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ISSUE FREQUENCY AND THE DETERMINANTS OF
DEBT MATURITY*

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With Good Reputation Size Does not Matter: Issue Frequency and the Determinants of Debt Maturity

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WITH GOOD REPUTATION SIZE DOES NOT MATTER: ISSUE FREQUENCY AND THE DETERMINANTS OF DEBT MATURITY

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Abstract

This paper examines empirically the effect firm reputation has on the determinants of debt maturity. Utilising data from European primary bond market between 1999 and 2005, I find that the maturity choice of issuers with a higher reputation is less sensitive to macroeconomic conditions, market credit risk-premiums, prevailing firm credit quality and size of the debt issue. The annualised coupon payments are shown to be a significant factor in determining the debt maturity and reveal a monotonously increasing relationship between credit quality and debt maturity once controlled for. Finally, I show that issuers lacking a credit rating have an implied credit quality positioned between investment-grade and speculative-grade debt.

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INTRODUCTION

This paper examines empirically the effect firm reputation has on the determinants of debt maturity. Theoretical papers provide us with variable projections on a firm's choice of debt maturity, ranging from the matching of asset-maturity to tax-relief benefits and comprising various signalling effects based on information asymmetry and agency cost theories (see e.g. Myers (1977), Brick and Ravid (1985), Flannery (1986), Diamond (1991a)). Diamond (1991b) argues that reputation helps alleviate information asymmetry problems, since reputation implies lower degrees of adverse selection to be present in the future. While empirical research has mainly focused on testing these theories in isolation, my foremost contribution to the existing literature is combining the reputation argument with the debt maturity literature and showing that an issuer's reputation in itself affects the determinants of debt maturity.

Following Guedes and Opler (1996) and Bali and Skinner (2006), I study incremental debt issues, thereby departing from another strand of literature on debt maturity which looks at the entire liability structure on a firm's balance sheet. The advantage of the incremental approach lies in that individual observations on debt maturity are exact and easily identified, while a weakness may be the wide variation in debt issue characteristics. To limit this disadvantage, I incorporate controls for a variety of debt issue features into my model. Utilising data from the European primary bond market between 1999 and 2005, I confirm previous empirical findings by Guedes and Opler (1996), Baker, Greenwood and Wurgler (2003) and Bali and Skinner (2006) that firms choose the maturity of their debt with changes in the level and slope of the yield curve, similar to conclusions that can be drawn from a survey among US chief financial officers conducted by Graham and Harvey (2001). However, while this is true in the aggregate, the sensitivity to these macroeconomic variables and market credit risk premiums differ significantly depending on an issuer's reputation in the market, which I proxy by its frequency to issue bonds.

I also provide evidence of the gradual development of the European debt capital market. Before the introduction of the common currency, most corporate bond issues were made by firms of highest credit qualities (see e.g. Pagano and von Thadden (2004),

p.10). After 1999 and the creation of the Euro-denominated debt capital market, issues of lower credit qualities have dominated the primary bond market, with fully new opportunities to access market-based funding emerging to speculative-grade issuers. The new market place has also been quick to extend the term to maturity available to firms seeking corporate funding in terms of debt capital. By focusing the research on non-financial corporate issuers, I specifically answer questions about the funding of these firms and industries under the new currency and its capital market.

Diamond (1993) shows that firms maximize their debt capacity by bearing short-term senior debt and long-term junior debt. Parallel to Bali and Skinner (2006), I find empirical evidence to confirm Diamond's prediction that debt of junior status has longer maturity than senior debt.

Additionally, I contribute further to the literature by showing that by controlling for coupon payments, a monotonically decreasing risk-maturity relationship is observed for debt issues, while omitting this control variable, as done in earlier work, produces on non-monotonic relationship between credit quality and debt maturity similar to Diamond (1991a). Thus, the credit quality alone is not a key determinant of debt maturity, but in combination with the contractual coupon payments they materially affect the maturity of issued debt. Finally, through this methodology, I am also able to establish an implied credit quality for issuers lacking a credit rating by a credit rating agency, which gives further insight about the firms utilising the bond market for funding.

THEORETICAL FRAMEWORK AND HYPOTHESIS DEVELOPMENT

In this chapter I present the central theories on debt maturity. As the emphasis in this paper lies in factors concerning information asymmetries, I will spend more time discussing related predictions on debt maturity and only briefly touch other strands of theories. The academic literature basically recognises four main classes of theories on the determinants of debt maturity, namely the maturity-matching hypothesis, the tax hypothesis, the agency cost hypothesis, the signalling and liquidity risk hypothesis.

Subordination has further implication on debt maturity. Each of the hypotheses provides variable projections on the choice of debt maturity.

Perhaps the most intuitive of the theories is the maturity-matching hypothesis by Myers (1977), which argues that a firm should match the maturity of its assets with the liabilities it carries. Guedes and Opler (1996), Stohs and Mauer (1996) and the qualitative survey by Graham and Harvey (2001) find empirical evidence to support the hypothesis. Together with the tax hypothesis (see Brick and Ravid (1985)), which states that corporate debt maturity is positively correlated with yield curve movements due to obtained tax shield benefits as interest rates rise, these two theories reflect specific firm-level asset characteristics and functions of corporate tax ratios on the choice of debt maturity.

The third pillar in the theoretical framework on debt maturity is the agency cost hypothesis. Myers (1977) argues that managers, acting on behalf of equity holders, may limit investments since benefits of the exercised growth options may be absorbed by bondholders as payments on risky debt. As a result, stockholders may even reject positive net present value projects. The underinvestment problem can be alleviated by limiting the total amount of debt or by issuing short-term debt, which matures before the growth options are exercised and can be re-priced to reflect new information. In other words, firms holding a wide opportunity set of investments should issue short-term debt. This hypothesis is, however, only supported by weak evidence in the empirical studies by Stohs and Mauer (1996) and Graham and Harvey (2001).

While less tangible, models on information asymmetries help explain debt maturity decisions based on the perceived credit quality of the issuing firm. Flannery (1986) suggests that the debt maturity structure of firm signals private information about the quality of the firm. In a world without costs, a low-quality firm can replicate the debt maturity choices of a high-quality firm. Introducing costs creates a separating equilibrium; utilising shorter maturity debt generates higher costs due to more frequent refinancing, thus separating high-quality firms from low-quality firms, where the former will issue at the short end of the maturity spectrum to signal higher quality, while the latter, unable to pay the reoccurring transaction costs, is forced to issue long-term debt.

Kale and Noe (1990) show that the separating equilibrium can exist even without transaction costs.

Diamond (1991a) presents a similar, albeit non-monotonic relationship between debt maturity and firm quality based on liquidity risk; issuing short-term debt increases the roll-over frequency of debt, thus exposing the firm to greater uncertainty on the availability of funds at each maturity date. High-quality firms, confident of their credit quality and the likelihood of continued funding, will issue short-term debt. The risk of facing an illiquid market gives firms with a lower credit quality an incentive to issue longer term debt. However, “circumventing” liquidity risk by issuing long-term debt may not be an option for very low-quality firms. Instead, they are screened out of the long-term maturity segment due to increasing credit risk premiums further along the credit curve and are, as a consequence, restricted to issue shorter-term debt. Short-term debt is therefore issued by either high- or very low-quality firms, while issuers with credit qualities between these extremes prefer long-term funding. Both Guedes and Opler (1996) and Stohs and Mauer (1996) find empirical evidence supporting Diamond’s and Flannery’s models.

