapiro, A.: 1989, Cross-sectional regularities in the response of stock prices to bond rating changes, *Journal of Accounting, Auditing and Finance* **4**, 460–479.

Covitz, D. and Harrison, P.: 2004, Do banks time bond issuance to trigger disclosure, due diligence, and investor scrutiny?, *Journal of Financial Intermediation* **13**, 299–323.

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

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

Diamond, D.: 1991, Monitoring and reputation: The choice between bank loans and directly placed debt, *Journal of Political Economy* **99**, 689–721.

Dichev, I. and Piotroski, J.: 2002, The long-run stock returns following bond ratings changes, *Journal of Finance* **56**, 173–203.

Ederington, L. and Yawitz, J.: 1987, The bond rating process, *in* E. Altman (ed.), *Handbook of Financial Markets and Institutions*, 6th edition, John Wiley and Sons, New York.

Erel, I., Julio, B., Kim, W. and Weisbach, M.: 2012, Macroeconomic conditions and capital raising, *Review of Financial Studies* **25**, 341–376.

Faulkender, M. and Petersen, M.: 2006, Does the source of capital affect capital structure?, *Review of Financial Studies* **19**, 45–79.

Goh, J. and Ederington, L.: 1993, Is a bond rating downgrade bad news, good news, or no news for stockholders?, *Journal of Finance* **48**, 2001–2008.

Gomes, A. and Phillips, G.: 2012, Why do public firms issue private and public securities?, *Journal of Financial Intermediation* **21**, 619–658.

Graham, J., Lemmon, M. and Schallheim, J.: 1998, Debt, leases, taxes and the endogeneity of corporate tax status, *Journal of Finance* **53**, 131–162.

Hale, G. and Santos, J.: 2008, The decision to first enter the public bond market: The role of reputation, funding choices, and bank relationships, *Journal of Banking and Finance* **32**, 1928–1940.

Hand, J., Holthausen, R. and Leftwich, R.: 1992, The effect of bond rating agency announcements on bond and stock prices, *Journal of Finance* **47**, 733–752.

Hertzel, M. and Smith, R.: 1993, Market discounts and shareholder gains for placing equity privately, *Journal of Finance* **48**, 459–485.

Holmstrom, B. and Tirole, J.: 1997, Financial intermediation, loanable funds and real sector, *Quarterly Journal of Economics* **112**, 663–691.

Hoshi, T., Kashyap, A. and Scharfstein, D.: 1993, The choice between public and private debt: An analysis of post-deregulation corporate financing in Japan, *Working Paper 4317*, NBER.

Kahle, K. and Stulz, R.: 2010, Financial policies and the financial crisis: How important was the systemic credit contraction for industrial corporations?, *Working Paper 16310*, NBER.

Kwan, S. and Carleton, W.: 2010, Financial contracting and the choice between private placement and publicly offered bonds, *Journal of Money Credit and Banking* **42**, 907–929.

Leland, H. and Pyle, D.: 1977, Informational asymmetries, financial structure, and financial intermediation, *Journal of Finance* **32**, 371–387.

Lummer, S. and McConnel, J.: 1989, Further evidence on the bank lending process and the capital market response to bank loan agreements, *Journal of Financial Economics* **21**, 99–122.

Pagano, M., Panetta, F. and Zingales, L.: 1998, Why do companies go public? An empirical analysis, *Journal of Finance* **53**, 27–64.

Passov, R.: 2003, How much cash does your company need?, *Harvard Business Review* pp. 1–8.

Petersen, M. and Rajan, R.: 1994, The benefits of lending relationships: Evidence from small business data, *Journal of Finance* **49**, 3–37.

Rajan, R.: 1992, Insiders and outsiders: the choice between informed and arms length debt, *Journal of Finance* **47**, 1367–1400.

Repullo, R. and Suarez, J.: 2000, Enterpreneurial moral hazard and bank monitoring: A model of the credit channel, *European Economic Review* **44**, 1931–1950.

Santos, J. and Winton, A.: 2008, Bank loans, bonds, and information monopolies across the business cycle, *Journal of Finance* **63**, 1315–1359.

Schenone, C.: 2004, the effect of banking relations on the firms IPO underpricing, *Journal of Finance* **60**, 2903–2958.

Servigny, A. and Sandow, S.: 2007, Univariate risk assessment, *in* A. Servigny and N. Jobst (eds), *Handbook of Structured Finance*, Standard and Poor's.

Sufi, A.: 2007, Information asymmetry and financing arrangements: Evidence from syndicated loans, *Journal of Finance* **62**, 629–668.

Sufi, A.: 2009, The real effects of debt certification: Evidence from the introduction of bank loan ratings, *Review of Financial Studies* **22**, 1659–1691.

Tirole, J.: 2006, *The Theory of Corporate Finance*, Princeton University Press.

Townsend, R.: 1979, Optimal contracts and competitive markets with costly state verification, *Journal of Economic Theory* **21**, 265–293.

Weinstein, M.: 1977, The effect of a rating change announcement on bond price, *Journal of Financial Economics* **5**, 329–350.

Yasuda, A.: 2005, Do bank relationships affect the firm's underwriter choice in the corporate-bond underwriting market?, *Journal of Finance* **60**, 1259–1292.

