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ROLLOVER RISK, CASH HOLDINGS AND CREDIT SPREADS: AN EMPIRICAL
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The recent financial crisis from 2008-09 brought with it a lot of consequences. One of these correspond to the notorious growth in the spread of corporate bonds. According to the literature, the principal factors that explains that effect are default risk and liquidity risk. However, in the last year, two variables have become relevant as determinants of corporate bond spreads: rollover risk and cash holdings.

Despite the above, there are no literature that consider both variables, rollover risk and cash holdings, in one model to explain their joint effects on corporate bond spreads. The intuition says that higher level of cash holding should decrease the impact of rollover risk on corporate bond spreads. All of this are the main reason and motivation of this thesis, to contribute to an unexplored area: the joint impact of rollover risk and cash holdings on spreads, studying the impact of these two variables from different perspectives and scenarios.

The central question of this study, is to explore whether increasing the level of cash holdings reduce the effect of rollover risk on the corporate bond spreads. To do this study I use a regression model on corporate bond spreads considering its respective explanatory variables, which was taken from existent literature.

The data used in this study is the same used in Valenzuela (2016). The period of the study starts in January 2004 and finishes in June 2009, in that way we are able to see the effects of the financial crisis. The dataset consists of month-end data and considers all fixed-rate bonds denominated in U.S. dollars and available to Bloomberg in June 2009.

After all the results obtained, and consistent with the studies of rollover risk and cash holdings, this paper demonstrates that the effect of short term debt to total debt on corporate bond spreads is decreased by a higher level of cash holdings. These results remains when we control for potential endogeneity problems. In this way, this paper contributes in the empirical study of corporate bond spreads, and the influence that rollover risk and cash holdings have on this in different scenarios, maturities and industries.

RIESGO DE REFINANCIAMIENTO, TENENCIA DE EFECTIVO Y SPREADS CREDITICIOS: UNA INVESTIGACIÓN EMPÍRICA

La reciente crisis financiera de los años 2008-09 trajo consigo una serie de consecuencias. Una de estas corresponde al notorio crecimiento observado en los spreads de los bonos corporativos. De acuerdo a la literatura, los principales factores que explican este efecto son el riesgo de default y el riesgo de liquidez. Sin embargo, en los últimos años, dos variables han ganado relevancia como determinantes de los spreads de bonos corporativos: la tenencia de efectivo y el riesgo de refinanciamiento.

A pesar de esto último mencionado, no existe literatura que considere ambas variables en un modelo que trate de explicar el efecto conjunto que tienen ambas variables sobre los spreads de los bonos. La intuición dice que mayores niveles de tenencia de efectivo debería generar una reducción en el impacto del riesgo de refinanciamiento sobre los spreads de los bonos corporativos. Todo esto es la principal razón y motivación de esta tesis, es decir, contribuir a un área no explorada: el impacto conjunto del riesgo de refinanciamiento y de la tenencia de efectivo en los spreads de los bonos, estudiando el impacto de ambas variables desde diferentes perspectivas y escenarios.

La pregunta central de este estudio, es explorar si es que mayores niveles de tenencia de efectivo reducen el impacto del riesgo de refinanciamiento sobre los spreads de los bonos corporativos. Para realizar este estudio se ocupó un modelo de regresiones sobre los spreads de los bonos corporativos, considerando sus respectivas variables explicativas, las cuales fueron selecciones de la literatura que existe hoy en día con respecto al tema.

Los datos usados en este estudio son los mismos que se ocuparon en Valenzuela (2016). El periodo de estudio inicia en enero de 2004 y finaliza en junio del año 2009. De esta manera se pueden observar los efectos de la crisis financiera. El conjunto de datos consiste en datos de final de mes y consideran todos los bonos de tasa fija emitidos en dólares estadounidenses y que estaban disponibles en Bloomberg en junio del 2009.

Después de todos los resultados obtenidos, y consistentes con los estudios relacionados al riesgo de refinanciamiento y tenencia de efectivo, este paper demuestra que el efecto del ratio de deuda de corto plazo sobre el total de deuda disminuye cuando los niveles de tenencia de efectivo son más altos. Estos resultados se mantienen cuando controlamos los potenciales problemas de endogeneidad existentes. De esta manera, esta tesis contribuye en los estudios empíricos de los spread de bonos corporativos, y sobre la influencia que posee el riesgo de refinanciamiento y la tenencia de efectivo sobre estos en diferentes escenarios, madurez e industrias.

DEDICATORIA

Para mi madre, mi padre, mi hermana, mi polola, y para Dios.

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1 INTRODUCTION

There are widely literature and studies, theoretical and empirical, dedicated to the study of the factors that affect corporate bond spreads. However, given this, the recent financial crisis of 2008 brought with it, several consequences over international debt markets, causing a considering rise in the spread of corporate bonds (see Figure 1 and Figure 2). This highlight the importance of other determinants of corporate bond spreads, for example: the rollover risk as a factor to consider at the moment of evaluate the price of a corporate bond.

Rollover risk could be defined as the risk that firms faces when its debt is close to the date of payment, and that must be rolled over into new debt. This brings to corporation a lot of different kind of risks, for example, if the interest rates raise, firms must pay higher amounts of money decreasing the earnings.

On the other side, we have cash holdings, which represents the level of cash that the firm owns and that allows it to fulfill its obligations. There is also studies that link this variable with corporate bond spreads. Inside the group of recent studies about corporate bond spreads, we can find the work developed by Acharya, Davydenko and Strebulaev (2012). Their research try to show the relation that exist between cash holdings and credit spreads. A simple intuition that appears at the moment of evaluate this relation, and that they mention in their paper, is that cash holdings and corporate credit spreads are negatively related, which means that higher levels of cash holdings should impact negatively on corporate bond spreads, given that elevated presence of cash can be interpreted as a good sign of confidence in the firm that issue the bond. However, these academics propose that this intuition is not always observed, and that in some cases, cash holdings and bond spreads can be positive correlated. An explanation to this case is that firms that are facing financial difficulties, sometimes take the action of elevate their level of cash holding in a precautionary way, so the credit spread of the bond that they issue can be higher when firms present higher level of cash. However, in the study the authors propose a model to explain this situation. One of the conclusions they get with the model is that in some cases there is a presence of endogeneity, and that this case is observed when firms prevents adverse events, saving more cash to face difficulties.

Between the groups of papers dedicated to the study of the determinants of corporate bond spreads we can find the one developed by Cavallo and Valenzuela (2010). In their research, they explore the determinant of

corporate bond spreads in emerging markets. The results obtained shows that corporate bond spreads are determined by different series of factors. Between these factors, we find firm-specific variables, macroeconomic conditions, global factors, bond characteristics and country-specific sovereign risk.

Related to the relation of credit spreads and the proportion of short term debt, as a representation of refinancing risk, Gopalan, Song and Yerramilli (2014) show in their work that the bonds issued by firms that possess a high level of proportion of short term debt, trade at higher credit spreads and also presents higher probabilities of experience credit rating downgrades, compared with firms with lower levels of short term debt.

Also, we have the research developed by Valenzuela (2016). In that work, the author study the relationship between rollover risk and credit spreads involving the debt market illiquidity. Using a dataset of corporate bonds from firms around the world and placed in international market, the paper shows that higher proportion of short term debt causes an amplification in the effect of debt market illiquidity on credit spreads. The results are maintained when the model controls for endogeneity. Also, the study consider the evaluation of the model in different scenarios, for example, comparing the results in periods of financial stability and financial distress.

Another relevant study related to variables that are important to this thesis, is the research done by Harford, Klasa and Maxwell (2014). They study the relationship between refinancing risk and cash holdings. The principal finding of their research is that firms elevate their level of cash holdings to mitigate refinancing risk caused by shorter maturity debt.

Taking into account all the results and factors of the studies mentioned previously, related with credit spreads, all the factors have been explored as independent determinants of credit spreads, so it is crucial to better understand the role of cash holdings as precautionary savings to mitigate the effect of refinancing risk on corporate bond spreads, considering both variables in a single model. So, the primary goal of this thesis is to examine whether the effect of refinancing risk on corporate bond spreads is attenuated in firms that presents higher levels of cash holdings.

This work contributes to the emerging literature on the determinants of corporate bond spreads in at least three ways. First, taking a step beyond the previously mentioned papers by considering rollover risk and cash holdings in one model to see their impact on corporate credit spreads, and how the level of cash holdings of a firm reduces the impact of refinancing risk on the cost of

debt capital. Second, in contrast to most studies that focus on U.S. domestic bond markets, this thesis goes beyond utilizing a dataset on corporate bonds placed in international markets by emerging and developed borrowers. This point is important according to the study of Gozzi, Levine and Schmukler (2010). Their results indicate that debt issues in international markets are an important source of capital for firms. And finally, the third contribution of this study, is that aims to explore the relationship between refinancing risk, cash holdings and credit spreads during both periods of financial distress and periods of financial stability, different time horizons, different industries and both firms with investment grade bonds and speculative grade bonds.

The results obtained from this work suggested that the intuition, related to the variables in study, is correct depending of the scenario. Moreover there results also suggest that there are a wide range of opportunities of research in the area of the determinants of corporate bond spreads.