Furthermore, theory suggests an inverse relationship between the seniority of debt and debt maturity. Diamond (1993) shows that firms maximize their debt capacity by bearing short-term senior debt and long-term junior debt. Short-term senior debt is more information sensitive and preferred if firms anticipate positive news to arrive. It also gives control rights to lenders in case of default, at which point lenders prefer to liquidate. Thus, too much short-term debt leads lenders to liquidate too often. By bearing long-term junior debt while allowing additional future debt to be raised, the borrower can alleviate unwanted liquidation. Bali and Skinner (2006) provide empirical evidence confirming Diamond’s prediction.

Problems associated with information asymmetries are predominant when negotiating debt agreements and remain present over the entire lifespan of such contracts. Firms may try to signal their counterparty quality through behaviour, but in many cases such

actions are replicated by the peers from which the firms try to differentiate themselves. Diamond (1991b) argues that reputation “*can eventually deal with moral hazard*”¹ because it implies that less adverse selection will be present in the future. Reputation may therefore be a significant and distinguishable way of alleviating some of the information asymmetry problems. While equity markets and stock exchange regulation obligate their members to reveal information to equity investors and thereby bridging information gaps, the same is not obvious in OTC-type bond markets. The hypothesis I propose suggests therefore that more frequent debt issuers gain from visiting the capital markets regularly and are met more favourably by the investors, where my main argument is that a higher reputation allows a firm to issue debt with longer maturity. Reoccurring debt issuance reveals information about the borrower to debt investors on a continuous basis and helps thereby deal with the information asymmetries. Berger *et al.* (2005) show that the average maturity of bank loans increase significantly when information asymmetries are lessened. From a theoretical perspective, my hypothesis reflects the reputation argument by Diamond (1991b) and it also makes practical sense; if a firm frequently visits the debt capital markets for funding, it reveals information about itself more often and builds up a reputation among debt investors, thus lessening information asymmetries, which in turn should be beneficial to both parties and reflected in the contractual relationship between them.

RESEARCH METHODOLOGY

The study is restricted to Euro-denominated fixed-rate bonds, issued by non-financial firms residing in EMU-countries and spanning a time-period beginning from the introduction of the Euro in 1999 to the year-end 2005. This choice is motivated by several factors; first, the gradual development of the Euro-denominated corporate bond market in terms of maturity spectrum available to corporate bond issuers has so far been undocumented in the literature. Second, concentrating only on non-financial issuers,

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gives specific answers to questions about their ability to adapt to and seek funding from a broader debt capital market. Third, the markets' capacity to absorb maturities by a wide range of different qualities of corporate debt is of interest to academics and practitioners alike. Fourth, bonds with embedded features or varying coupon payments are essentially special cases of plain fixed-rate bonds and are therefore outside the scope of this study.

My model relates the maturity of incremental debt issues to macroeconomic factors with control variables for firm-quality and issue-specific characteristics. Using this incremental approach for testing the debt maturity theories is twofold; its strength lies in that individual observations on debt maturity are exact and easily identified, while a weakness may be the wide variation in debt issue characteristics. As a result, my model includes variables to control for the varying characteristics of the bonds in the final sample.

The model:

$$MAT_i = \alpha_i + \beta_1^{[-]} LEVEL_t + \beta_2^{[-]} SLOPE_t + \beta_3^{[+/-]} BBBAAA_t + \beta_4^{[+]} COUPON_i + \beta_5^{[+]} SIZE_i + \beta_6^{[+/-]} BOOKRUN_i + \beta_8^{[+/-]} QUAL_i + \beta_7^{[+]} SUB_i + \varepsilon_i$$

The dependent variable MAT_i is the natural log of one plus the maturity of bond i measured in years², $LEVEL_t$ is the 3 month EURIBOR-rate at time t , $SLOPE_t$ is measured as the difference between the yield of 10-year government bonds and the 3-month EURIBOR rate at time t , $BBBAAA_t$ is the market credit risk premium measured as the yield spread difference between AAA-rated and BBB-rated corporate bonds observed in the market, $CUOPON_i$ is the annualised fixed coupon of issue i , $SIZE_i$ is the log of the amount of debt issued in million euros, $BOOKRUN_i$ is the allocation power of issue i , estimated by the number of financial institutions involved in the sale of the transaction. $QUAL_i$ and SUB_i are categorical dummy-variables, where the former

² Following Berger *et al* (2005), the one in $LN(1+Maturity)$ is included to avoid taking the log of a value close to zero, which would yield negative log maturities.

reflects the credit quality of an issuer determined by a credit rating from either Moody's, Standard&Poor's or both and the latter indicates whether the issued debt is contractually subordinated and has a junior debt status. Superscripts indicate the expected sign of the coefficients in the model.

Determining reputation

To test whether firm reputation affects the maturity of debt, I observe the frequency of issuance for each individual firm over the entire sample period. I categorise issuers as '*frequent*' or '*infrequent*' based on the absolute number of issues they make during the seven year sample period and perform separate model-regression for each category. Firms with seven or more issues – equivalent to at least one issue per year on average – are categorized as frequent issuers, while those with six bond issues or less are denoted infrequent issuers. This technique may seem artificial, since the issue-frequency is observed ex post, while the hypothesis implies that reputation has an ex ante effect on debt maturity. In effect, I make the assumption that an issuer has a given reputation before the start of my sample period and that the in-sample issue-frequency is representative of previous behaviour. Lastly, I categorise one-time issuers separately, resulting in three different groups of issuers; *single* issuers, *infrequent* issuers with 2-6 debt issues and *frequent* issuers with 7 or more issues in total. As these threshold values are not derived from theory, but rather a result of arbitrary definition, I also report regression results for subgroups of the infrequent category in order to highlight the transitional effects an increasing reputation (issue-frequency) has on debt issues.

DATA AND DESCRIPTIVE STATISTICS

The data set originates from the Dealogic database, containing issue-specific information on Euro-denominated bond issues made by EMU-country residents from January 1st, 1999 to December 31st, 2005.

Raw data comprises 12.060 observations. I eliminate issues by governments³, supranationals, financial institutions and any linked category based on the issuer type and issuer industry coded in the database. I further exclude floating-rate issues; collateralized or covered bonds; bonds with various embedded option-features; currency-, inflation- or index-linked bonds; bonds with variable payment schedules; tap-issues⁴; and other irregular features as noted in the database. Unclear entries are cross-referenced with the Thomson ONE Banker database, after which incomplete or missing records are also excluded from the final sample, which thus consists of 739 plain fixed-rate bond-issues by 367 individual non-financial corporate EMU-residents⁵. I use the date of the public announcement of a bond issue to identify it to a specific month in the sample period. Table 1 presents summary statistics for each variable.

Data on interest rates is obtained from the European Central Bank (ECB). All yields are monthly averages quoted at mid-month and weighted by the nominal outstanding amounts of national government bonds in each maturity band. This method is chosen, because at the time of announcing a debt issue, the maturity of the issue has already been selected. Hence, economic conditions affecting the maturity must have been considered prior to the announcement of a debt issue.