6 Appendix

A simple stylized model (not for publication)

We develop a simple stylized framework that is similar to models that study the role of net worth in the choice between alternative modes of finance as for example in Holmstrom and Tirole (1997), Repullo and Suarez (2000), Hoshi et al. (1993). We borrow from the insights of this earlier work to motivate our assumptions. In our model firms have incentives to seek flexibility in finance due to the constraints on liquidity internally and the benefits of diversification of financial sources as in Rajan (1992). Firms will find they are unable to obtain sufficient finance from retained profits to proceed with investment projects and the scale of the finance required will create incentives to the firm to obtain bond market finance. Thus for large investment projects firms will prefer to tap the public bond market and there is a choice between bank or market finance, driven by differences in the cost of finance between the two.

In our model we address repeated access to bond markets with a critical role for building "reputation" of quality through successful repeat issues. Since our main goal is to illustrate the role of quality signals on market finance we study a two period model in which the outcome of the first period influences the financing outcome of the subsequent period introducing a role for quality signals.[29] We now describe the key elements of the model. The exposition, notation and main building blocks are similar to Holmstrom and Tirole (1997).

Corporate sector. There is a continuum of firms each of which is characterized by the amount of net worth A. The set of all firms is described by a cumulative distribution function $F(A)$. Firm owners are risk neutral. The owner of the firm has available an investment project that costs I to implement. Projects can be undertaken at any scale, i.e. $I \in [0, +\infty)$. The firms' net worth, A is such that $0 < A < I$, and can be used to finance the project (or used for consumption). The project has the following *characteristics*. It succeeds with probability p generating a return $R(I) = RI$ (i.e. proportional to I), and fails with probability $1 - p$ generating zero income. The probability of success p depends on whether the firm owner manages the project diligently. Consequently, $p = p_h$ if the firm owner manages the project to the best of her abilities, and $p = p_l < p_h$ otherwise. In the latter case the firm owner enjoys a private benefit. We assume the owner can choose between a project with a high probability of success, p_h that yields no private benefit, and a project

[29] With two periods, the link between them is that finance in the second period depends on the outcome of the first period i.e. whether the project is successful and the return to the bond holder is positive. If this is the case finance is made available in the second period. This introduces a role for building "reputation" from quality signals because repeat issuance occurs when a firm does not default on the bond in the earlier periods. Moreover firm characteristics are also important since initial access to finance depends on whether the net worth of the firm exceeds some cutoff level.

with a low probability of success, p_l that yields a private benefit. The private benefit is proportional to investment scale I, that is, $(B(I) = BI, b(I) = bI)$ with $B > b > 0$ and is private information to the firm owner. All other details of the economic environment are common knowledge between all parties.

Financial sector. There is a continuum of lenders. Lenders can either be bond holders (investors) or intermediaries (banks).[30] Lenders are risk neutral. Because of perfect competition among lenders, firms face a perfectly elastic supply of funds and lenders just break even, that is, zero expected profits.

Financing projects. Given $A < I$ the firm needs to raise $I - (A - c)$ from investors (through directly placed issues) or $I - A$ from intermediaries (intermediated finance), where c is a fixed cost assumed to be independent of issue size. We assume that bond holders (collectively defined as the "market") demand an expected rate of return equal to r_m. Intermediaries demand a rate of return per unit loaned equal to $r_b \geq r_m$. We can motivate the assumption that $r_b \geq r_m$ with monitoring costs faced by intermediaries. In our context this takes the form of resources spent (e.g. labor costs) on monitoring the firm's management.[31] An implication of monitoring is that banks can reveal whether the firm is b or B type. On the other hand, c captures the (fixed) underwriters' fees that are normally associated with public debt issues. For our purposes the assumptions on the cost of finance (r_m, r_b, c) create a choice between bank or market finance. For relatively small financing needs firms are most likely to use a bank in order to avoid the fixed cost, while for large scale finance issuing directly is preferable.

Beliefs and track record. We now come to the role of track record in various financial markets. In contrast to intermediaries, investors only observe the firms' success or failure but not the private benefit (B or b). They form (and update) a belief–equivalently a *rating*– about firm reliability based on this information. Formally, the bond holder has (in period 1) a prior belief about firm type (b or B). This is given by a probability equal to γ that the firm is the b-type (high-reliability), and $1 - \gamma$ that is the B-type (low-reliability). Investors of course prefer high reliability borrowers since they are more likely to manage their projects competently if offered identical compensation to the low reliability ones. As we shall see the belief about the quality of the firm can be updated using firm-specific information, loan histories, and market information from ratings and past issuance.[32]

This information has been shown by Sufi (2007, 2009) to help a firm gain access to less well informed investors, and draws on the same reasoning from the same Holmstrom and Tirole (1997) framework that we use here. In particular, Sufi argues that intermediaries and the loan rating agencies act as informed investors that can send signals to less informed investors, such as those in the public debt markets. The intermediaries and rating agencies certify that projects have been successful and confirming the quality of the borrower, through updating of information on default risk. They also monitor the project by deciding on whether to invoke covenant requirements, changing or seizing the collateral posted to the project and so on.

We now describe the sequence of events. There are two periods as described in Figure 2. In period 1 the firm owner seeks finance from lenders to undertake the project. If the project succeeds, the firm owner receives R_E and the bond holder (or intermediary) R_L, where $R(I) = R_E + R_L$. If the project fails each receive zero (i.e. we assume limited liability). The project has a positive net present value (NPV) when the firm owner manages diligently but

[30] We use the terms investor and bond holder interchangeably.

[31] A higher cost of bank finance can also be rationalized with auditing costs paid by banks to verify project returns (in the spirit of Townsend (1979)). In our model however returns are verifiable, and we have chosen to sidestep this additional source of adverse selection (i.e. project returns) that would not offer any additional insights.