This thesis has the following organization: it continues with a section of sample characteristics and data description. This section contains the explanation of the data used in this study, theory and empirical descriptions of the data and its statistics. The next section called Results: Regression Analysis, contains all the results of the models in the study, showing the results of the models implemented in different scenarios, and comparing the results between both variables used as a representation of rollover risk. The following section called Additional Results, presents the evaluation of the same models of the previous section with the difference that the variable that represents rollover risk is the proportion of long term debt maturing within a year instead of short term debt to total debt. Continuing with the structure of the paper, there is a section called Other studies, the one that presents the results of other subsets of the data. The next section called Additional robustness check and suggestions, contain information about alternatives studies that can be done in the future using the same data. Finally, the paper concludes with a section of the principal conclusions of the study. Also, there is a section of Appendix which includes the results of additional regressions done during the study.

2 SAMPLE CHARACTERISTICS AND DATA DESCRIPTION

The data used in this study is almost the same data used in Valenzuela (2016). It was built using Bloomberg Professional to construct a set of data on corporate bonds placed in international markets by emerging and developed market borrowers. The period of the study starts in January 2004 and finishes in June 2009, in that way we are able to see the effects of the financial crisis.

The dataset consists of month-end data and considers all fixed-rate bonds denominated in U.S. dollars and available to Bloomberg in June 2009.

As the same as the paper of Valenzuela (2016), this study focuses on the international dimension of the data, so the dataset excludes every bond issued by firms whose location is in the U.S. or U.K. After this consideration, the final sample include 29 countries¹.

The dataset contains information from bonds issued by public financial firms and firms which are not contained in the financial sector. The distribution of issuers by sector in the sample is as follows: industrial with a 53.9% of the data, banking with a 17.1%, financial with a 9.0%, utility with an 8.6%, telephone with a 7.8%, oil and gas with a 2.4%, and transportation with a 1.2%. However, given that some of the variables that are considered in the study are only reported quarterly, the study considers quarterly data for the whole set of variables. This causes a small change in the distribution previously mentioned: industrial with a 51.7% of the data, banking with a 20.9%, financial with a 8.2%, utility with an 6.7%, telephone with a 8.0%, oil and gas with a 2.2%, and transportation with a 2.3%.

Given that only certain types of firms choose to access the offshore financing market versus the onshore financing market, the results of this thesis cannot be extrapolated to the entire universe of firms around the world. The sample of firms using in this work just represent firms that issue international bonds denominated in U.S. dollars., which according to Hausmann and Panizza (2010) and Gozzi et al. (2012) international debt issues tend to be denominated in foreign currencies, particularly in U.S. dollars.

With the objective of reduce potential coding errors, the data was cleaned in four ways. The procedure is the same that Valenzuela describes in their work.

As it was mentioned at the beginning of this document, the variables in study are: corporate bond spreads, rollover risk and cash holdings. The first variable of the study it's represented by OAS, the second one is represent by the short-term debt and finally cash holdings is a direct variable. Also, trying to mitigate endogeneity problems, rollover risk was modeled using the proportion of long-term debt maturing within a year. All of these things are explained in the following parts.

¹ The countries included, mentioned alphabetically, are Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Malaysia, Mexico, the Netherlands, New Zealand, Norway, Panama, Peru, the Philippines, Singapore, South Korea, Spain, Sweden, Switzerland and Thailand.

2.1 Corporate bond spreads

As it was mentioned before, in this work I did a regression analysis. The dependent variable of these regressions corresponds to Option-Adjusted Spread (OAS), variable that was obtained from Bloomberg, and that represents the spread over an issuer's spot rate curve, i.e., the theoretical yield on a zero-coupon U.S. Treasury security. In this case, according to Fabozzi (2006), when the OAS is measured over a U.S. Treasury security, it captures the credit spread.

Given that the data is the same used by Valenzuela (2016), we are able to say that the OAS data used doesn't present any selection bias. Valenzuela in his work, compare the data with principal OAS indices (Bank of America Merrill Lynch). The results obtained from this comparison shows that the OAS used in this study follows the same behavior of the other OAS indices, suggesting that the results obtained shouldn't be affected by sample selection bias. For more details see Valenzuela (2016).

2.2 Short-term debt and long-term debt maturing within a year

The ratio of short-term debt to total debt is considered as a determinant of corporate bond spreads. This could be widely observed among different studies. The ratio of short-term debt over total debt was constructed using accounting data from Bloomberg and was calculated as the ratio of short-term borrowings to total borrowings.

Given that this ratio could be considered as an endogenous variable, in this study, I also utilize the proportion of long-term debt maturing within the year rather than the proportion of short-term debt. Using this another variable, the study is able to isolate the exogenous effect of pure rollover risk on corporate bond spreads from the actions of firm's managers when the conditions in credit risks changes. In fact, Valenzuela (2016) highlights the same argument in his research.

As the same as the ratio of short-term debt over total debt, the ratio of proportion of long-term debt maturing within the year to total debt, was constructed using accounting data from Bloomberg.

2.3 Cash holding

As it was mentioned at the beginning of this paper, cash holding is one of principal variables of this study. This variable is a measure of the liquidity of

the firm, and is defined as the division of the liquid financial assets that the firm owns with the total debt that this has.

2.4 Other corporate bond spreads determinants

The variables mentioned above, are the most important variables of the study. However, it is important to take in account in the regression model, other variables that could directly affect corporate bond spreads. To consider control variables, the way that there were chosen is based primarily on structural credit risk models and empirical literature which study the determinants of corporate bond spreads, for example: Collin-Dufresne et al, 2001 and Campbell and Taksler, 2003. In table 1, we can find all the variables used in the study, their description, units, frequency and others.

The control variables included could be classified depending on their level:

At a bond level, all regressions include bond fixed effects and control for the time to maturity. The first one control from the endogeneity arising from the time-invariant bond and/or firm heterogeneity. The second one is direct, and also is part of the results of previous studies.

At a firm level, following Campbell and Taskler (2003), is was considered the issuer's equity volatility, and other variables considered as standard variable in this kind of model: operating income to sales, the ratio of short-term debt to total debt, leverage measured as the ratio of total debt to assets, and firms size. Also, as it was mentioned before, it was considered the study variable the ratio of cash holdings to total debt.

It is important to remeber that some of the variables just mentioned, are part of the balance sheet of the firms, which are generally reported quarterly, so the data consider in the study correspond to quarterly data. The clustering regression residuals is at a bond level.

At a country level, it was included the S&P sovereign credit rating to control for a lot of country-level factors that are correlated with sovereign risk that could affect the credit risk of firms. In this point, we can mention that Borensztein, Cowan and Valenzuela (2013) show that sovereign credit ratings remain a significant determinant of corporate credit risk even after controlling for firm-level financial indicators of economic conditions in their respective countries.

2.5 Interaction term

To reach the main objective of this study, one of the models included in all the scenarios, contains an interaction term between short term debt to total debt and cash holdings to total debt. Also, was included in the models in which I tried to mitigate endogeneity using the proportion of long term debt maturing within the year, instead of short term debt to total debt.

This interaction term was included to see which is the relation between rollover risk and cash holdings when we are evaluating their impact on corporate bond spreads. This term is defined as the multiplication of both variables mentioned before.

3 RESULTS: REGRESSION ANALYSIS

3.1 Corporate bond spreads, rollover risk and cash holdings

All the models and results showed in this study consider at least the following regression with the objective of observe the individual and joint effect of the variables in study:

1. OAS + Control Variables
2. OAS + Control Variables + STD (Prop. LT debt maturing within a year)
3. OAS + Control Variables + CH
4. OAS + Control Variables + STD (Prop. LT debt maturing within a year) *CH

This was done in different scenarios to improve the analysis and give a better use to the data available. The scenarios considered in the study are, one in which all the data is used without consider any factor of difference, other in which the data is split depending on the year that the bond was issue to evaluate periods of financial stability and financial distress. The third scenario takes in account the time to maturity, to explore the temporary role of the variables in study. The fourth scenario shows if there is any difference between bank and financial firms versus other sectors. And finally, the fifth scenario divide the data into speculative and investment grade bonds.

Table 1 contains a description of the variables involve in the models presented in this study, considering also the unit of each one and the source of which each variable was obtained. Also, table 2 contains a resume of the principal statistics (quantity of observations, mean, standard deviation, minimum value

and the maximum value) for the variables of the sample of bonds considered in the study.

The central question of this thesis is to explore the effect of the rollover risk and cash holdings on corporate bond spreads, more specifically, whether the effect of different levels of short term debt to total debt on corporate bond spread is amplified for firms with lesser levels of cash holdings. The simple intuition behind this proposition is that when firm possess more cash, its ability to face their incoming obligations is higher, this is a good sign for the market, translating in a decrease in its corporate credit bonds issued. So, higher level of cash should reduce the impact of rollover risk.