International Index Company produces iBoxx bond-indices, which I use for calculation of the credit risk premium between AAA- and BBB-category investment-grade bonds. This data is available from April 1st 1999 onwards.

³ Debt issues which have been granted a state-guarantee of repayment are also excluded.

⁴ Tap-issues are re-issues of a bond, executed in varying amounts and at different times, usually in response to investor demand. The main terms of the bond (issuing conditions, coupon and maturity) remain unchanged, but the issue price can vary according to market conditions. Tap-issues on bonds are thus left outside the sample, since they would induce a bias as the same bond appears multiple times in the sample.

⁵ All non-financial corporate issuer residing within the EMU-area are considered; Austria, Belgium, Finland, France, Germany, Greece (2001), Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain. However, issuers in related colonies or territories to EMU countries, such as the French Polynesia or the Netherlands Antilles are omitted. On the other hand, issues by subsidiaries to other than EMU-residents are left in the sample; e.g. Toyota's European arm, Toyota Motor Finance BV located in the Netherlands belongs to the final sample.

A credit rating by Moody's, Standard and Poor's or both has been assigned to 635 of the 739 bonds in the sample. I recode the rating categories with integer numbers in ascending order, where the highest AAA/Aaa-rating is coded as "1" and the lowest CCC/Caa is coded as "7". For issues with split ratings, a composite rating is calculated corresponding to an average of the values of the separate ratings assigned by the rating agencies. Unrated issues are coded as zero. The rating scales and their corresponding values are shown in table 2.⁶

Chart 1 shows six panels on the distribution of issues by rating categories and different maturity classes over the sample period and highlights a few key insights. Panel 1 graphs the stacked movement of the 3-month interest rate, the slope of the yield curve and the market credit risk premium over the sample period. We observe large fluctuations in the short-end level of interest rates in the beginning of the period, while it has remained low and stable during the last three years. The slope of the yield curve has always remained positive, but was almost flat in early 2001. Based on survey results by Graham and Harvey (2001), we can expect that the larger the difference between the slope and level curve, the more attractive is short term debt issuance to firms. We also notice that the peak of interest rate level in late 2000 is higher than the combination of the short-term rate plus the yield curve slope mark-up from mid-2002 onwards. Meanwhile, the market credit risk premium has fluctuated between 0.497 and 2.192, reaching its peak in august 2002. Lastly, we observe that during the last year of the sample period, the overall issuance cost for long term debt including a credit risk premium is lower than the short-end cost of issuance in early 2001, meaning that a high quality firm issuing a short term bond in early 2001 paid a similar or higher fixed coupon than a firm of lower quality with long term maturity debt during the last years included in the sample.

In panel 2 we see that issues belonging to rating categories A and BBB are predominant among the rated issues represented in the sample. Unrated issues account for roughly 15% of the total number of issues in the sample, but their relative number seems to

⁶ See appendix 1 for a complete summary of the variables and related data sources.

decrease towards the end of the sample period. By contrast, there appears to be an increase in speculative-grade issues. In panel 3 we observe that the speculative-grade issuers target almost uniquely the 5-10 year maturity segments and are not present in either very long or short maturity categories, while lower investment-grade categories A and BBB utilise shorter maturities. This separation between lower investment-grade and speculative-grade issues follows Diamond (1991a) suggestion that lower quality firms issue longer term debt to minimize liquidity risk problems. Interestingly, almost two-thirds of the unrated issues are shorter than five years, perhaps reflecting higher information asymmetries due to lacking credit ratings, while the highest quality firms (AAA and AA rated) issue debt in relative terms more evenly over the entire maturity spectrum.

Panel 4 graphs the distribution of issues grouped by maturity classes. Two distinct features can immediately be observed; the diminishing number and quantity of short maturity issues and the birth of bonds with a maturity exceeding 15 and 25 years. This may in part be due to the favourable interest rate environment during the latter part of the sample period, but likewise evidence of a maturing and broadening market. The development of the European bond market is visible in panel 5, which shows the average credit rating in each maturity class excluding the unrated issuers. We see that the average numeric credit rating increases, denoting lower credit quality, in almost all maturity classes over time. This is indicative of the gradual development of the debt capital markets and its ability to absorb a wider variety of debt by issuers of different credit qualities. The phenomenon is especially visible in the categories for bonds with a maturity of 10 to 15 years and 15 to 25 years. Interestingly, the longest dated bonds start with a higher average credit rating (lower credit quality), which is in part due to the relatively few bonds belonging to this category, with only 11 issues at maturities exceeding 25 years during the entire sample period. For instance, the first column in this maturity class corresponds to a single issue made by Olivetti Finance NV, which came to the market with a 30-year bond under a BBB/Baa-credit rating, equalling a numeric value of four. Nevertheless, issuers of lower investment-grade quality have made the

inaugural issues of very long-dated bonds⁷. Another noteworthy characteristic is the increase in credit quality (lower numeric rating) in the shortest maturity segment towards the end of the sample period, a time characterised by low interest rates and a steep yield curve. This may again be indicative of Diamond's (1991a) argument that high-quality firms issue short when they anticipate beneficial news when coming out of a period of a generally sluggish economic environment. Alternatively, the demand for issues by the highest quality firms in the longer maturity segments may be low, as investors seek higher yields in assets of lower quality firms at times when credit risk premiums are narrow.

Finally, panel 6 of chart 1 presents the average coupon paid in each maturity class grouped by rating categories. It is apparent that longer maturity correlates positively with higher coupon payments. This is mostly true for all issues with a credit rating, while the unrated category displays a negative correlation. I believe this is a result of the diminishing presence of unrated issuers in the market, as we have seen in panel 2, combined with the fact that the majority of issues by unrated firms were initially made in the short maturity segments when interest rates were high. These unrated issuers paid thus a relatively high coupon for short maturity debt, while only a small number of unrated firms secured their funding at lower coupon rates when interest rates were lower with a slightly higher maturity. Also note that unrated issuers are completely absent from maturity classes exceeding 10 years. Another clear feature of the coupon payments is their dramatic increase when credit quality deteriorates to speculative-grade segment, a direct consequence of the higher default rates recorded for the lower quality credits.

Panels 1 and 2 of table 3 present the average maturity by credit quality and year across the different reputation categories. Overall, we see single issuers being more restricted by maturity than repeating, infrequent issuers, confirmed in panel 3 by the difference in mean test. Issuers deemed frequent issue bonds with comparable average maturity as single issue firms. Maturity exhibits a humped shape across the reputation categories,

⁷ The first and only 50-year bond in the sample was issued by Telecom Italia SpA in March 2005, bearing a BBB/Baa-credit rating.

which has parallels to Diamond (1991a) non-monotonic relationship between credit quality and maturity. Thus, it would appear that the reputation of an issuer yields similar maturity characteristics as credit quality, where the highest category issues short term debt, the middle category issues long term debt and the lowest category is screened out of the long term segment and forced to issue short. We also observe that the standard deviation of maturity for both infrequent and frequent issuers is higher than for single issuers. We also note that firms lacking a credit rating issue to shortest maturity debt; unrated issuers face the highest degree of information asymmetry and may try to signal private information about their credit quality by issuing short term debt, as suggested by Flannery (1986).