[32] We refer to this indicator as a 'rating' in the remainder of the paper, but we have in mind a that wide range of information is used to determine its value, including official ratings, but also signals from other sources.

negative otherwise: $p_h R - (1 + r_i) > 0 > p_l R - (1 + r_m) + B$, $i = m, b$. For simplicity we assume the parameters of the model, $p_h, p_l, B, b, R, I, r_b, r_m, c$ are identical across periods.

Description of the solution. Our main objective is to illustrate the role of signals of quality and their influence on the likelihood and scale of market finance.In what follows therefore we focus on the implications of the model when firms opt for market finance. Given our assumptions on bank finance, it is easy to show that both types will obtain finance from banks and the B-type will never opt for market finance. Note that the structure of this model is similar to Holmstrom and Tirole (1997), with the addition of a second period. However, we assume that the outcome (of financing and investment) in any given period does not specify anything (financing and investment) for the subsequent period, that is we assume finance is project specific. We can therefore solve the model as a game with period by period maximization keeping track of the evolution of beliefs from lenders. Essentially the assumptions we make imply the only link between the two periods is the firms' track record (success or failure), and the associated updating of the rating, γ. We use backward induction to solve for a separating equilibrium in which the b-type firm manages the project diligently while the B-type firm does not. The solution of the model determines the optimal investment scale, I, the division of the project's return between the borrower, R_E, and lender, R_L and the level of net worth, $\overline{A}$, that determines the mode of finance, i.e. market or intermediated finance. We present the details of the solution in the Appendix. In the remainder of this section we state the period 1 maximization problem of the b-type firm and summarize the main results that we use below in the empirical sections. The period 2 maximization problem is identical (except for the rating γ which is updated to γ' when the firm has received market finance in period 1).

The firm's problem in period 1 is given by,

$$U(A) = \max\{U^m, U^b\}$$

where, $U^b = p_h R_E^b - (1 + r_b)A, U^m = p_h R_E^m - (1 + r_b)A$, denote the net utilities to the firms' owner when the project receives intermediary and market finance respectively, subject to:

Division of the project return between borrower, R_E, and lender, R_L.

$$R_E^i + R_L^i = RI \quad \text{for i = m,b}$$

Incentive compatibility constraint for the firm owner,

$$p_h R_E^i \geq p_l R_E^i + bI \quad \text{for i =m,b}$$

Participation constraints for the lender,

$$\text{market finance:} \quad \gamma p_h(RI - \frac{bI}{\Delta p}) + (1 - \gamma)(p_l(RI - \frac{bI}{\Delta p})) \geq (1 + r_m)(I + c - A)$$

$$\text{intermediary finance:} \quad p_h(RI - \frac{bI}{\Delta p}) \geq (1 + r_b)(I - A)$$

Holmstrom and Tirole (1997) show that in equilibrium all the constraints will bind, the firm will use its entire net worth into the project and the lenders will finance the rest, i.e. $I - A$, $I - (A - c)$ in the case of intermediary and market respectively. Using the lender's participation constraints we can compute the optimal investment level.

Optimal investment scale.

$$(A-c)\kappa_m = I \quad (5)$$
$$A\kappa_b = I \quad (6)$$

where $\kappa_m = \frac{1+r_m}{(1+r_m)-(R-\frac{b}{\Delta p})\rho}$ $\kappa_b = \frac{1+r_b}{(1+r_b)-(R-\frac{b}{\Delta p})p_h}$, define the multipliers on net worth and $\rho = \gamma p_h + (1-\gamma)p_l$ is the probability of success as perceived by the investor. Equations (1) and (2) define the effective technology the firm has available to implement investment projects. Note the following. First, it is straightforward to verify that $\frac{\partial \kappa_m}{\partial \gamma} > 0$. Thus since γ rises with success a firm can finance a larger project with the same net worth, A in successive periods. The dependence of κ_m on γ implies that $\kappa_m > \kappa_b$ with certainty as long as lenders observe successful financing of projects and thus γ rises over time. We now define the net worth threshold that determines the source of finance that firms prefer.

Definition of net worth threshold. The threshold is computed as the solution, $A = \overline{A}$ to the three equations,

$$U^b = U^m, \quad I = \kappa_b A, \quad I = \kappa_m(A-c)$$

Insights. First note that given success in period 1, the updated rating is greater than the initial rating, i.e. $\gamma' > \gamma$. Hence upon observing success the market attaches a greater weight that it faces a high-reliability (b-type) firm. From the optimal investment scale under market finance above, and the expression for κ_m we can immediately see that likelihood of market finance increases in net worth, A. Therefore high collateralized firms with strong balance sheets have a higher likelihood of obtaining market finance.

The fact that $\kappa_m > 1$ means that a firm can lever its net worth and κ_m can be interpreted as the multiplier (c.f. Tirole (2006), p.127). It is also useful to note that we can define leverage as: $\frac{(\kappa_m - 1)A}{A} = \kappa_m - 1$. Since $\frac{\partial \kappa_m}{\partial \gamma} > 0$, for the same value of net worth, firms can increase the scale of their investment projects with an improvement in ratings, and demand more market finance. Equivalently it implies that firms can increase their leverage with a positive updating of their rating (that follows a successful outcome in the previous period). There is a second effect of the rating that operates on the threshold $\overline{A}$. This is given by $\frac{\partial \overline{A}}{\partial \gamma} < 0$. This means that the minimum amount of net worth for market finance decreases with an improved rating. Therefore an improvement in the rating increases the probability of issuing a bond to the market. We can therefore state the following.