Given this, the baseline specification is as follows:

$$\begin{aligned}
 (1) \quad \text{Bond Spread}_{bfct} = & \eta_0 + \eta_1 \text{Maturity}_{bfct} + \eta_2 \text{Equity Volatility}_{fct} \\
 & + \eta_3 \text{Credit Rating}_{fct} + \eta_4 \text{Operating Income/Sales}_{fct} \\
 & + \eta_5 \text{Total debt/Assets}_{fct} + \eta_6 \text{Size}_{ct} + \eta_7 \text{Sovereign credit Rating}_{ct} \\
 & + \eta_8 \text{ST Debt/Debt}_{fct} + \eta_9 \text{Cash/Debt}_{fct} \\
 & + \eta_{10} \text{ST Debt/Debt}_{fct} \times \text{Cash/Debt}_{fct} + \mathbf{A}_b + \mathbf{B}_r + \varepsilon_{bfct},
 \end{aligned}$$

$$\begin{aligned}
 (2) \quad \text{Bond Spread}_{bfct} = & \eta_0 + \eta_1 \text{Maturity}_{bfct} + \eta_2 \text{Equity Volatility}_{fct} \\
 & + \eta_3 \text{Credit Rating}_{fct} + \eta_4 \text{Operating Income/Sales}_{fct} \\
 & + \eta_5 \text{Total debt/Assets}_{fct} + \eta_6 \text{Size}_{ct} + \eta_7 \text{Sovereign credit Rating}_{ct} \\
 & + \eta_8 \text{Prop. LT debt maturing within a year/Debt}_{fct} + \eta_9 \text{Cash/Debt}_{fct} \\
 & + \eta_{10} \text{Prop. LT debt maturing within a year/Debt}_{fct} \times \text{Cash/Debt}_{fct} + \\
 & \mathbf{A}_b + \mathbf{B}_r + \varepsilon_{bfct},
 \end{aligned}$$

Where the subscript b refers to bond, f refers to firm, c refers to country and t to time. \mathbf{A}_b and \mathbf{B}_t , corresponds to vectors of bond a time dummy variables representing the fixed effects in the model. Finally, ε_{bfct} represents the error term.

To attenuate cases of endogeneity issues, I also re-estimate all the regressions using another variable instead of short term debt to total debt to represent rollover risk. This other variable correspond to the proportion of long term debt maturing within a year. The model using this variable is represented in (2).

The explanation of the use of this other variable and the results associated are in the next section.

Table 3 presents the main results from the estimation of the baseline regression using ordinary least squares with errors clustered at the bond level. Columns 2 and 6 reports the results of the baseline regression shown above, setting η_9 and η_{10} to zero, to estimate in first instance, the average effect of rollover risk. It can be seen that that both variables, the proportion of short term debt and the proportion of long term debt have coefficients that are positive and statically significant. These results are consistent with the empirical research that exist about debt maturity structure and credit spreads. (for more details see Gopalan, Song and Yerramilli 2013). Also, the results align with those that Valenzuela (2016) obtained.

On the other side, column 3 report the impact of cash holdings over credit spread, as it can be seen, follows the intuition that a higher level of cash holdings should have a negative impact on corporate bond spreads. It can be observed that the coefficient associated to cash holding has a negative sign, as it was expected, and according to the literature, however this should not be considered given that this coefficient has a lack of statically significance.

When we consider the two variables in the models, the results described above are maintained, either in significance, sign and magnitude. This can be observed in column 4. But if we see the results of the column 5, where the model considers both variables and also the interaction between these ones, we observed that both variables continues with the same characteristics of the previous results, and that the intuition of this study is true. The interaction of proportion of short term debt a cash holdings has a negative sign and statically significant coefficient, which stays in line with the expected results. This can be interpreted as that firms can mitigate the effect that rollover risk has over their credit spreads by increasing their levels of cash holdings.

Given a sight to the control variables, most of it have the expected sign, but only a few are statically significant (Maturity, Equity volatility, Credit rating and Total debt to Assets).

3.2 Periods of financial stability versus periods of financial distress

This study, as a lot of contemporary studies dedicated to evaluate and explore the effects of the financial crisis of 2008-09, also consider evaluation of the models separating the data considering a period without the crisis since 2004 to 2007, and during the crisis, since 2008 to 2009.

Given the characteristics of periods of financial distress and financial stability, we can think that in periods of financial distress, rollover risk, represented by proportion of short term debt, has a higher impact on credit spreads than during periods of financial stability, because the access to different ways of refinance are harder.

Table 4 show the results of this section in study. In columns 2, and 4 we can see that during periods of financial stability neither the proportion of short term debt and cash holdings to total debt seems to has no relevance in corporate bond spreads, this can be observed in the statically insignificance of both variables. Even more, when the interaction between both variables are considered in the model the results go against the intuition presented in this study. In column 5, the coefficient reported to the interaction of variables is positive and statically significant, which suggest that a higher level of cash holdings increase the impact of rollover risk over corporate bond spreads. This is something that can be explained by the results obtained by Acharya, Davydenko and Strebulaev (2012). In this case, can be a presence of endogeneity, in fact, when we try to reduce the probability of endogeneity by using proportion of long term debt maturing within a year, instead of short term debt to total debt, the coefficient lost it significance. This result is commented and explained in the next section, in which the focus is evaluate the same models but trying to mitigate endogeneity problems.

In the opposite side, during periods of financial distress, it can be observed in columns 7, 8, 9 and 10, that all the intuitions are usually met. As it been said before, during this periods the impact of proportion of short term debt are increased and statically significant. Also, the variable cash holding presents higher coefficients among models, with a negative sign and a statically significance. This goes in line with the intuition that higher level of cash holding reduces the spread of corporate bonds. This can be explained with the idea that when cash holdings are higher in a corporation, this allow to face in a better way every obligation presented.

Seeing the coefficient associated to the interaction of the variables in study in column 10, the results are the expected for all the principal variables: a coefficient with a negative sign and a statically significance for the interaction term, confirming the intuitions presented. With this results, the study presents new evidence that a higher proportion of cash holdings contributes to decrease the effect of rollover risk on corporate bond spreads during periods of financial distress. In periods of financial stability, the positive sign of the coefficient in the significant variable that represents the interaction between proportion of

short term debt and cash holdings, can be a case where endogeneity plays a role. For example, during periods of financial stability, the manager of a firm has facilities to change the structure of the short-term debt of the firm, while during periods of financial distress take actions is harder given to the difficulties to access to debt markets. In this last case, the value of cash holdings is higher than in the first case, because better levels of cash allow firms to face their incoming obligations in a better way.

3.3 Rollover risk, cash holding and maturity

To study if the two main variables has different impacts through time depending on the maturity of the bonds, the data was divided in this dimension considering three groups: short, medium and long maturity bonds.

Short maturity bonds were defined as those with a time to maturity under the three years. In the category of medium maturity bonds belongs all bonds which time to maturity are between three and seven years, and in the long maturity bonds are those with time to maturity superior to seven years.

Table 6 show the results of this area of study. A fast look to the columns show that the variables in study play a role in the short and medium term. In columns 9 to 12, which represents the group of bonds with time to maturity more than seven years, although we observed the expected sign in each variable, there are no statically significant variables. If we give a look to medium-term maturity bonds in column 8, we can see that both variables, short term debt to total debt and cash holding to total debt gain significance in the models.

In bonds with time to maturity between three and seven years, the results of the models represented in columns 5 to 8, both variables alone present coefficients with the expected sign and significance. However, the coefficient of the interaction has the expected sign aligned with the previous results and intuitions, but has no significance.

On the other side, the subset of bonds with years to maturity under the three years presents results similar to the case explained before, but with the difference that the coefficient of the interaction is very significant statically, and has the expected sign. This says that cash holding plays a role in the short term at the moment of decrease the impact of rollover risk on corporate bond spreads. In the next section, we will see that this results remains when we control by endogeneity using another variable to represent rollover risk.

3.4 Bank and financial sector versus other sectors

Another potential characteristic of the data used in this study, is that every bond emitted are identified depending on the sector of the enterprise that belongs to. As it was described in section 2, bonds of the database are from different sectors, this allow us to study the different models separating the data in bank and financial sector, and other sectors (industrial, utility, telephone, oil and gas and transportation).

The results of the models when we divide the data in bank and financial sector versus other sectors are presented in table 8. Columns 1 to 4 presents the results associated to bonds emitted in bank and financial sector, while columns 5 to 8 present the results associated to bonds emitted for corporations of other sectors.

Table 8 shows that either in bank and financial sector and other sectors, cash holdings present the expected sign but are not statically significant. On the other hand, according to the results, proportion of short term debt has no significance in bank and financial sector, while in other sectors it has a great significance, an expected sign and a high magnitude. This main difference can be explained by the fact that enterprises that belong to bank and financial sector usually based their business in short term debt, so knowing this publicly decrease the effect on the spreads of the bonds that issues. Meanwhile in the companies of the other sectors the intuition is more observable. Continuing with the results, is important to mention that only for the subset of bank and financial sector, the coefficient of the interaction is statically significant and with a negative sign, that is an expected result. An explanation to the difference with the other subset is that knowing that the companies of this group present a lot of short term debt due its business model, the presence of more cash holdings helps more to attenuate the impact of rollover risk on corporate bonds. Even more, for the characteristics of this kind of companies they usually have a lender of last resort that may alleviate the cost of rolling over their maturing debt.

3.5 Speculative grade bonds versus investment grade bonds

As it is known, not every bond issued has the same quality and qualification. This gives another natural perspective to compare bonds and evaluate the impact of the variables in study. To study the difference in the impacts that each relevant variable has on credit spreads, the data was split in to subsets: Speculative Grade Bonds, which consider all bond with a classification of BB+ or lesser, and Investment Grade Bonds, which are evaluated with the best

classification considering all bond with better than a BB+. As it is known, this qualification is directly related with the ability of payment. From the universe of 7.302 observations, 5.641 correspond to Investment Grade Bonds (77%), while 1.661 (23%) correspond to Speculative Grade Bonds.