EMPIRICAL EVIDENCE

Employing the model presented earlier, I evaluate the determinants of debt maturity. Columns I through IIII in table 4 present results for regression including macroeconomic variables and issues-specific controls. Results confirm previous findings by Guedes and Opler (1996), Baker, Greenwood and Wurgler (2003) and Bali and Skinner (2006) that firms in the aggregate do respond to the level and shape of the yield curve, while the market credit risk premium variable BBAAA appears insignificant.⁸ The SIZE variable appears positive and significant; large firms are the most likely candidates to issue sizeable bonds and we can rationalise that the larger the bond issue, the larger the issuing firm and the longer the maturity of issued debt. This finding gives indirect evidence of Myers' (1977) proposition that smaller (growth) firms issue short term debt to alleviate agency problems, while large, well-established firms issue longer debt. Stohs and Mauer (1996) find moderate empirical evidence to support the theory. By contrast, Guedes and Opler (1996) use firm size as a control for credit quality and attribute their similar finding to Diamond's (1991a) model of debt maturity and credit quality, where firms of lower quality (smaller size) are screened out of the

⁸ By including the risk premium BBAAA variable, I lose 32 observations on individual bond issues from the regressions, since this data is not available before April 1st, 1999.

long-term end of the maturity spectrum. The annual coupon of an issued bond (COUPON) is significant at a 1% level, implying that the market seems concerned with the duration, not necessarily the absolute maturity of the issued bond. All signs are as predicted.

Columns V through VIII introduce dummy variables for credit rating categories, where the omitted category represents the BBB/Baa-credit rating⁹. LEVEL and SLOPE variables are found consistently significant. Similar to reported findings by Bali and Skinner (2006) but in contrast with evidence by Baker, Greenwood and Wurgler (2003) the full-model regression in column VIII displays the risk premium variable BBBAAs as significant. Bali and Skinner (2006) argue that controlling for credit quality yields a relationship between the market credit risk premium and the maturity of debt, which is negative for lower quality issuers and positive for high quality issuers. However, when the model specification excludes the COUPON variable, we find the risk premium variable insignificant in columns VI and VII of table 4. The risk premium variable is also found insignificant in Bali and Skinner's (2006) full-sample regression (corresponding to the regression in column VII), but the authors find the risk premium variable significant when they perform separate regression for each rating category. Controlling for both credit quality and size of the coupon on a full-sample regression as I report in column VIII captures the opposing relationships between the maturity of debt and the high- contra low-quality issuers.

Comparing columns VII and VIII, we observe the effect of omitting the COUPON variable from the model specifications; coefficients for the credit rating dummies are non-monotonously increasing with credit quality in column VII. The result is obvious; as seen in panel 6 of the chart 1, lower quality debt must pay a higher coupon to receive funding. Excluding the coupon variable from the regression does not relate the cost of funding to debt maturity. Indeed, sample statistics show that on average, speculative-

⁹ Bonds issued by issuers with a BBB/Baa-rating are predominantly represented in the sample along with A-rated issues. The BBB/Baa-category is, however, more interesting since it borders with the speculative-grade ratings and is a distinct divider of the two super-categories. Therefore, this category is the chosen as the base category to limit problems of too few observations as the sample is split up further.

grade firms issue longer maturity debt than lower investment-grade (A and BBB) firms, while the highest quality issuers receive – on average – longest term on their debt.¹⁰ However, we wish to examine the true determinants of debt maturity, where we need to consider the coupon payments that speculative-grade issuers are required to make in order to receive such funding. We notice that the debt maturity is determined significantly by the combination of both the credit quality and coupon payments, resulting in the monotonously increasing relationship between credit rating and debt maturity.¹¹ We also notice a considerable increase in the adjusted R-squared value from 0.26 to 0.44 when the coupon variable is included in the regression model. All rating dummies are significant at 1% in the full model in column VIII. In addition, this methodology allows us to observe an implied credit quality for firms lacking a credit rating based on their position in the maturity spectrum, appearing between low investment-grade and high speculative-grade credit quality.

As predicted by Diamond (1993), the coefficient of the subordinated debt dummy is positive and significant. It should be noted that all 16 subordinated debt issues were made by speculative-grade issuers, which are more likely to default on debt than investment-grade issuers. This behaviour follows likewise Diamond’s predictions that junior debt is issued to alleviate liquidation in case of default.

Reputation and the determinants of debt maturity

Diamond (1991b) suggests that reputation can help deal with problems involving information asymmetries. Unlike equity markets, where regulation obligates members to reveal information about them on a continuous basis, OTC-type bond markets do not have direct mechanisms for providing investors with information on a regular basis. As a result, “bondholder value” – a term synonymous with transparency and information content specifically directed to debt investors – has made a debut in recent years to cater information demands specific to debt investors. For individual debt issuers, reputation

¹⁰ Table 3, panel 1

¹¹ Appendix 2 seeks to explain this relationship in further detail by showing numeric values of chart 1 panel 5 on the average coupon payments for different maturities

may be beneficial if it involves bridging information gaps between the issuer and debt investors by repeatedly visiting the market with new debt issues and thereby providing the market with firm specific information. Table 5 presents results of industry fixed effects regressions for each reputation category, with the infrequent issuer category split further into sub-groups. Recall that the omitted credit rating category is the BBB/Baa-grade, which is the lowest credit rating in the investment-grade super-category and thus borders with the speculative-grade super-category. The full-sample regression results in column I are similar to the ones shown in column VIII of table 4, with the exception of the SUB-variable which now appears insignificant, although the coefficient is of similar magnitude. The variable representing the amount of debt issued is significant with a positive sign for all regressions, consistent with the size-effect in Myers' (1977) agency-cost hypothesis. Similarly, the COUPON variable is highly significant and positive.

Single issuers are sensitive to all three macroeconomic variables. Regression results for this group present a very noteworthy phenomenon, namely, that all the credit quality dummies are insignificant for the single issuers, indicating that regardless of their credit quality, firms are unable to obtain significantly different maturities on their debt. Or, put in another way, the low reputation of these issuers overwhelms their credit quality, restricting differentiation between the firms in terms of maturity. Also, the COUPON-variable coefficient is lower than in any other reputation group, showing that an incremental increase in coupon payments does not increase the maturity of debt as much as for issuers of higher reputation.

For infrequent issuers, all macroeconomic factors are consistently significant at 1% level, with the exception of market credit risk premium variable BBBAAA in the subgroup of firms with 4-6 bond issues in column VI. Debt status dummy SUB is found weakly significant as a determinant of debt maturity in column V, with positive and expected sign. Interestingly, the BOOKRUN-variable appears weakly significant with a negative sign in column VI. I believe this relationship is a result of a disproportionately

high involvement of book-runners in sales of relatively short dated bonds in this group, a characteristic typical among large firms with many bank relationships to nurture.¹² Maturity separation between different credit qualities appears strong; in general, the relationship between maturity and credit quality remains monotonically increasing with the control for coupon payments included in the regression. Speculative-grade issuers receive shorter maturity, with all coefficients negative and statistically highly significant. Due to rising cost of financing in terms of coupon payments, speculative-grade issuers are screened from the longest maturity segments, parallel to predictions by Diamond (1991a). However, the effect of credit quality diminishes with increased firm reputation, as shown in column VI, where investment-grade credit quality dummies are all found insignificant.