The effect of an improved rating (in the form of higher probability, γ) has two effects. The first (through the effect on κ_m) allows firms to increase their leverage and thus to secure more finance from the market. This is analogous to the argument proposed by Faulkender and Petersen (2006), who suggest that the volume of lending will increase on the supply-side as perceived quality of the borrower improves, but also, since the price of debt is lower in markets compared to loans from intermediaries that incur monitoring costs, the demand for debt may also be higher. Boot et al. (2006) argue that a good quality signal (in the form of a rating) could prove to be an 'information equalizer', enlarging the investor base and expanding the ability to borrow. The second (through the effect on $\overline{A}$) implies that less well collateralized firms can access a greater volume of market finance. This effect is discussed by Cantor and Packer (1996) and Boot et al. (2006) when they identify the role of ratings as a minimum quality standard that allows certain types of investors to purchase securities. They cutoff between investment grade and sub-investment grade ratings is particularly important for pension funds, savings and loans institutions and money market mutual funds, for example. The combined effect implies that the likelihood of obtaining market finance increases with the perceived "reputation" of quality from a successful track record of previous bond issues.

Details of the solution. We use backward induction to solve for a separating equilibrium in which the b-type firm manages the project diligently while the B-type firm does not.

Period 2

There are two cases.

I. The project has failed in period 1. For simplicity we assume that there is no finance available for a new project in period 2, since firms have used up all of their net worth, A, into the period 1 project. The investor (or intermediary) has observed failure (F) in period 1 and so updates her beliefs according to the Bayes rule.[33]

II. The project has succeeded in period 1. Firms enter period 2 with net worth A and seek finance for the period 2 project.[34] For the firm owner to manage diligently upon receiving finance, the incentive compatibility constraint (**IC**) has to be satisfied. In the case of the B-type:

$p_h R_E \geq p_l R_E + BI$

and similarly for the b-type:

$p_h R_E \geq p_l R_E + bI$

Let $\Delta p = p_h - p_l$. From the **IC** constraints above the minimum payoff that preserves incentives (i.e. the owner manages to the best of her abilities) is $R_E = \{\frac{bI}{\Delta p}, \frac{BI}{\Delta p}\}$

Let γ' be the markets' updated belief about type b firm in the second period given success (S) in the first period. This is calculated using Bayes rule,

$$\gamma' = \frac{P(b,S)}{P(S)} = \frac{p_h \gamma}{p_h \gamma + p_l(1-\gamma)}$$

Note that given success in period 1, $\gamma' > \gamma$. We now calculate the expected payoff to the investor in order to derive the conditions necessary to extend finance and determine the maximum investment scale I. There are two cases to consider.

II.a. $R_E = \frac{bI}{\Delta p}$. From the incentive compatibility constraints, the b-type firm manages well while the B-type does not. The expected payoff to the bond holder is:

$\gamma' p_h(RI - \frac{bI}{\Delta p}) + (1-\gamma')(p_l(RI - \frac{bI}{\Delta p}))$

Thus for the project to receive finance the bond holder's participation constraint (**PC**) has to be satisfied.

$\gamma' p_h(RI - \frac{bI}{\Delta p}) + (1-\gamma')(p_l(RI - \frac{bI}{\Delta p})) \geq (1+r_m)(I+c-A)$

II.b. $R_E = \frac{BI}{\Delta p}$. In this case both types manage well. The expected payoff to the bond holder is:

$\gamma' p_h(RI - \frac{BI}{\Delta p}) + (1-\gamma')(p_l(RI - \frac{BI}{\Delta p}))$

Thus for the project to receive finance the bond holder's participation constraint (**PC**) has to be satisfied.

$\gamma' p_h(RI - \frac{BI}{\Delta p}) + (1-\gamma')(p_l(RI - \frac{BI}{\Delta p})) \geq (1+r_m)(I+c-A)$

Note that we can eliminate $\frac{bI}{\Delta p} < R_E < \frac{BI}{\Delta p}$, since the expected payoff to the bond holder is strictly less than that in case II.a. Similarly by appealing to the same argument of dominance we can eliminate $\frac{bI}{\Delta p} > R_E$ or $\frac{BI}{\Delta p} < R_E$.

We now state the following assumption.

A.1. $\gamma' p_h(RI - \frac{bI}{\Delta p}) + (1-\gamma')(p_l(RI - \frac{bI}{\Delta p})) > (1+r_m)(I+c-A) > p_h(RI - \frac{BI}{\Delta p})$. This assumption implies that we can also eliminate case II.b above, and that the project will be financed if it offers at least $R_E = \frac{bI}{\Delta p}$ to the firms' owner. It then follows that the lender

[33] The updated probability conditional on failure in period 1 is given by $\frac{P(b,F)}{P(F)} = \frac{\gamma(1-p_h)}{\gamma(1-p_h)+(1-\gamma)(1-p_l)}$.

[34] We implicitly assume that initial net worth in period 2 equals initial net worth in period 1. One can point out that some of the surplus from period 1 will be used to enhance second period net worth, thus giving rise a role for retained earnings. We can abstract from this complication by assuming that the firm distributes the surplus from the first period project as dividends.

receives, $R - R_E$. Moreover, in this case the b-type manages well while the B-type does not in period 2.

Period 1

Given that period 1 has identical parameters (except γ) to period 2 we do not need to repeat the analysis. The following assumption guarantees an equilibrium in which the b-type manages well while the B-type does not in period 1 given optimal actions and beliefs in period 2.