Columns 1 to 10 from table 10 reports the results of this section when we use the short-term debt as a representation of rollover risk. The first notorious difference between both groups of bonds is that for Investment Grade Bonds the variable short term debt to total debt is statically significant and has a positive sign, which means that a higher level of short term debt to total debt cause an increase in the spread of corporate bonds, in this case for investment grade bonds, this can be observed in columns 7, 9 and 10. While, for Speculative Grade Bonds this observation doesn't seem to hold. This can be explained by the fact that firms that issues bond with a lesser qualification usually presents a higher rollover risk, while for the other group of firms this is not a fact, so higher levels of rollover risk impact the bonds that they issue.

When we observed the impact of the variable Cash Holding, the results are contrary to the case explained before. This variable has relevance for the subset of Speculative Grade Bonds. Observing columns 3 and 4, this variable has the expected negative sign and has a statically significance. These characteristics can't be observed in the case of Investment Grade Bonds. One reason for this difference is the fact that for firms that issues bonds with a worst qualification, the fact that elevate their level of cash holding are a good sign for the environment, showing that they count with higher cash to fulfill their obligations with the bonds that they issued.

In the case of the interaction term, represented by columns 5 and 10, is very particular the fact that for neither the subset of Speculative Grade Bonds and Investment Grade Bonds, the variable has significance in statically terms. According to the results explained for the other two variables, we can conclude that for the group of Speculative Grade Bonds is relevant the variable cash holding, but not rollover risk, so this is a result that should be expected. For firms that issue Speculative Grade Bonds, as it was mentioned before, cash holding has no relevance on their corporate bond spread, and this results is maintained in the model represented by column 10, showing that a high level of cash holding does not reduce the impact of rollover risk, which is a relevant variable for this cases, on corporate bond spreads.

4 ADDITIONAL RESULTS

In this section are presented all the results following the same models presented in section 3, with the difference that now we consider the proportion of long term debt maturing within a year as a representation of rollover risk. The use of this new variable has the purpose of mitigate problems of endogeneity. Using this another variable rather than the proportion of short term debt, this study is able to isolate the exogenous effect of rollover risk on corporate bond spreads from the response of firm managers when they face episodes of financial crisis.

4.1 Corporate bond spreads, rollover risk and cash holdings

Columns 6 to 9 of the table 3, show the results of the baseline regression. This results are equivalent to the results shown in section 4.1. It can be seen that the results are exactly the same when the explanatory variable is the proportion of short term debt (proportion of long term debt maturing within a year and the interaction term presents a significant coefficient and the expected sign). This result is very important to this study because isolating the exogenous effect of rollover risk mentioned before, we obtained the same positive results. Another similar result to remark is that in no one of each models the other variable in study: cash holdings has a statically significance for the model.

4.2 Periods of financial stability versus periods of financial distress

In this section, we compare the results with those obtained in section 3.2. Table 5 shows the results of using proportion of long term debt within a year instead of proportion of short term debt, comparing periods of financial stability versus periods of financial distress.

During periods of financial distress, we can observe that the results are the same using both variables. Either proportion of long term debt maturing within a year and cash holdings has a statically significance and expected sign coefficient: proportion of long term debt has a positive impact in corporate bond spreads, while cash holdings has a negative impact. The coefficient of the interaction term is statically significant and have a negative impact on the dependent variable. This result aligns with the intuition and objective of this study.

The principal difference with the results of the section 4.2 are observed in the scenario where exist financial stability. In this case, the results for the

coefficient of cash holding is the same, but the results for the coefficient of the variable that represents rollover risk are different. The first remarkable difference is that the coefficient of the interaction term loses the significance compared to the model which use proportion of short term debt as a representation of rollover risk. This is an important result because we don't have to consider the positive sign of the coefficient result that is contrary with the intuition. This can be the explanation for the result of the same point in section 3.2, saying that during periods of financial stability is more probable to observe the presence of endogeneity problems. Also, in this scenario, the coefficient of proportion of long term debt maturing within a year gain significance in models represented by columns 2 and 4, presenting the expected sign, reaffirming that maybe there is a case of endogeneity in the case of financial stability using short term debt to total debt to represent rollover risk.

In resume, the results showed in this section reaffirms the results of section 3.2 in the scenario of period of financial distress, showing that exist an important role of the level of cash holding in the impact that rollover risk causes on corporate bond spreads. Higher levels of cash holdings reduce the impact of rollover risk on corporate bond spreads during periods of financial distress. This result is exactly the same that we propose at the beginning of this document, and can be explained because during periods of financial distress the access to sources of financing are harder, so every managerial aspect is harder to manage, so a high level of cash holdings is more valuable, and gives goods signs of operations, traducing into lesser corporate bond spreads. Also, the results presented of section 3.2 and 4.2 suggest that during periods of financial stability cash holdings do not have a role neither by their own on corporate bond spreads, and in reducing the impact of rollover risk on spreads.

4.3 Rollover risk, cash holding and maturity

This section is equivalent to the study of section 3.3, even the results are very similar. The results of this section are shown in Table 7. As the same that in table 6, we can see that both cash holdings and rollover risk have a short-term role in the influence that they have on corporate bond spreads. As we can see, when the time to maturity is equivalent to 7 or more years, neither rollover risk and cash holdings do not have a significance impact on corporate bond spreads. The result is the same when we add the interaction term to the model.

In the medium term, apparently do not exist a clearly impact of the interaction between rollover risk and cash holdings in corporate bond spread. This can be

observed for both representation of rollover risk. However, both proportion of long term maturing within a year and cash holdings presents coefficients with the expected sign and significance. Also, this result is observable in section 3.3. But in the short term (time to maturity lesser than 3 years), the only model that presents coefficients that are statically significant, is the one represented by column 4, the one which includes the interaction term between cash holdings and rollover risk. In this case, both variables, proportion of long term maturing within a year and the interaction term present a significance and an expected sign. This reaffirms the conclusion of section 4.3 that claims that cash holdings have a role in the short term, decreasing the impact of rollover risk on corporate bond spreads. This result can be interpreted as that the presence of higher levels of cash holdings are a sign of that the firm is going to be able to fulfill their obligations with the bond that they emitted when the bond has a short time to maturity.

4.4 Bank and financial sector versus other sectors

The results of this section can be seen in table 9, and are equivalent to the study of section 3.4. There is no big difference with the results from table 8. In the case of Bank and Financial sector, no one of the relevant variables in study, including the interaction term show any significance. On the other hand, when we consider all the firms from other sectors different that Bank and Financial sector, the main variable that impacts on corporate bond spreads is the proportion of long term debt maturing within a year, which represents rollover risk. This variable presents the expected sign and statically significance for the models represented by columns 5, 7 and 8; rollover risk impact in a positive way on corporate credit bonds.

The explanation of the difference between both subsets, is the same that was mentioned in section 3.4. In resume, the firms that belongs to Bank and Financial sector base their business in the manipulation of short term debt, thing that is known for everyone, so the bond that they issue shouldn't consider a high weight on this factor, while firms from other sectors, that present another core business are more affected by higher level of rollover risk, having a greater impact on the bonds that they issue.

4.5 Speculative grade bonds versus investment grade bonds

In this section the division of the data that was made is exactly the same that the one which was described at the beginning of section 3.5. The results of this section can be seen in columns 11 to 18 from table 10. Columns 11 to 14

represents the models applied to Speculative Grade Bonds, and the rest of the columns represents the models of Investment Grade Bonds.

A quick look to the results show that there are no great differences with those described in section 3.5. In fact, for the variable Cash Holding, the results are exactly the same in expected sign and significance for both groups of bonds. The explanations for this results are the same that in the equivalent section when we used short term debt to total debt as the representation of rollover risk. The differences are observed when we take a look in to the proportion of long term maturing within a year and the interaction term. For the first case, in the model represented by column 14, which includes the three terms: cash holdings, rollover risk and the interaction between these ones, cash holding is the only variable that doesn't present statically significance for the model. Both, proportion of long term maturing within the year, and the interaction term presents the expected signs, for the case of Speculative Grade Bonds. This is a huge difference with the case when is used short term debt to total debt as a representation of rollover risk, model in which none of the variables presents significant coefficients. This difference can be explained with the same argument given in section 3.2 related with the capabilities of managers to change the structure of short term debt versus the incapability of change the proportion of long term debt maturing within a year.

For the case of the Investment Grade Bonds, there are no differences: The significance is observed in the same variable, the one that represents rollover risk, and the sign is the expected. For the other two variables, the results are also the same for all models.