Finally, column VII shows the industry fixed effects regression for the frequent issuers. We notice that the macroeconomic variable representing the slope of the yield curve appears insignificant, while the variable measuring the level of short end interest rates remains highly significant. Credit risk premium variable BBAAA has also lost its explanatory power in the regression, while the size of the issue, the number of book-runners involved in the sale of the bond and the annualised coupon are found statistically significant at a 5% level. Speculative-grade issuers are absent from the category and no debt issues of junior status have been made by issuers categorised as frequent. All signs remain as expected. Similar to the infrequent issues subgroup with 4-6 issues, the credit quality yields no apparent separation in maturity for frequent issuers, apart from the highest rated AAA-category. Adjusted R-squared values vary between 0.44 and 0.58 for the regressions with industry fixed effects included.

Robustness check

Of the total number of 24 industry sectors, only nine are present in the frequent issuer category, signifying strong variability between industries to issue bonds. Table 6 shows

¹² This group is the only one with bonds featuring up to eight book-runners and 60% of all issues with more than 4 book-runners are made by firms belonging to the subgroup of infrequent issuers with 4-6 issues.

that out of the 24 industry sectors, a cluster of five industry sectors issue half of all the bonds in the sample¹³. This inevitably gives rise to questions of whether it is plausible to assume that the issuers within these groups are homogenous in character and could there still exists unobserved heterogeneity *within* the industry groups? Have all firms within industries similar principles of funding their business operations and do they have comparable capital structures? Also, recall that only a limited number of individual issuers are actually categorised as frequent, while the number of issues by members of this category is high, meaning that multiple issues by individual firms are present in the regressions of frequent issuers. Could this induce a selection bias between the reputation groups within industry sectors?

To answer these questions, I perform regressions on the sub-samples of frequent and infrequent issuers with firm fixed effects included; table 7 presents the results of these regressions, where the similarities with previous regressions are noticeable. Macroeconomic variables do not show any significant changes compared with industry fixed effects regression. The first apparent difference is the lack of significance for the SIZE-variable in the sub-groups of the repeating issuers. Secondly, we observe that the subordinated debt dummy variable appears significant for the infrequent issuer group, validating theoretical predictions by Diamond (1993) that the maturity of junior debt has longer term than senior debt. Looking at the main reputation classes, we notice that the credit rating dummies are largely insignificant for investment-grade debt, with the exception of the dummy variable representing the highest AAA-credit quality in the infrequent-issuer category. However, dummies for the speculative-grade rating categories BB, B and CCC appear significant with expected negative sign in the full-sample regressions in column I and for the infrequent issuer groups in columns III through VI. These results are interesting for a number of reasons; first, it implies that rating changes within the investment-grade credit quality segment does not have a significant affect in determining the maturity of debt for a given issuer. Secondly, firms

¹³ Sectors include: “Telecoms/Communications”, “Energy/Utility”, “Automotive”, “Food & Drink” and “Retailing & Consumer goods”. The industries roughly correspond to the sectors classified by Bali and Skinner (2006) as having long-term assets on their balance-sheets.

with speculative-grade credit worthiness are significantly affected by their credit quality as a determinant of debt maturity. Third, information asymmetries are large for unrated single issuers; the OLS regression in column II shows that the dummy for unrated issuers stands out as the only statistically significant rating dummy at a 10% level with a negative coefficient. The unrated dummy in the regression on a sub-sample of firms with two bond issues in column III requires some attention; here, the unrated dummy variable is *positive* and weakly significant. The reason is that for this subgroup, the unrated issuers actually pay on average a *lower* coupon than the reference BBB-rated issuers, yielding a positive sign for the dummy variable.

The last column in table 7 presents the fixed effects regression for frequent issuers. There are 142 bond issues in this category made by 16 firms. Similarly to the industry fixed effects regression, we observe that the only variables showing statistical significance are the macroeconomic variable LEVEL, the annualized coupon and the BOOKRUN-variable. None of the rating-dummies are significant, not even the unrated-dummy.

DISCUSSION AND CONCLUSIONS

The main finding in this paper suggests that repeated bond issues bridge information gaps and firms with multiple issues are rewarded with market recognition and increase flexibility in choosing the maturity of issued debt.

Maturity choice is largely dependent on the prevailing macroeconomic conditions. I confirm previous findings by Guedes and Opler (1996), Baker, Greenwood and Wurgler (2003) and Bali and Skinner (2006) that firms choose the maturity of incremental debt issues with changes in the level and slope of the yield curve. However, while this is true in the aggregate, I observe significant variations in the sensitivity to these macroeconomic conditions depending on the issuer's propensity to issue bonds. Firms issuing bonds more frequently are less sensitive to the slope of the yield curve and the market credit risk premium when choosing the maturity of their debt.

Issuers deemed frequent or infrequent are also of higher credit quality than one-time issuers. While Bali and Skinner (2006) find substantial variation in debt maturity within

credit categories, we have observed that frequent issuers and one-time issuers have a similar average maturity of issued debt, but frequent issuers display greater variation on the debt maturity for different qualities of credit. Thus, variability in maturity is not only conditional on credit quality alone, but also related to the reputation of an issuer.

Credit quality itself has a high impact on the issued maturity. I contribute to previous literature by showing for the first time that controlling for coupon payments yields a monotonically decreasing risk-maturity relationship, when omitting this control produces on non-monotonic relationship between credit quality and debt maturity similar to Diamond (1991a). While speculative-grade quality firms issue on average longer term debt than lower investment-grade issuers, they are screened out of the longest maturity segments due to increased costs in terms of annualised coupon payments. Unlike investment-grade issuers, the frequency of issue bears no effect on the speculative-grade issuers, who do not see an increase in the variability of debt maturity for more frequent issuers. It would also appear that the most frequent, good quality issuers are neither inclined to extend their debt maturity through bond markets nor affected by general macroeconomic condition when choosing their maturity of debt. The frequent use of bond markets as a source of debt capital may be a result of firm specific funding policies, making general economic conditions a less prominent driver of maturity choice after firm-specific funding needs are considered. The higher average credit quality of frequent issuers allows them to negotiate debt issues with higher flexibility. By contrast, infrequent issuers seek the longest maturities in the market and similar to single issuers, they time the market by altering their debt maturity according to prevailing economic conditions. It may be that firms in the infrequent group have knowingly set out to build a reputation, in order to access the longer term on debt through by utilising the capital markets.

Subordination of debt is issued with a longer maturity than senior debt. Similar to theoretical predictions by Diamond (1993), issuers of subordinated debt are of lower credit qualities, thus at a higher risk of default and a possible liquidation, which the lower debt status seeks to alleviate. The European capital markets have also had an increasing appetite for lower credit qualities and I have documented the growth of the so called junk bond market in Europe.

I have also shown that the implied credit quality of issuers without a credit rating lies on the edge of speculative-grade and investment-grade credit quality. An interesting extension to the presented empirical evidence would be to assess whether the lack of a credit rating alone determines the debt maturity available to these issuers or whether the term of debt for unrated issuers is driven by firm-specific characteristics, which the market correctly recognises. If the first alternative would turn out to be true, it would be a strong signal of the significance of credit rating agencies as agents in bridging gaps in information asymmetries on the debt capital markets.