A.2. The incentive compatibility constraint is satisfied for the b-type ($\Delta p R_E \geq bI$) but violated for the B-type ($\Delta p R_E \leq BI$). Further, the net expected payoff to the B-type from not managing well in both periods, is strictly greater than deviating in period 1 (i.e. manage in period 1 and do not manage in period 2), that is,

$p_l A + BI + p_l\{p_l(R_E) + BI - A\} > p_h A + p_h\{p_l(R_E) + BI - A\}$

This assumption guarantees that the b-type manages well, while the B-type does not in period 1 given optimal actions in period 2 for both types (i.e. b-type manages well, B-type does not) and the rationality of the investors' beliefs.

Optimal investment scale. We can now define the investment scale that will obtain under the two different modes of finance (intermediary (b) or market (m)). We combine the incentive compatibility constraint (**IC**) for the b-type firm ($p_h R_E \geq p_l R_E + bI$) with the participation constraint (**PC**) constraint of the financier (m,b),

$(PC_m): \quad \gamma p_h(RI - \frac{bI}{\Delta p}) + (1-\gamma)(p_l(RI - \frac{bI}{\Delta p})) \geq (1 + r_m)(I + c - A)$

$(PC_b): \quad p_h(RI - \frac{bI}{\Delta p}) \geq (1 + r_b)(I - A)$

Solving the two equations above we get:

$$(A - c)\kappa_m \geq I \quad (1)$$

$$A\kappa_b \geq I \quad (2)$$

Equations (1) and (2) define the effective technology the firm has available to implement investment projects. These two equations will be satisfied as strict equalities given perfect competition among lenders.

where $\kappa_m = \frac{1+r_m}{(1+r_m)-(R-\frac{b}{\Delta p})\rho} \quad \kappa_b = \frac{1+r_b}{(1+r_b)-(R-\frac{b}{\Delta p})p_h}$, define the multipliers on net worth and $\rho = \gamma p_h + (1-\gamma)p_l$ is the probability of success as perceived by the investor. It is also important to note that $\kappa_m > \kappa_b$ with certainty as long as the outcome of financing is successful (i.e. the project succeeds) and the rating, γ improves over time.

Equation (1) or (2) says that the firm can lever its net worth $(A-c)$ or A with multiplier equal to $\kappa_i, \quad i = m, b$. We also note that firms must have positive net worth ($A > 0$) to invest using bank finance and $A > c$ using market finance.

Using (1) it is straightforward to verify that $\frac{\partial \kappa_m}{\partial \gamma} > 0$. Thus since γ rises with success a firm can finance a larger project with the same net worth, A in successive periods.

Definition of net worth threshold. We now calculate the net utility (after we subtract the opportunity cost of internal funds) to the firm from financing and undertaking the project. This will allow us to define a threshold value for $A = \overline{A}$ such that for all $A < \overline{A}$ firms prefer intermediary finance, whereas for all $A \geq \overline{A}$ firms prefer bond finance. Using the zero profit condition for the lender ($p_h R_L = (1 + r_b)(I - A)$, under bank finance, $\rho R_L = (1+r_m)(I+c-A)$ under market finance) the net utility to the firm when using intermediary (market) finance is given respectively by,

$$U^b = p_h R_E - (1 + r_b)A = p_h(RI - R_L) - (1 + r_b)A = (p_h R - (1 + r_b))I$$

$$U^m = p_h R_E - (1+r_b)A = p_h(RI - R_L) - (1+r_b)A = (p_h R - \frac{p_h}{\rho}(1+r_m))I + (\frac{p_h}{\rho}(1+r_m) - (1+r_b))A - \frac{p_h}{\rho}(1+r_m)c$$

We state the following assumption.

A.3. $p_h R - (1 + r_b) > 0, \quad \frac{p_h}{\rho} < \frac{\kappa_m p_h R - (1+r_b)}{(1+r_m)(\kappa_m - 1)}, \quad p_h R - \frac{p_h}{\rho}(1 + r_m) > 0$

The first two inequalities guarantee that $\frac{\partial U^i}{\partial I} > 0, \quad i = m, b$. Therefore the firm would like to invest as much as possible. However, as equations (1) and (2) show, the scale of the investment is limited by the participation constraints of the lender and incentive compatibility constraints of the firm. The first and last inequalities in A.3 also imply a positive net present value (per unit of investment) irrespective of mode of finance. The threshold $\overline{A}$ is defined as the solution to the three equations below.

$$U^b = U^m, \quad I = \kappa_b A, \quad I = \kappa_m (A - c)$$

The following inequality guarantees that $\overline{A} > 0$.

$$(p_h R - \frac{p_h}{\rho}(1 + r_m))\kappa_m - (p_h R - (1 + r_b))\kappa_b > (1 + r_b) - \frac{p_h}{\rho}(1 + r_m) \tag{4}$$

The threshold for A is given by,

$$\overline{A} = \frac{\left(\frac{p_h}{\rho}(1 + r_m) + (p_h R - \frac{p_h}{\rho}(1 + r_m))\kappa_m\right) c}{(p_h R - \frac{p_h}{\rho}(1 + r_m))\kappa_m - (p_h R - (1 + r_b))\kappa_b + \frac{p_h}{\rho}(1 + r_m) - (1 + r_b)} \tag{5}$$

Thus for $A < \overline{A}$ firms prefer bank finance, while if$A \geq \overline{A}$ firms prefer to issue publicly.