5 OTHER STUDIES

This thesis contains a section called Appendix. In that section I present the results of the analysis of scenarios with and without crisis, but separating the data also in two groups: bank and financial sector, and other sectors. The results of this studies can be seen in Appendix 1 (A1) to Appendix 8 (A8). The Table of A1 and the table of A2 present the results when the variable that represents rollover risk is short term debt to total debt, and A3 and A4 the results when rollover risk is modelled with the proportion of long term debt maturing within a year. It is interesting to mention that when we observed the results associated to the group of firm that excludes all financial and bank firms, the results are quite similar to the ones presented in previous sections, observing that the intuition presented at the beginning of the study is supported by the results of the models, even when we use short term debt to total debt or the proportion of long term debt maturing within a year. But,

when we observed the results of the firms that belong to the bank and financial sector, it seems that during periods of financial stability the things works in a different way. A3 shows interesting results when we observed the coefficient associated to the proportion of long term debt maturing within a year, and the coefficient associated to the interaction term. Both of them are statically significant, however also both of them presents a sign that is the opposite to the expected. This could be explained, in a fast way, maybe due to the function and business model of the bank and financial firms, in which one of the most important thing is to capture money, being most of it short term obligations with others. Even though this can be an interesting area to explore and study. From A5 to A8, the results showed contain information that try to support the results from previous sections, by making some changes in the model. In A5 the variable cash holding contains a lag. The results are very similar to the results obtained in table 3, so we can get the same conclusions. For A6 and A7 the results are similar too. We are to say that apparently cash holding play a role in the short and middle term, just like we observed it in previous sections. A8 try to replicate the study done by

6 ADDITIONAL ROBUSTNESS CHECK AND SUGGESTIONS

During the elaboration of this thesis, apart from the results showed before, I obtained other results from another group of regression analysis, with the objective to explore other areas and see if there are interesting results that can lead to other relevant studies.

In these unreported regressions, I also analyzed variations in the models showed in previous sections. Among these unreported regressions, we find models in which robust standard errors were clustered at industry and firm level instead of at a bond level. The results for this variation were very similar to the results presented in previous sections.

Also, I conduct regressions considering credit rating as a fixed effect instead of explanatory variable. The results were pretty similar too.

To take advantage of the data and evaluate the possibilities of futures researches, I also conduct regressions where the dependent variable is credit rating, and regressions that link the relationship between rollover risk and cash holdings, similar to the study of Harford, Klasa and Maxwell (2014). The results can be observed in A8. Is important to mention that the regressions were conducted with the available data, so the study do not always contain the same variables from the original studies.

In conclusion, the dataset used in the study allows to continue with the exploration and study of corporate credit spreads.

7 CONCLUSIONS

Through time it can be observed that there are many variables that are gaining significance at the moment of evaluate the price of bonds. During the crisis of 2008 and 2009, there was an increase in the importance of rollover risk as a variable to consider at the moment of observe the spread of bonds and their values.

Also, as it was mentioned during this study, there are studies that show the impact of cash holdings on corporate bond spreads, however there are no empirical studies that consider models that includes both variables. Consistent with this lack of studies, this study has contributed in a certain way to show how these two variables interact in different scenarios.

Consistent with the studies of rollover risk and cash holdings and the intuition presented in this study, this paper demonstrates that the effect of short term debt to total debt on corporate bond spreads is decreased by a higher level of cash holdings. This effect is robust when controlling for the standard determinants of corporate bonds spreads, and the potential endogeneity effect of short term debt to total debt, when is used instead of this, the proportion of long term debt. Also, is robust to the inclusion of bond and time fixed effects.

Also, this paper contributes to show the effects of both variables on corporate bond spreads in different scenarios, considering periods of financial distress and financial stability, the maturity of bonds, the different kind of sector where the firms in study belongs taking in account two big sets, bank and financial institutions and others. Also, considers the quality of the bonds. Despite this results, there is a lot of potential areas to continue studying the relation of this variables.

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APPENDIX

A1

Speculative Grade Bonds versus Investment Grade Bonds

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with short term debt to total debt.

	ST debt to total debt									
	Bank & Financial									
	Financial Stability						Financial Distress			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years to maturity	-6.330 (4.007)	-5.925 (3.892)	-6.228 (4.052)	-5.932 (3.869)	-6.320 (3.854)	-195.381*** (43.097)	-197.886*** (41.991)	-192.843*** (43.178)	-195.794*** (42.130)	-196.130*** (41.909)
Equity volatility	0.898* (0.473)	0.944** (0.461)	0.899* (0.473)	0.944** (0.461)	0.917** (0.453)	-2.783*** (0.792)	-2.822*** (0.770)	-2.629*** (0.799)	-2.673*** (0.776)	-2.622*** (0.775)
Credit rating	-0.618 (4.106)	-0.928 (3.957)	-0.577 (3.989)	-0.930 (3.843)	-1.906 (3.901)	-16.578 (15.616)	-16.457 (15.505)	-17.063 (15.660)	-16.924 (15.541)	-14.506 (15.325)
Operating income to sales	-0.013 (0.043)	-0.002 (0.041)	-0.013 (0.042)	-0.002 (0.041)	0.003 (0.040)	-0.957 (0.796)	-0.951 (0.796)	-0.938 (0.795)	-0.931 (0.795)	-0.941 (0.793)
Total debt to asset	1.751*** (0.317)	1.700*** (0.310)	1.756*** (0.315)	1.700*** (0.307)	1.721*** (0.315)	-9.051** (3.932)	-9.029** (3.946)	-9.162** (3.943)	-9.137** (3.957)	-9.268** (3.949)
Size	5.726 (18.153)	12.732 (18.125)	5.947 (17.942)	12.718 (17.926)	12.674 (18.128)	-229.297 (170.221)	-236.651 (170.990)	-214.043 (168.161)	-222.624 (168.729)	-233.119 (168.986)
Sovereign credit rating	11.780 (12.910)	13.314 (11.492)	11.882 (12.803)	13.307 (11.391)	12.972 (11.108)	-49.760 (47.676)	-49.833 (47.319)	-54.428 (43.271)	-54.563 (42.836)	-54.003 (40.913)
ST debt to total debt		-0.541*** (0.156)		-0.541*** (0.154)	-0.800*** (0.178)		0.397 (1.374)		0.472 (1.382)	1.082 (1.556)
Cash holding to total debt			0.018 (0.119)	-0.001 (0.125)	-0.102 (0.158)			-2.202* (1.162)	-2.225* (1.172)	-0.476 (1.787)
ST debt to total debt x Cash holding to total debt					0.009*** (0.003)					-0.036 (0.028)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,139	1,139	1,139	1,139	1,139	829	829	829	829	829
R-squared	0.416	0.426	0.416	0.426	0.430	0.442	0.442	0.444	0.444	0.444
Number of bond	140	140	140	140	140	193	193	193	193	193
R-squared within	0.416	0.426	0.416	0.426	0.430	0.442	0.442	0.444	0.444	0.444
R-squared between	0.273	0.291	0.276	0.290	0.228	0.157	0.158	0.144	0.145	0.151
R-squared overall	0.0963	0.0939	0.0982	0.0938	0.0627	0.146	0.145	0.139	0.138	0.141

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A2

Speculative Grade Bonds versus Investment Grade Bonds

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with short term debt to total debt.

	ST debt to total debt									
	Financial Stability					Other sectors				
	(1)	(2)	(3)	(4)	(5)	(6)	Financial Distress		(9)	(10)
Years to maturity	-15.110*** (3.002)	-15.009*** (2.949)	-15.130*** (2.992)	-15.029*** (2.940)	-15.539*** (2.974)		-230.529*** (28.535)		-230.446*** (28.924)	-230.179*** (28.779)
Equity volatility	2.504*** (0.653)	2.539*** (0.654)	2.497*** (0.653)	2.531*** (0.654)	2.543*** (0.654)	3.506*** (0.882)	3.376*** (0.883)	3.339*** (0.895)	3.235*** (0.898)	3.213*** (0.901)
Credit rating	-29.050*** (5.725)	-29.789*** (5.616)	-28.833*** (5.716)	-29.578*** (5.610)	-29.784*** (5.613)	-106.346*** (29.423)	-107.445*** (28.258)	-108.798*** (29.046)	-109.535*** (27.974)	-110.355*** (27.776)
Operating income to sales	-0.050 (0.209)	-0.050 (0.204)	-0.060 (0.208)	-0.059 (0.203)	-0.060 (0.203)	-1.985* (1.029)	-2.109** (1.040)	-1.956* (1.016)	-2.081** (1.029)	-2.084** (1.020)
Total debt to asset	2.149*** (0.524)	2.082*** (0.507)	2.251*** (0.525)	2.179*** (0.509)	2.259*** (0.509)	4.481 (2.752)	1.886 (2.257)	3.793 (2.645)	1.356 (2.246)	1.470 (2.233)
Size	7.883 (11.558)	5.184 (10.991)	7.514 (11.518)	4.855 (10.961)	2.963 (11.036)	67.848 (95.904)	22.844 (81.613)	40.537 (92.186)	0.377 (80.317)	22.468 (81.762)
Sovereign credit rating	-14.371*** (4.310)	-13.914*** (4.232)	-14.214*** (4.303)	-13.769*** (4.225)	-13.682*** (4.222)	-55.795 (36.954)	-58.589 (38.072)	-54.564 (36.697)	-57.456 (37.847)	-66.643* (36.747)
ST debt to total debt		0.547*** (0.168)		0.543*** (0.167)	0.275 (0.205)		5.020*** (1.362)		4.895*** (1.344)	6.729*** (1.675)
Cash holding to total debt			0.107 (0.068)	0.101 (0.068)	-0.015 (0.107)			-1.299** (0.533)	-1.122** (0.515)	-0.015 (0.600)
ST debt to total debt x Cash holding to total debt					0.009* (0.005)					-0.099** (0.045)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,179	3,179	3,179	3,179	3,179	1,850	1,850	1,850	1,850	1,850
R-squared	0.377	0.382	0.378	0.383	0.384	0.563	0.576	0.566	0.578	0.581
Number of bond	288	288	288	288	288	362	362	362	362	362
R-squared within	0.377	0.382	0.378	0.383	0.384	0.563	0.576	0.566	0.578	0.581
R-squared between	0.606	0.616	0.608	0.618	0.619	0.621	0.235	0.625	0.253	0.246
R-squared overall	0.504	0.511	0.506	0.513	0.514	0.538	0.231	0.534	0.242	0.238

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A3

Speculative Grade Bonds versus Investment Grade Bonds

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with the proportion of long term debt maturing within a year.