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Table 1: Summary statistics

PANEL 1												
Full sample		N	Mean	Std.Dev	Min	p10	p25	Median	p75	p90	Max	
Macroeconomic variables		84	1.473	0.6	0.14	0.62	1.13	1.57	1.93	2.21	2.51	
	Level	84	3.121	0.957	2.03	2.12	2.15	2.94	3.6	4.69	5.09	
	Bbbaa	81	1.208	0.405	0.497	0.808	0.938	1.15	1.358	1.865	2.192	
Issue specific variables		739	7.719	4.645	0.4	3	5	7	10	10.3	50	
	Coupon	739	5.821	2.117	0.1	3.75	4.5	5.375	6.375	9	14.5	
	Size (millions)	739	533.468	546.111	8	100	175	450	750	1000	4500	
	Bookrun	739	2.226	1.154	1	1	1	2	3	4	8	
	Qual	739	3.165	1.763	0	0	2	3	4	6	7	
	Sub	739	0.022	0.146	0	0	0	0	0	0	1	
PANEL 2												
Correlation matrix		Maturity	Level	Slope	Bbbaa	Coupon	Size	Bookrun	Qual	Sub		
	Maturity	1.000										
	Level	0.138	1.000									
	Slope	-0.264	-0.753	1.000								
	Bbbaa	-0.013	-0.174	0.161	1.000							
	Coupon	0.050	0.054	-0.038	-0.097	1.000						
	Size	0.081	-0.108	0.083	0.085	-0.088	1.000					
	Bookrun	0.225	0.111	-0.231	0.039	-0.057	0.490	1.000				
	Qual	0.145	-0.064	0.210	-0.031	0.292	-0.147	-0.168	1.000			
	Sub	0.100	0.097	-0.164	-0.062	0.251	-0.035	0.010	0.556	1.000		

Note: The variables are defined as follows: *Maturity* is the maturity of bond *i* measured in years, *Level* is the 3 month EURIBOR-rate, *Slope* is measured as the difference between the yield of 10-year government bonds and the 3-month EURIBOR, *Bbbaa* is the market credit risk premium measured as the yield spread difference between AAA-rated and BBB-rated corporate bonds observed in the market, *Coupon* is the annualised fixed coupon of issue *i*, *Size* is the amount of debt issued in euros, *Bookrun* is the number of financial institutions involved in the sale of the transaction. *Qual* is a categorical variable identifying the firm's credit rating, where AAA = 1, ..., CCC = 7 and unrated firms receive a code of 0, *Sub* indicates whether the issued debt is contractually subordinated (=1) or not (=0).

Table 2: Credit rating scales by rating agency

Rating agency			Value	# of Obs.
Moody's	Standard & Poor's			
Aaa	AAA	Investment-grade quality	1	51
Aa	AA		2	81
A	A		3	221
Baa	BBB		4	178
Ba	BB	Speculative-grade quality	5	28
B	B		6	82
Caa	CCC		7	17
Ca	CC		8	0
C	C		9	0
D	D		10	0

Chart 1: Selected sample statistics presented graphically

Panel 1

Panel 2

Panel 3

Panel 4

Panel 5

Panel 6

Table 3: Average maturities by reputation categories

Panel 1	I			II			III			IV		
	Full sample			Single issuers			Infrequent 2 - 6 issues			Frequent Issuers 7 issues or more		
	Std.			Std.			Std.			Std.		
Credit Rating	Mean	dev.	# Obs.	Mean	dev.	# Obs.	Mean	dev.	# Obs.	Mean	dev.	# Obs.
AAA	9.31	5.38	51	8.25	5.38	4	9.82	5.68	28	8.78	5.13	19
AA	8.53	4.42	81	7.27	3.50	11	8.41	3.61	42	9.19	5.69	28
A	7.64	4.92	221	7.02	3.14	32	8.33	5.51	145	5.84	3.17	44
BBB	7.51	5.86	178	6.55	2.98	28	8.43	6.71	92	6.50	5.25	58
BB	7.39	1.71	28	7.83	1.92	18	6.6	0.84	10	.	.	.
B	8.7	1.84	82	8.72	1.94	57	8.64	1.63	25	.	.	.
CCC	8.81	1.65	17	9.49	1.05	10	7.83	1.92	7	.	.	.
UNRATED	5.49	2.26	81	5.18	2.16	61	6.23	2.25	19	10	0	1
Total	7.72	4.64	739	7.10	2.84	221	8.33	5.28	368	7.12	4.94	150

Panel 2	I			II			VI			VII		
	Full sample			Single issuers			Infrequent			Frequent Issuers		
	Std.			Std.			Std.			Std.		
Year	Mean	dev.	# Obs.	Mean	dev.	# Obs.	Mean	dev.	# Obs.	Mean	dev.	# Obs.
1999	7.53	2.87	108	7.26	3.04	32	7.73	2.80	51	7.46	2.88	25
2000	6.63	3.07	97	6.42	2.95	33	6.92	3.28	45	6.29	2.84	19
2001	5.87	2.96	134	5.67	2.15	30	6.22	3.00	72	5.25	3.45	32
2002	6.50	4.13	94	5.01	2.60	26	7.73	4.53	50	5.27	3.83	18
2003	9.92	6.54	134	7.62	2.65	37	10.8	7.15	68	10.9	7.87	29
2004	8.66	3.85	90	8.75	2.47	34	9.18	4.67	42	6.89	3.56	14
2005	9.06	5.87	82	8.48	1.93	29	10.2	7.83	40	6.69	3.66	13
Total	7.72	4.64	739	7.10	2.84	221	8.33	5.28	368	7.12	4.94	150

Panel 3	Difference in means		Single issuers			Infrequent			Frequent Issuers		
			Std.			Std.			Std.		
	Diff.	t-stat	Mean	dev.	# Obs.	Mean	dev.	# Obs.	Mean	dev.	# Obs.
Full sample											
Single - Frequent	-0.015	-0.038	7.10	2.84	221				7.12	4.94	150
Single - Infrequent	-1.228	-3.1901***	7.10	2.84	221	8.33	5.28	368			
Infrequent - Frequent	1.213	2.4147***				8.33	5.28	368	7.12	4.94	150

<i>Two-sample t test with unequal variances</i>											
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Table 4: Full sample regressions of MAT