The effect of the rating γ on $\overline{A}$ can be computed using comparative statics. Let $\omega = (p_h R - \frac{p_h}{\rho}(1+r_m))\kappa_m - (p_h R - (1+r_b))\kappa_b + \frac{p_h}{\rho}(1+r_m) - (1+r_b)$ and $\psi = \left(\frac{p_h}{\rho}(1 + r_m) + (p_h R - \frac{p_h}{\rho}(1 + r_m))\kappa_m\right)$

Then,

$$\frac{\partial \overline{A}}{\partial \gamma} = \frac{1}{\omega}\left(\frac{\partial \psi}{\partial \gamma} - \overline{A}\frac{\partial \omega}{\partial \gamma}\right) = \frac{1}{\omega}\left(\frac{p_h \kappa_m(\kappa_m - 1)\Delta p(\rho R - (1 + r_m)) + p_h \Delta p(1 + r_m)(\kappa_m - 1)}{\rho^2}\right)(c - \overline{A})$$

Note that from A.3 and equation (4) it follows $\overline{A} > c$. Therefore given that the term in parenthesis is strictly positive it follows immediately that $\frac{\partial \overline{A}}{\partial \gamma} < 0$. Thus the threshold, $\overline{A}$ falls with a better rating.

Table 1

Summary Statistics

	All Firms	Issuers	Non-Issuers	Diff.	Good Record	Poor Record	Diff.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LEV	26.20	30.15	23.43	0.00	26.57	25.44	0.01
	(19.35)	(16.28)	(20.80)		(21.04)	(15.96)	
$PROF$	9.34	10.07	8.24	0.01	9.41	9.30	0.86
	(8.72)	(9.58)	(7.08)		(9.41)	(7.28)	
$CAPEX$	5.42	5.72	4.99	0.00	5.55	5.05	0.00
	(5.28)	(4.82)	(5.56)		(4.65)	(5.55)	
COV	18.29	8.49	34.21	0.00	13.04	28.55	0.00
	(52.42)	(19.92)	(78.72)		(37.65)	(103.24)	
$S\&P\ RATING$	3.65	3.36	3.51	0.00	3.63	3.77	0.00
	(1.06)	(0.87)	(1.04)		(0.98)	(1.08)	
$IMPLIED\quad RATING$	2.42	2.42	-	-	2.13	2.45	0.00
	(1.43)	(1.43)			(1.40)	(1.43)	
$SIZE$	10.01	10.71	9.52	0.00	10.66	10.47	0.00
	(1.51)	(1.27)	(1.46)		(1.29)	(1.75)	
$COLL$	4.09	4.76	3.59	0.00	4.51	3.81	0.00
	(5.19)	(5.61)	(4.81)		(5.23)	(5.09)	
AGE	32.29	40.67	29.97	0.00	44.24	35.20	0.00
	(31.71)	(32.11)	(30.69)		(32.60)	(30.63)	
$GROWTH$	0.12	0.07	0.16	0.00	0.10	0.14	0.00
	(0.30)	(0.22)	(0.35)		(0.27)	(0.34)	

Notes. The Table reports sample means with standard deviations in parentheses. The p-value of a test of the equality of means is reported. The sample period is 1995-2004, the number of firms is 933 and the number of observations is 6587. *Issuers* are those firms that issued a bond at any time during the sample period. *Non-Issuers* are those firms that never issued bonds in our sample period. *Steady quality* are those firms whose implied bond rating has not been downgraded during the sample period. *Not steady quality* are those firms whose implied bond rating has been downgraded at least once in the sample period. LEV: Total debt to total assets. $PROF$: Earnings before interest and taxes to total assets. $CAPEX$: Capital expenditures to total assets. COV: Earnings before interest and taxes to total interest expenses. $S\&PRATING$: Standard and Poor's issuer rating. $IMPLIED\quad RATING$: Spread implied rating calculated as shown in footnote 17). $SIZE$: The logarithm of real total assets. $COLL$: Tangible assets over total assets. AGE: The difference between the present year and the year of incorporation. $GROWTH$: Growth in sales.

Table 2

BASELINE MODEL

	Probit	Marginal Effects	Probit	Marginal Effects
LEV	0.002	0.0001	0.003*	0.0002
	(1.34)		(1.82)	
PROF	0.014***	0.004	0.013***	0.004
	(3.68)		(3.53)	
COV	-0.003**	-0.001	-0.003**	-0.001
	(-2.30)		(-2.07)	
CAPEX	0.019***	0.005	0.018***	0.005
	(3.38)		(3.19)	
SIZE	0.368***	0.113	0.368***	0.112
	(16.29)		(16.29)	
BANKFIN	-0.006*	-0.001	-0.007**	-0.001
	(-1.78)		(-2.04)	
EQFIN	-0.001	-0.0001	-0.001	-0.0001
	(-1.15)		(-1.31)	
RULE 144*A*	-0.370***	-0.118	-0.381***	-0.120
	(-7.17)		(-7.34)	
RELATIONSHIP	0.369***	0.102***		
	(5.58)			
LOAN YIELD			0.671***	0.162
			(8.27)	
Observations	4,455		4,455	
R-squared	0.28		0.28	