	Proportion LT debt maturing within the year									
	Financial Stability					Banks & Financial				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years to maturity	-6.330 (4.007)	-0.740 (4.935)	-6.228 (4.052)	-0.919 (5.327)	-2.062 (5.605)	-195.381*** (43.097)	-243.265*** (56.571)	-192.843*** (43.178)	-214.996*** (49.651)	
Equity volatility	0.898* (0.473)	1.864*** (0.531)	0.899* (0.473)	1.861*** (0.536)	1.822*** (0.526)	-2.783*** (0.792)	-2.315 (1.648)	-2.629*** (0.799)	-1.280 (1.415)	-0.220 (1.248)
Credit rating	-0.618 (4.106)	-11.351 (8.093)	-0.577 (3.989)	-11.429 (7.875)	-12.244 (7.925)	-16.578 (15.616)	-95.267*** (31.392)	-17.063 (15.660)	-104.263*** (30.896)	-85.243*** (28.715)
Operating income to sales	-0.013 (0.043)	-0.007 (0.048)	-0.013 (0.042)	-0.007 (0.047)	-0.002 (0.046)	-0.957 (0.796)	-0.094 (0.931)	-0.938 (0.795)	0.045 (0.959)	0.186 (0.970)
Total debt to asset	1.751*** (0.317)	0.645 (0.582)	1.756*** (0.315)	0.638 (0.578)	0.686 (0.568)	-9.051** (3.932)	12.859*** (4.711)	-9.162** (3.943)	13.737*** (4.293)	16.494*** (4.040)
Size	5.726 (18.153)	38.286** (15.809)	5.947 (17.942)	37.894** (15.476)	35.616** (15.369)	-229.297 (170.221)	478.284** (189.529)	-214.043 (168.161)	515.963*** (188.936)	539.143*** (188.237)
Sovereign credit rating	11.780 (12.910)	29.083 (17.858)	11.882 (12.803)	28.901 (17.568)	27.185 (16.966)	-49.760 (47.676)		-54.428 (43.271)		
Proportion LT debt maturing within the year		-0.379* (0.214)		-0.381* (0.210)	-0.606*** (0.201)		22.328*** (6.935)		24.174*** (6.997)	29.790*** (8.010)
Cash holding to total debt			0.018 (0.119)	-0.020 (0.164)	-0.247 (0.256)			-2.202* (1.162)	-5.052*** (1.659)	-1.078 (1.426)
Proportion LT debt maturing within the year x Cash holding to total debt					0.010* (0.006)					-0.194*** (0.052)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,139	584	1,139	584	584	829	353	829	353	353
R-squared	0.416	0.379	0.416	0.379	0.383	0.442	0.519	0.444	0.532	0.549
Number of bond	140	72	140	72	72	193	90	193	90	90
R-squared within	0.416	0.379	0.416	0.379	0.383	0.442	0.519	0.444	0.532	0.549
R-squared between	0.273	0.155	0.276	0.153	0.149	0.157	0.164	0.144	0.188	0.193
R-squared overall	0.0963	0.0470	0.0982	0.0453	0.0371	0.146	0.0527	0.139	0.0597	0.0499

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A4

Speculative Grade Bonds versus Investment Grade Bonds

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with the proportion of long term debt maturing within a year.

	Proportion LT debt maturing within the year									
	Financial Stability					Other sectors				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years to maturity	-15.110*** (3.002)	-14.891*** (3.323)	-15.130*** (2.992)	-14.893*** (3.319)	-14.932*** (3.326)		-229.620*** (30.792)		-229.537*** (31.387)	-230.043*** (31.606)
Equity volatility	2.504*** (0.653)	2.715*** (0.667)	2.497*** (0.653)	2.709*** (0.668)	2.706*** (0.667)	3.506*** (0.882)	3.561*** (0.953)	3.339*** (0.895)	3.380*** (0.966)	3.375*** (0.973)
Credit rating	-29.050*** (5.725)	-34.926*** (5.868)	-28.833*** (5.716)	-34.815*** (5.876)	-34.863*** (5.877)	-106.346*** (29.423)	-78.533*** (27.674)	-108.798*** (29.046)	-82.926*** (27.903)	-82.163*** (28.344)
Operating income to sales	-0.050 (0.209)	0.046 (0.206)	-0.060 (0.208)	0.041 (0.205)	0.039 (0.205)	-1.985* (1.029)	-1.869* (1.093)	-1.956* (1.016)	-1.831* (1.076)	-1.821* (1.078)
Total debt to asset	2.149*** (0.524)	2.749*** (0.548)	2.251*** (0.525)	2.794*** (0.546)	2.800*** (0.547)	4.481 (2.752)	4.089 (2.775)	3.793 (2.645)	3.429 (2.685)	3.494 (2.671)
Size	7.883 (11.558)	7.008 (11.430)	7.514 (11.518)	6.929 (11.400)	7.000 (11.408)	67.848 (95.904)	75.656 (97.200)	40.537 (92.186)	46.923 (94.070)	58.399 (96.567)
Sovereign credit rating	-14.371*** (4.310)	-13.720 (11.267)	-14.214*** (4.303)	-13.618 (11.270)	-13.601 (11.269)	-55.795 (36.954)	-31.293 (64.140)	-54.564 (36.697)	-28.891 (63.902)	-37.140 (63.392)
Proportion LT debt maturing within the year		0.395*** (0.095)		0.390*** (0.096)	0.340*** (0.127)		1.546 (1.064)		1.395 (1.061)	2.385 (1.516)
Cash holding to total debt			0.107 (0.068)	0.051 (0.072)	0.031 (0.091)			-1.299** (0.533)	-1.301** (0.547)	-1.027* (0.541)
Proportion LT debt maturing within the year x Cash holding to total debt					0.002 (0.003)					-0.036 (0.039)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,179	2,842	3,179	2,842	2,842	1,850	1,629	1,850	1,629	1,629
R-squared	0.377	0.390	0.378	0.391	0.391	0.563	0.565	0.566	0.568	0.569
Number of bond	288	255	288	255	255	362	319	362	319	319
R-squared within	0.377	0.390	0.378	0.391	0.391	0.563	0.565	0.566	0.568	0.569
R-squared between	0.606	0.632	0.608	0.633	0.633	0.621	0.108	0.625	0.130	0.126
R-squared overall	0.504	0.541	0.506	0.542	0.542	0.538	0.136	0.534	0.154	0.151

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A5

Corporate Bond Spreads, Rollover Risk and Cash Holdings

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of both cases, one in which rollover risk is modelled with short term debt to total, and the other in which the variable used correspond to the proportion of long term debt maturing within a year.

	ST debt to total debt					Proportion LT debt maturing within the year			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Years to maturity	-39.975*** (4.757)	-40.920*** (4.616)	-47.516*** (6.118)	-49.469*** (5.777)	-50.397*** (5.439)	-21.570*** (5.422)	-47.516*** (6.118)	-29.405*** (7.479)	-29.704*** (7.168)
Equity volatility	0.600 (0.408)	0.599 (0.407)	1.183*** (0.411)	1.170*** (0.406)	1.116*** (0.391)	3.222*** (0.605)	1.183*** (0.411)	3.131*** (0.670)	3.107*** (0.652)
Credit rating	-60.058*** (9.779)	-60.395*** (9.695)	-67.196*** (13.252)	-67.824*** (13.137)	-67.943*** (13.151)	-55.799*** (9.137)	-67.196*** (13.252)	-60.205*** (10.908)	-60.268*** (10.884)
Operating income to sales	-0.325 (0.240)	-0.353 (0.240)	0.040 (0.245)	0.015 (0.244)	0.012 (0.243)	-0.207 (0.247)	0.040 (0.245)	-0.266 (0.285)	-0.268 (0.285)
Total debt to asset	1.144 (0.956)	0.947 (0.919)	0.309 (1.102)	0.072 (1.070)	0.018 (1.032)	2.118* (1.146)	0.309 (1.102)	0.588 (1.373)	0.573 (1.353)
Size	-3.654 (28.061)	-11.201 (27.445)	12.859 (33.896)	-0.097 (32.653)	-1.977 (31.769)	-13.872 (27.604)	12.859 (33.896)	0.567 (33.708)	0.344 (33.458)
Sovereign credit rating	0.518 (9.444)	-0.492 (9.339)	-11.064 (14.993)	-15.789 (14.954)	-14.188 (14.524)	-1.082 (14.461)	-11.064 (14.993)	-1.560 (17.775)	-0.835 (17.678)
ST debt to total debt		1.391*** (0.433)		1.676*** (0.544)	1.156* (0.612)				
Cash holding to total debt (lag: 1 year)			0.154 (0.192)	0.193 (0.183)	-0.060 (0.394)		0.154 (0.192)	0.294 (0.198)	0.227 (0.280)
ST debt to total debt x Cash Holding to total debt (lag: 1 year)					0.020 (0.025)				
Proportion LT debt maturing within the year						1.037*** (0.360)		1.297** (0.507)	1.090* (0.633)
Proportion LT debt maturing within the year x Cash Holding to total debt (lag: 1 year)									0.010 (0.025)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,997	6,997	4,828	4,828	4,828	5,408	4,828	3,820	3,820
R-squared	0.580	0.582	0.596	0.599	0.599	0.627	0.596	0.632	0.633
Number of bond	587	587	474	474	474	441	474	363	363
R-squared within	0.580	0.582	0.596	0.599	0.599	0.627	0.596	0.632	0.633
R-squared between	0.473	0.488	0.459	0.461	0.458	0.606	0.459	0.588	0.584
R-squared overall	0.497	0.511	0.495	0.502	0.495	0.587	0.495	0.597	0.595
F	48.22	46.41	49.56	47.06	44.92	45	49.56	46.07	44.40