Independent Variables	Dependent Variable : MAT [LN(1+Mat.)]							
	I	II	III	III	V	VI	VII	VIII
SLOPE	-0.101** (-2.58)	-0.104** (-2.56)	-0.0780** (-2.01)	-0.132*** (-3.64)	-0.0943** (-2.48)	-0.0977** (-2.45)	-0.0651* (-1.72)	-0.261*** (-6.23)
LEVEL	-0.191*** (-7.56)	-0.190*** (-7.31)	-0.170*** (-6.78)	-0.233*** (-9.59)	-0.177*** (-7.04)	-0.177*** (-6.78)	-0.146*** (-5.70)	-0.407*** (-10.4)
BBBAAA		-0.0390 (-0.80)	-0.0679 (-1.43)	-0.0590 (-1.32)		-0.0355 (-0.74)	-0.0522 (-1.12)	-0.141*** (-3.45)
SUB			0.323*** (5.09)	-0.0191 (-0.35)			0.107* (1.69)	0.0958* (1.69)
SIZE (LN)			0.135*** (5.91)	0.146*** (6.78)			0.147*** (6.12)	0.0962*** (4.50)
BOOKRUN			0.0186 (0.98)	0.0269 (1.53)			0.0415** (2.08)	0.0206 (1.29)
COUPON				0.0840*** (12.2)				0.227*** (9.04)
AAA					0.185** (2.19)	0.172* (1.95)	0.283*** (3.30)	0.451*** (6.17)
AA					0.155** (2.43)	0.191*** (2.87)	0.222*** (3.48)	0.343*** (6.28)
A					-0.00992 (-0.20)	-0.000318 (-0.0063)	0.00701 (0.15)	0.111*** (2.82)
BB					0.0583 (1.06)	0.0503 (0.90)	0.178*** (2.84)	-0.426*** (-5.17)
B					0.196*** (4.13)	0.195*** (4.05)	0.361*** (6.74)	-0.815*** (-5.92)
CCC					0.150** (2.28)	0.142** (2.11)	0.264*** (3.46)	-0.951*** (-6.27)
UNRATED					-0.171*** (-3.50)	-0.187*** (-3.79)	-0.0195 (-0.37)	-0.159*** (-2.79)
Constant	2.795*** (21.7)	2.846*** (19.7)	1.938*** (11.2)	1.637*** (9.74)	2.708*** (20.0)	2.753*** (18.1)	1.618*** (8.33)	1.991*** (11.5)
Observations	739	707	707	707	739	707	707	707
Adjusted R-squared	0.09	0.09	0.19	0.31	0.13	0.14	0.26	0.44

Robust t-statistics in parentheses: *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level. AAA,..., CCC are dummy variables of corresponding credit rating categories, where the omitted base category represents BBB credit quality. Dependent variable MAT is the log of one plus the maturity in years. SIZE is the log of the amount of debt issued in euros.

Table 5: Industry fixed effects regressions of MAT by reputation category

Industry fixed effects regressions	Dependent Variable : MAT [LN(1+Mat.)]						
	I	II	III	Infrequent issuers	V	VI	VII
	Full sample	Single issuers	2 - 6 issues	2 issues	2 - 3 issues	4 - 6 issues	7 issues or more
Independent Variables							
SLOPE	-0.257*** (-6.41)	-0.142*** (-2.69)	-0.433*** (-7.56)	-0.303*** (-4.25)	-0.435*** (-7.20)	-0.502*** (-5.91)	-0.177 (-1.65)
LEVEL	-0.382*** (-9.79)	-0.199*** (-4.46)	-0.600*** (-10.5)	-0.481*** (-7.39)	-0.606*** (-10.1)	-0.616*** (-6.31)	-0.354*** (-3.39)
BBBAA	-0.167*** (-4.15)	-0.235*** (-4.04)	-0.166*** (-2.63)	-0.292*** (-4.21)	-0.234*** (-3.65)	-0.126 (-1.21)	-0.124 (-1.55)
SUB	0.0689 (1.01)	0.0638 (0.88)	0.133 (0.79)	0.291 (1.63)	0.314* (1.72)	.	.
SIZE(LN)	0.102*** (4.98)	0.113*** (2.73)	0.0839*** (3.21)	0.0798** (2.30)	0.0830** (2.52)	0.0900** (2.22)	0.116** (2.30)
BOOKRUN	0.0249 (1.47)	-0.000139 (-0.0050)	-0.0181 (-0.81)	0.0117 (0.41)	-0.00162 (-0.068)	-0.0768* (-1.80)	0.0840*** (2.25)
COUPON	0.218*** (8.77)	0.0802*** (3.70)	0.360*** (8.19)	0.304*** (6.53)	0.367*** (8.62)	0.350*** (4.18)	0.227** (2.60)
AAA	0.265*** (3.65)	0.183 (0.59)	0.387*** (3.99)	.	0.372** (2.06)	0.211 (1.11)	0.327** (2.02)
AA	0.157*** (2.59)	0.160 (1.17)	0.248*** (3.83)	0.233** (2.62)	0.343*** (4.83)	0.0387 (0.17)	0.0776 (0.47)
A	0.0428 (1.03)	0.0486 (0.62)	0.0921* (1.79)	0.0985 (1.35)	0.225*** (3.70)	-0.149 (-1.23)	-0.0649 (-0.63)
BB	-0.403*** (-4.83)	-0.0224 (-0.24)	-0.855*** (-5.71)	-0.658*** (-5.07)	-0.875*** (-6.71)	.	.
B	-0.744*** (-5.36)	-0.0692 (-0.52)	-1.438*** (-5.70)	-1.348*** (-4.03)	-1.577*** (-5.62)	-1.264*** (-2.93)	.
CCC	-0.907*** (-5.96)	-0.164 (-1.12)	-1.692*** (-7.04)	-1.324*** (-4.96)	-1.518*** (-6.83)	-1.975*** (-3.54)	.
UNRATED	-0.175*** (-3.17)	-0.0928 (-1.20)	-0.166 (-1.62)	-0.275*** (-2.84)	-0.124 (-1.22)	.	-0.175 (-1.03)
Constant	1.986*** (11.9)	1.981*** (5.95)	2.452*** (10.9)	2.266*** (9.04)	2.413*** (10.0)	2.886*** (6.83)	1.422*** (3.92)
Observations	707	211	354	130	215	139	142
Number of sectors	24	24	22	18	21	14	9
Adjusted R-squared	0.44	0.45	0.51	0.55	0.58	0.47	0.54
F	22.87	11.81	14.04	8.724	13.97	7.033	10.75

Robust t-statistics in parentheses: *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level. AAA,..., CCC are dummy variables of corresponding credit rating categories, where the omitted base category represents BBB credit quality. Dependent variable MAT is the log of one plus the maturity in years. SIZE is the log of the amount of debt issued in euros.

Table 6: Issue frequency and average credit quality by industry sector

	Avr. numeric credit quality excl. unrated issues		Corresponding credit rating category		Percent	Cum.
	Freq.					
Telecoms/Communications	110	4.20	BBB/ Baa		14.88	14.88
Energy/Utility	100	2.75	A / A		13.53	28.42
Automotive	60	3.37	A / A		8.12	36.54
Food & Drink	50	3.41	A / A		6.77	43.30
Retailing & Consumer goods	44	3.76	BBB/ Baa		5.95	49.26
Other	43	4.94	BB/ Ba		5.82	55.07
Construction	37	3.56	BBB/ Baa		5.01	60.08
Engineering	37	3.42	A / A		5.01	65.09
Oil, Coal & Gas	37	2.28	AA / Aa		5.01	70.09
Media & Publishing	29	4.61	BB/ Ba		3.92	74.02
Transport & Shipping	29	2.19	AA / Aa		3.92	77.94
Chemicals	28	3.89	BBB/ Baa		3.79	81.73
Railways	23	1.77	AA / Aa		3.11	84.84
Electronics/Electrical	20	3.22	A / A		2.71	87.55
Forest products/Packaging	16	5.33	BB/ Ba		2.17	89.72
Hotels & Leisure	12	5.09	BB/ Ba		1.62	91.34
Iron & Steel	11	4.83	BB/ Ba		1.49	92.83
Luxury goods	10	4.00	BBB/ Baa		1.35	94.18
Real Estate	10	3.63	BBB/ Baa		1.35	95.53
Industrials & Conglomerates	9	3.71	BBB/ Baa		1.22	96.75
Healthcare & Pharmaceuticals	7	3.80	BBB/ Baa		0.95	97.70
Public works/Public services	7	4.00	BBB/ Baa		0.95	98.65
Textiles & Clothing	7	5.00	BB/ Ba		0.95	99.59
Mining	3	3.00	A / A		0.41	100.0
Total	739	3.56	BBB/ Baa		100	100