Notes. The Table reports the effects of the variables listed on the probability to issue bonds by a probit model, as shown in equation (3). The dependent variable is a dummy equal to one if the firm is a bond issuer, and zero otherwise. The marginal effects evaluated at covariate means. Robust z-statistics are reported in the parentheses. Time-dummies and industry dummies were included in the model. LEV is the ratio of total debt over total assets. PROF is the ratio of earnings before interest and taxes to total assets. COV is measured as earnings before interest and taxes to total interest expenses. CAPEX is the ratio of capital expenditures to total assets. SIZE denotes the logarithm of real total assets. BANKFIN is defined as short-term debt to total assets. EQFIN is defined as equities over total assets. RULE 144A is a dummy equal to one if the bond has been issued in the private market under the 144A rule and zero otherwise. RELATIONSHIP is a dummy which takes the value one if the firm has used the same lead manager in its loan deals more than one time. LOAN YIELD is a dummy which takes the value one if all loans of the firm are classified as investment grade and zero otherwise. All firm-specific variables are lagged one period. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3

Model with bond market signals

	Probit	Marginal Effects	Probit	Marginal Effects
LEV	0.005***	0.002	0.006***	0.002
	(2.87)		(3.33)	
PROF	0.011***	0.003	0.011***	0.003
	(2.93)		(2.78)	
COV	-0.003**	-0.001	-0.003**	-0.001
	(-2.23)		(-1.98)	
CAPEX	0.024***	0.007	0.022***	0.007
	(4.29)		(4.06)	
SIZE	0.419***	0.128	0.420***	0.127
	(17.71)		(17.80)	
STEADY_RECORD	0.621***	0.190	0.629***	0.190
	(11.46)		(11.61)	
BANKFIN	-0.007**	-0.002	-0.008**	-0.002
	(-2.18)		(-2.42)	
RULE 144*A*	-0.283***	-0.089	-0.291***	-0.091
	(-5.32)		(-5.46)	
RELATIONSHIP	0.402***	0.112		
	(6.02)			
LOAN YIELD			0.714***	0.171
			(8.69)	
Observations	4,455		4,455	
R-squared	0.40		0.39	

Notes. The Table reports the effects of the variables listed on the probability to issue bonds by a probit model, as shown in equation (4). The dependent variable is a dummy equal to one if the firm is a bond issuer, and zero otherwise. The marginal effects are evaluated at covariate means. Robust z-statistics are reported in the parentheses. Time-dummies and industry dummies were included in the model. *STEADY_QUAL* is a dummy which is equal to one if firms' bond implied rating has not been downgraded in the sample and equal to zero otherwise. LEV is the ratio of total debt over total assets. PROF is the ratio of earnings before interest and taxes to total assets. CAPEX is the ratio of capital expenditures to total assets. SIZE denotes the logarithm of real total assets. BANKFIN is defined as short-term debt to total assets. RULE 144A is a dummy equal to one if the bond has been issued in the private market under the 144A rule and zero otherwise. RELATIONSHIP is a dummy which takes the value one if the firm has used the same lead manager in its loan deals more than one time and zero otherwise. LOAN YIELD is a dummy which takes the value one if all loans of the firm are classified as investment grade and zero otherwise. All firm-specific variables are lagged one period. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4

Model with bond market signals

investment grade ratings

	Probit	Marginal Effects	Probit	Marginal Effects
LEV	0.005***	0.002	0.006***	0.002
	(2.75)		(3.20)	
PROF	0.010***	0.003	0.009**	0.003
	(2.58)		(2.40)	
COV	-0.003**	-0.001	-0.003*	-0.001
	(-2.15)		(-1.94)	
CAPEX	0.023***	0.007	0.021***	0.006
	(4.12)		(3.89)	
SIZE	0.406***	0.124	0.406***	0.122
	(17.24)		(17.26)	
GOOD_RECORD	0.662***	0.195	0.670***	0.195
	(12.12)		(12.27)	
BANKFIN	-0.007**	-0.002	-0.008**	-0.002
	(-2.16)		(-2.40)	
RULE 144*A*	-0.285***	-0.090	-0.295***	-0.092
	(-5.39)		(-5.55)	
RELATIONSHIP	0.353***	0.099		
	(5.31)			
LOAN YIELD			0.672***	0.163
			(8.20)	
Observations	4,458		4,458	
R-squared	0.41		0.42	

Notes. The Table reports the effects of the variables listed on the probability to issue bonds by a probit model, as shown in equation (4). Only firms with investment grade implied ratings are considered. The dependent variable is a dummy equal to one if the firm is a bond issuer, and zero otherwise. The marginal effects are evaluated at covariate means. Robust z-statistics are reported in the parentheses. Time-dummies and industry dummies were included in the model. *GOOD_QUAL* is a dummy which is equal to one if firms' investment grade bond implied rating has not been downgraded in the sample and equal to zero otherwise. LEV is the ratio of total debt over total assets. PROF is the ratio of earnings before interest and taxes to total assets. CAPEX is the ratio of capital expenditures to total assets. SIZE denotes the logarithm of real total assets. BANKFIN is defined as short-term debt to total assets. RULE 144A is a dummy equal to one if the bond has been issued in the private market under the 144A rule and equal to zero otherwise. RELATIONSHIP is a dummy which takes the value one if the firm has used the same lead manager in its loan deals more than one time and equal to zero otherwise. LOAN YIELD is a dummy which takes the value one if all loans of the firm are classified as investment grade and equal to zero otherwise. All firm-specific variables are lagged one period. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5