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A6

Short term debt to total debt: Bond Maturity and Financial Distress

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	ST debt to total debt: Financial Distress											
	Years to maturity ≤ 3				3 < Years to maturity < 7				Years to maturity ≥ 7			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years to maturity	-56.701*	-293.121***	-46.288	-40.161	-114.904***	-97.684***	-111.883***	-111.891***	-323.835***	-326.732***	-325.471***	-323.142***
	(31.588)	(45.259)	(30.651)	(30.542)	(29.767)	(32.103)	(29.246)	(29.357)	(55.256)	(54.433)	(54.868)	(54.880)
Equity volatility	-0.250	0.072	-0.012	0.474	-0.546	-0.507	-0.669	-0.670	0.749	0.790	0.809	0.864
	(0.707)	(0.672)	(0.669)	(0.751)	(0.873)	(0.897)	(0.842)	(0.848)	(1.045)	(1.060)	(1.054)	(1.058)
Credit rating	-106.163***	-103.351***	-106.120***	-102.121***	-55.646**	-61.154**	-57.210**	-57.224**	-51.147*	-56.782*	-57.404*	-55.964*
	(35.602)	(35.317)	(35.058)	(35.255)	(23.754)	(23.868)	(23.716)	(23.918)	(29.697)	(29.656)	(30.730)	(30.269)
Operating income to sales	-0.553	-0.706	-0.584	-0.471	-1.321	-1.348	-1.323	-1.323	-0.659	-0.660	-0.662	-0.659
	(0.969)	(0.995)	(0.966)	(0.958)	(1.035)	(1.035)	(1.022)	(1.023)	(0.911)	(0.885)	(0.887)	(0.877)
Total debt to asset	-0.591	-0.793	-0.731	-0.690	0.227	0.282	-0.340	-0.340	-3.738	-4.625	-4.375	-4.781
	(5.746)	(5.876)	(5.725)	(5.631)	(3.913)	(4.047)	(3.642)	(3.645)	(4.193)	(4.222)	(4.214)	(4.214)
Size	-154.045	-199.919*	-212.802*	-181.923*	46.071	51.102	8.106	8.041	-178.008	-136.253	-128.504	-154.200
	(111.410)	(111.408)	(112.813)	(106.697)	(153.832)	(168.221)	(141.475)	(141.255)	(144.431)	(149.023)	(135.383)	(141.066)
Sovereign credit rating	5.229	-1.488	-7.402	-21.710	-46.483	-46.577	-49.035	-48.990	-50.597	-53.363	-53.961	-51.943
	(56.267)	(51.659)	(52.493)	(51.044)	(108.343)	(106.167)	(108.521)	(107.606)	(49.772)	(49.829)	(49.716)	(48.356)
ST debt to total debt	2.364		2.810	4.304*	4.160**		3.989**	3.985*	0.090		-0.367	1.101
	(1.976)		(1.983)	(2.257)	(1.803)		(1.740)	(2.120)	(1.519)		(1.548)	(1.818)
Cash holding to total debt		-2.807**	-3.078**	-1.165		-2.066***	-1.915***	-1.918***		-2.851**	-2.876**	-1.174
		(1.246)	(1.350)	(1.091)		(0.784)	(0.724)	(0.724)		(1.220)	(1.248)	(1.267)
ST debt to total debt x Cash holding to total debt				-0.073**				0.000				-0.077
				(0.032)				(0.041)				(0.047)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	735	735	735	735	1,281	1,281	1,281	1,281	661	661	661	661
R-squared	0.473	0.476	0.480	0.484	0.486	0.481	0.492	0.492	0.564	0.572	0.572	0.575
Number of bond	191	191	191	191	331	331	331	331	168	168	168	168
R-squared within	0.473	0.476	0.480	0.484	0.486	0.481	0.492	0.492	0.564	0.572	0.572	0.575
R-squared between	0.475	0.399	0.458	0.472	0.0875	0.178	0.170	0.171	0.255	0.260	0.261	0.259
R-squared overall	0.431	0.372	0.409	0.427	0.225	0.302	0.289	0.289	0.283	0.295	0.297	0.293

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A7

Proportion of Long Term debt maturing within a year: Bond Maturity and Financial Distress

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

	Proportion LT debt maturing within a year: Financial Distress											
	Years to maturity ≤ 3				3 < Years to maturity < 7				Years to maturity ≥ 7			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years to maturity		-356.223***	-293.121***	-320.007***	-277.111***	-275.499***	-97.684***	-275.558***				-326.732***
		(57.688)	(45.259)	(57.717)	(37.151)	(37.173)	(32.103)	(37.253)				(54.433)
Equity volatility	-0.351	0.077	0.072	1.477	1.960*	1.738*	-0.507	1.751*	3.009***	2.928**	0.790	2.912**
	(1.380)	(1.376)	(0.672)	(1.768)	(1.050)	(1.008)	(0.897)	(1.012)	(1.141)	(1.154)	(1.060)	(1.136)
Credit rating	-88.409***	-87.445***	-103.351***	-76.202***	-92.608**	-96.882**	-61.154**	-95.541**	-18.811	-31.600	-56.782*	-32.344
	(26.734)	(26.544)	(35.317)	(27.255)	(46.797)	(46.857)	(23.868)	(47.409)	(36.167)	(39.017)	(29.656)	(40.245)
Operating income to sales	-1.166	-1.193	-0.706	-0.940	-1.375	-1.366	-1.348	-1.354	-0.529	-0.498	-0.660	-0.505
	(1.178)	(1.184)	(0.995)	(1.153)	(1.317)	(1.309)	(1.035)	(1.308)	(0.999)	(0.964)	(0.885)	(0.988)
Total debt to asset	-8.142	-8.370	-0.793	-6.873	7.060**	6.464*	0.282	6.513**	7.265**	6.434*	-4.625	6.452*
	(6.067)	(6.079)	(5.876)	(5.583)	(3.503)	(3.285)	(4.047)	(3.283)	(3.534)	(3.375)	(4.222)	(3.467)
Size	-72.880	-151.829	-199.919*	-113.858	141.373	106.600	51.102	117.730	-153.230	-99.597	-136.253	-101.770
	(121.632)	(136.670)	(111.408)	(129.654)	(111.858)	(105.967)	(168.221)	(111.211)	(141.996)	(129.799)	(149.023)	(136.634)
Sovereign credit rating	58.377	36.101	-1.488	-68.162	-107.766	-105.125	-46.577	-110.915	-67.272	-69.689	-53.363	-68.590
	(210.866)	(207.154)	(51.659)	(191.493)	(189.447)	(188.076)	(106.167)	(190.042)	(86.856)	(86.715)	(49.829)	(87.621)
Proportion LT debt maturing within a year	2.012	2.176		6.789*	2.823*	2.636		3.319	-1.285	-1.622		-1.888
	(3.329)	(3.328)		(3.914)	(1.618)	(1.605)		(2.189)	(2.228)	(2.128)		(2.938)
Cash holding to total debt		-2.480*	-2.807**	-0.314		-1.449**	-2.066***	-1.265**		-2.769*	-2.851**	-2.830*
		(1.410)	(1.246)	(1.209)		(0.609)	(0.784)	(0.640)		(1.401)	(1.220)	(1.533)
Proportion LT debt maturing within the year x Cash holding to total debt				-0.156**				-0.027				0.007
				(0.075)				(0.032)				(0.062)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	498	498	735	498	997	997	1,281	997	485	485	661	485
R-squared	0.474	0.480	0.476	0.492	0.549	0.553	0.481	0.554	0.640	0.649	0.572	0.649
Number of bond	133	133	191	133	257	257	331	257	127	127	168	127
R-squared within	0.474	0.480	0.476	0.492	0.549	0.553	0.481	0.554	0.640	0.649	0.572	0.649
R-squared between	0.311	0.256	0.399	0.317	0.0197	0.0421	0.178	0.0328	0.381	0.413	0.260	0.413
R-squared overall	0.342	0.276	0.372	0.330	0.114	0.146	0.302	0.132	0.355	0.385	0.295	0.385

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

A8 Cash Holding and Rollover Risk

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond, time, firm and industry fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Cash Holding and Rollover Risk		
	(1)	(2)
Operating income to sales	0.011 (0.009)	0.038*** (0.013)
Total debt to asset	-0.632*** (0.072)	-0.752*** (0.097)
Size	-5.406** (2.725)	-8.717*** (3.078)
gamma	0.034*** (0.012)	0.040*** (0.013)
ST debt to total debt	-0.032 (0.038)	
Proportion LT debt maturing within the year x 100		0.049* (0.029)
Time FE	Yes	Yes
Firm FE	Yes	Yes
Industry FE	Yes	Yes
Bond FE	Yes	Yes
Observations	7,302	5,582
R-squared	0.056	0.065
Number of bond	607	455
R-squared within	0.0557	0.0646
R-squared between	0.209	0.155
R-squared overall	0.152	0.109

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLES

Table 1
Description of the variables

This table presents all the variables that was considered in the models. It contains the name of all variables, description of all variables, their respective unit, and the source from these were obtained.