Table 7: Firm fixed effects regressions of MAT by reputation category

Independent Variables	Dependent Variable : MAT [LN(1+Mat.)]						
	I	II	III	III	V	VI	VII
	Full sample	Single issuers	2 - 6 issues	2 issues	Infrequent issuers	4 - 6 issues	Frequent Issuers
		OLS					7 issues or more
SLOPE	-0.370*** (-3.87)	-0.137*** (-2.64)	-0.486*** (-5.68)	-0.536*** (-6.49)	-0.539*** (-5.74)	-0.428*** (-3.59)	-0.173 (-1.56)
LEVEL	-0.525*** (-5.14)	-0.209*** (-4.76)	-0.607*** (-8.02)	-0.670*** (-9.08)	-0.699*** (-7.33)	-0.614*** (-5.63)	-0.339*** (-3.10)
BBBAAA	-0.161** (-2.24)	-0.186*** (-2.97)	-0.192** (-2.54)	-0.335*** (-3.59)	-0.309*** (-3.41)	-0.140 (-1.34)	-0.107 (-1.30)
SUB	0.671*** (4.68)	0.0883 (1.50)	0.795*** (6.27)	0.757*** (4.56)	0.766*** (3.94)	.	.
SIZE	0.0861* (1.78)	0.124*** (2.98)	0.0537 (1.34)	0.00474 (0.071)	0.0482 (0.93)	0.0297 (0.60)	0.0795 (1.47)
BOOKRUN	-0.00707 (-0.15)	-0.0174 (-0.66)	-0.0770** (-1.97)	0.0139 (0.35)	0.0412 (1.11)	-0.127*** (-3.03)	0.129*** (3.03)
COUPON	0.321*** (3.48)	0.0782*** (3.75)	0.427*** (6.58)	0.524*** (7.55)	0.477*** (5.05)	0.418*** (4.47)	0.225** (2.50)
AAA	0.191 (0.78)	0.340 (1.22)	2.683*** (6.46)	.	2.382*** (2.75)	1.452*** (4.31)	0.171 (0.73)
AA	0.0531 (0.28)	0.186 (1.07)	0.0944 (0.44)	0.185 (1.21)	0.284 (1.61)	0.172 (0.60)	-0.0452 (-0.22)
A	0.0672 (0.64)	0.0903 (1.25)	0.0304 (0.24)	0.226* (1.80)	0.321*** (2.98)	-0.208 (-1.12)	0.0226 (0.18)
BB	-0.793** (-2.37)	-0.0233 (-0.25)	-1.084*** (-3.25)	-0.688** (-2.50)	-1.008** (-2.57)	.	.
B	-0.706** (-1.99)	-0.0977 (-0.72)	-1.002*** (-3.54)	-0.587** (-2.02)	-0.799*** (-3.49)	-1.135*** (-2.79)	.
CCC	-1.341*** (-2.85)	-0.151 (-1.02)	-1.785*** (-4.50)	-1.498*** (-4.63)	-1.416*** (-5.75)	-2.233*** (-3.95)	.
UNRATED	-0.0652 (-0.45)	-0.138* (-1.91)	-0.0445 (-0.28)	0.281* (1.76)	0.225 (1.39)	.	-0.253 (-1.03)
Constant	2.160*** (7.04)	1.940*** (5.60)	2.696*** (8.06)	2.223*** (4.93)	2.329*** (5.80)	2.968*** (6.95)	1.484*** (3.82)
Observations	707	211	354	130	215	139	142
Number of issuers	356	.	129	68	97	32	16
Adjusted R-squared	0.50	0.44	0.51	0.74	0.70	0.44	0.55
F	8.284	16.27	10.87	50.22	18.67	5.347	11.86

Robust t-statistics in parentheses: *** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level. AAA,..., CCC are dummy variables of corresponding credit rating categories, where the omitted base category represents BBB credit quality. Dependent variable MAT is the log of one plus the maturity in years. SIZE is the log of the amount of debt issued in euros.

APPENDIX 1: Description of variables and data sources

Variable	Data description	Intervall	Data source
BOOKRUN	Number of financial institutionals (bookrunners) involved in the sale of a given issue.	Per issue	Dealogic
COUPON	Annualized fixed coupon of a given issue.	Per issue	Dealogic
MAT	Log of one plus the maturity in years of given issue, calculated as the difference between the closing date and the final maturity date of a that issue.	Per issue	Dealogic
RATING	Category variable for credit ratings. For split rating an average rating is calculated based on the assigned values.	Per issue	Dealogic
SIZE	Log of the total size denominated in million euros of a given issue.	Per issue	Dealogic
SUB	Category variable, indicating if the debt issued has junior status. Has a value of 1 if subordinated, 0 otherwise.	Per issue	Dealogic
LEVEL	3 month euribor rates	Monthly	European central bank
SLOPE	Yield difference between 10 year harmonized government bond and 3 month euribor rate. Bond yields are quoted mid-month and represent the average yield calculated on the basis of harmonised national government bond yields weighted by the nominal outstanding	Monthly	European central bank
BBBAAA	Yield difference between market indices for BBB-rated and AAA-rated bonds.	Monthly	International Index Company: iBoxx indices

APPENDIX 2

Average annualized coupon	Maturity of debt							Total
	< 3 years	3 to 5 years	5 to 7 years	7 to 10 years	10 to 15 years	15 to 25 years	>25 years	
Investment grade debt	4.195	4.905	5.135	5.095	4.982	5.058	6.435	4.972
AAA	4.059	3.434	4.102	4.957	4.781	5.594	5	4.497
AA	3.634	4.289	4.509	5.087	5.244	4.638	5.625	4.754
A	4.041	4.776	4.973	4.96	4.869	4.833	5.875	4.752
BBB	4.782	5.529	5.457	5.382	5.321	5.313	7.349	5.481
Speculative-grade debt (excl. subordinated)	8.25	7.172	8.861	9.745	13.375	.	.	9.363
BB	.	6.925	7.644	8.107	.	.	.	7.632
B	8.25	7.583	9.936	9.988	14.313	.	.	9.948
CCC	.	.	9.667	9.688	11.5	.	.	9.797
Subordinated issues								
BB	.	.	7.375	.	.	.	.	7.375
B	.	.	10.063	10.375	.	.	.	10.323
CCC	.	.	.	10.188	7.75	.	.	9.375
Unrated debt	6.368	5.868	5.248	5.208	5.101	.	.	5.731
Total	4.921	5.209	5.869	6.725	5.329	5.058	6.435	

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