Excluding financials

	Probit	Marginal Effects	Probit	Marginal Effects
LEV	0.006***	0.002	0.007***	0.002
	(2.59)		(2.94)	
PROF	0.015***	0.004	0.013***	0.004
	(3.51)		(3.23)	
COV	-0.004**	-0.001	-0.003*	-0.001
	(-2.30)		(-1.94)	
CAPEX	0.025***	0.007	0.023***	0.007
	(3.95)		(3.65)	
SIZE	0.419***	0.125	0.427***	0.125
	(15.11)		(15.46)	
STEADY_RECORD	0.600***	0.182	0.621***	0.186
	(9.49)		(9.83)	
BANKFIN	-0.008*	-0.002	-0.007	-0.002
	(-1.66)		(-1.51)	
RULE 144*A*	-0.283***	-0.087	-0.273***	-0.082
	(-4.73)		(-4.53)	
RELATIONSHIP	0.450***	0.119		
	(5.82)			
LOAN YIELD			0.819***	0.181
			(8.60)	
Observations	3,482		3,482	
R-squared	0.39		0.40	

Notes. The Table reports the effects of the variables listed on the probability to issue bonds by a probit model, as shown in equation (4). Financials are excluded from the estimated equation. The dependent variable is a dummy equal to one if the firm is a bond issuer, and zero otherwise. The marginal effects are evaluated at covariate means. Robust z-statistics are reported in the parentheses. Time-dummies and industry dummies were included in the model. *STEADY_QUAL* is a dummy which is equal to one if firms' bond implied rating has not been downgraded in the sample and equal to zero otherwise. LEV is the ratio of total debt over total assets. PROF is the ratio of earnings before interest and taxes to total assets. CAPEX is the ratio of capital expenditures to total assets. SIZE denotes the logarithm of real total assets. BANKFIN is defined as short-term debt to total assets. RULE 144A is a dummy equal to one if the bond has been issued in the private market under the 144A rule and equal to zero otherwise. RELATIONSHIP is a dummy which takes the value one if the firm has used the same lead manager in its loan deals more than one time and equal to zero otherwise. LOAN YIELD is a dummy which takes the value one if all loans of the firm are classified as investment grade and equal to zero otherwise. All firm-specific variables are lagged one period. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6

Including lagged firm rating

	Probit	Marginal Effects	Probit	Marginal Effects
LEV	0.003	0.001	0.004	0.001
	(1.52)		(1.64)	
PROF	0.007*	0.002	0.007	0.002
	(1.65)		(1.48)	
COV	-0.003**	-0.001	-0.003*	-0.001
	(-1.99)		(-1.77)	
CAPEX	0.029***	0.007	0.027***	0.006
	(4.48)		(4.20)	
SIZE	0.329***	0.079	0.333***	0.079
	(11.93)		(12.05)	
STEADY_RECORD	0.553***	0.136	0.558***	0.135
	(9.12)		(9.15)	
S&PRATING-LAGGED	-0.136***	-0.033	-0.119***	-0.028
	(-3.96)		(-3.44)	
BANKFIN	-0.006*	-0.002	-0.007*	-0.002
	(-1.68)		(-1.80)	
RULE 144*A*	-0.260***	-0.065	-0.264***	-0.066
	(-4.35)		(-4.41)	
RELATIONSHIP	0.439***	0.092		
	(5.93)			
LOAN YIELD			0.635***	0.117
			(7.16)	
Observations	3,730		3,730	
R-squared	0.38		0.38	

Notes. The Table reports the effects of the variables listed on the probability to issue bonds by a probit model, as shown in equation (4) augmented with the lagged firm rating. The dependent variable is a dummy equal to one if the firm is a bond issuer, and zero otherwise. The marginal effects are evaluated at covariate means. Robust z-statistics are reported in the parentheses. Time-dummies and industry dummies were included in the model. *STEADY_QUAL* is a dummy which is equal to one if firms' bond implied rating has not been downgraded in the sample and equal to zero otherwise. LEV is the ratio of total debt over total assets. PROF is the ratio of earnings before interest and taxes to total assets. CAPEX is the ratio of capital expenditures to total assets. SIZE denotes the logarithm of real total assets. BANKFIN is defined as short-term debt to total assets. SPRATING-LAGGED denotes the lagged Standard and Poor's issuer rating. RULE 144A is a dummy equal to one if the bond has been issued in the private market under the 144A rule and equal to zero otherwise. RELATIONSHIP is a dummy which takes the value one if the firm has used the same lead manager in its loan deals more than one time and equal to zero otherwise. LOAN YIELD is a dummy which takes the value one if all loans of the firm are classified as investment grade and equal to zero otherwise. All firm-specific variables are lagged one period. * significant at 10%; ** significant at 5%; *** significant at 1%.

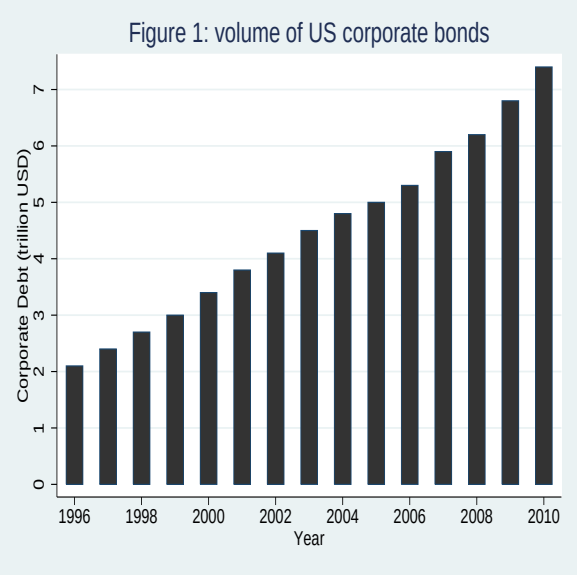


Figure 2. Timeline