Name	Description	Unit	Source
Bond spread	Option-adjusted spread	Basis points	Bloomberg
Years to maturity	Years to maturity	Years	Bloomberg
Equity Volatility	Volatility is the standard deviation of the day-to-day logarithmic price changes. A previous day's 180-day price volatility equals the annualized standard deviation of the relative price change of the most recent trading day's closing price, expressed in a percentage for the day prior to the current	Percent	Bloomberg
Total debt to assets	Total debt to assets	Ratio	Bloomberg
Operating income to sales	Operating income divided by net sales	Ratio	Bloomberg
Size	Total assets	Millions of U	Bloomberg
Sovereign credit rating	S&P's sovereign rating, long term debt, foreign currency	(1 = D,..., 21 = S&P)	
Rating	S&P's firm rating, long-term debt, foreign currency	(1 = D,..., 21 = S&P)	
Cash holding to total debt	Cash holdings divided by total debt	Ratio	Bloomberg
ST debt to total debt	Short-term debt divided by total debt	Ratio	Bloomberg
Proportion LT debt maturing within the year	Long-term debt maturing within the year divided by total debt	Ratio	Bloomberg

Table 2
Summary of Statistics of the Variables

This table presents a summary of statistics of all the variables considered in this study. It shows the number of observations, the mean, the standard deviation, the minimum value and the maximum value that each variable reach in the set of observations.

Variable	Obs	Mean	Std. Dev.	Min	Max
Bond spread	7302	282.0278	307.3576	25.29	2671.42
Years to maturity	7302	6.084957	2.652278	0.0876712	14.96712
Equity Volatility	7302	38.59879	23.64959	7.605	142.745
Total debt to assets	7302	0.330139	0.1683039	0.002283	0.930081
Operating income to sales	7302	0.1377077	0.2070476	-3.378865	0.919088
Size	7302	10.36443	1.864162	5.38388	15.10873
Cash holding to total debt	7302	10.36443	1.864162	5.38388	15.10873
ST debt to total debt	7302	0.2590854	0.2621386	0	1
Proportion LT debt maturing within the year	5582	0.1057499	0.1332672	0	0.9957466

Table 3
Corporate Bond Spreads, Rollover Risk and Cash Holdings

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of both cases, one in which rollover risk is modelled with short term debt to total, and the other in which the variable used correspond to the proportion of long term debt maturing within a year.

	ST debt to total debt					Proportion LT debt maturing within the year			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Years to maturity	-39.975*** (4.757)	-40.920*** (4.616)	-40.435*** (4.664)	-41.353*** (4.544)	-40.734*** (4.586)	-21.570*** (5.422)	-40.435*** (4.664)	-22.005*** (5.293)	-21.488*** (5.289)
Equity volatility	0.600 (0.408)	0.599 (0.407)	0.601 (0.407)	0.600 (0.405)	0.657 (0.411)	3.222*** (0.605)	0.601 (0.407)	3.212*** (0.601)	3.277*** (0.600)
Credit Rating	-60.058*** (9.779)	-60.395*** (9.695)	-59.820*** (9.813)	-60.164*** (9.728)	-59.596*** (9.691)	-55.799*** (9.137)	-59.820*** (9.813)	-55.723*** (9.170)	-55.318*** (9.162)
Operating income to sales	-0.325 (0.240)	-0.353 (0.240)	-0.320 (0.240)	-0.348 (0.240)	-0.359 (0.240)	-0.207 (0.247)	-0.320 (0.240)	-0.200 (0.247)	-0.199 (0.246)
Total debt to asset	1.144 (0.956)	0.947 (0.919)	0.930 (0.916)	0.744 (0.886)	0.603 (0.881)	2.118* (1.146)	0.930 (0.916)	1.949* (1.107)	1.925* (1.101)
Size	-3.654 (28.061)	-11.201 (27.445)	-5.854 (27.470)	-13.254 (26.996)	-11.273 (27.000)	-13.872 (27.604)	-5.854 (27.470)	-16.015 (27.038)	-16.668 (26.801)
Sovereign credit rating	0.518 (9.444)	-0.492 (9.339)	-0.347 (9.442)	-1.314 (9.351)	-2.119 (9.249)	-1.082 (14.461)	-0.347 (9.442)	-1.698 (14.439)	-1.893 (14.458)
ST debt to total debt		1.391*** (0.433)		1.382*** (0.428)	1.947*** (0.544)				
Cash holding to total debt			-0.314 (0.202)	-0.301 (0.196)	-0.013 (0.196)		-0.314 (0.202)	-0.218 (0.179)	0.044 (0.200)
ST debt to total debt x Cash holding to total debt					-0.022** (0.009)				
Proportion LT debt maturing within the year						1.037*** (0.360)		1.049*** (0.362)	1.649*** (0.463)
Proportion LT debt maturing within the year x Cash holding to total debt									-0.026** (0.013)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,997	6,997	6,997	6,997	6,997	5,408	6,997	5,408	5,408
R-squared	0.580	0.582	0.580	0.583	0.583	0.627	0.580	0.627	0.628
Number of bond	587	587	587	587	587	441	587	441	441
R-squared within	0.580	0.582	0.580	0.583	0.583	0.627	0.580	0.627	0.628
R-squared between	0.473	0.488	0.473	0.488	0.489	0.606	0.473	0.607	0.612
R-squared overall	0.497	0.511	0.496	0.509	0.517	0.587	0.496	0.586	0.588
F	48.22	46.41	46.83	45.13	44.71	45	46.83	43.12	41.90

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4
Short term debt to total debt: Financial Stability versus Financial Distress

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with short term debt to total debt.

	ST debt to total debt									
	Financial Stability					Financial Distress				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years to maturity	-13.970*** (2.817)	-13.937*** (2.814)	-13.894*** (2.812)	-13.861*** (2.808)	-14.419*** (2.829)	-333.589*** (27.307)	-344.303*** (27.257)	-329.338*** (27.173)	-339.841*** (27.057)	-337.809*** (27.177)
Equity volatility	2.102*** (0.509)	2.105*** (0.509)	2.096*** (0.510)	2.098*** (0.510)	2.105*** (0.508)	0.532 (0.552)	0.387 (0.526)	0.479 (0.538)	0.340 (0.517)	0.482 (0.534)
Credit rating	-22.206*** (4.843)	-22.259*** (4.836)	-22.138*** (4.835)	-22.191*** (4.829)	-22.639*** (4.825)	-82.092*** (21.012)	-81.455*** (20.858)	-83.264*** (20.909)	-82.609*** (20.766)	-81.164*** (20.741)
Operating income to sales	0.007 (0.055)	0.004 (0.055)	0.005 (0.055)	0.002 (0.055)	0.008 (0.055)	-1.177** (0.596)	-1.142* (0.595)	-1.191** (0.588)	-1.157** (0.588)	-1.139* (0.586)
Total debt to asset	2.201*** (0.388)	2.194*** (0.385)	2.257*** (0.386)	2.251*** (0.384)	2.330*** (0.380)	0.493 (2.860)	-0.366 (2.600)	-0.284 (2.689)	-1.090 (2.488)	-1.129 (2.497)
Size	1.376 (10.732)	0.614 (10.608)	1.221 (10.710)	0.457 (10.589)	-1.321 (10.585)	48.605 (106.597)	12.876 (93.891)	16.156 (97.459)	-17.360 (87.400)	-7.973 (87.036)
Sovereign credit rating	-14.843*** (4.349)	-14.794*** (4.328)	-14.667*** (4.349)	-14.617*** (4.328)	-14.525*** (4.323)	-38.136 (32.441)	-40.218 (33.375)	-39.617 (32.093)	-41.583 (32.982)	-46.535 (32.529)
ST debt to total debt		0.128 (0.127)		0.128 (0.126)	-0.176 (0.152)		2.973** (1.170)		2.876** (1.128)	3.809*** (1.244)
Cash holding to total debt			0.080 (0.056)	0.080 (0.055)	-0.051 (0.079)			-2.013*** (0.592)	-1.948*** (0.569)	-1.174** (0.593)
ST debt to total debt x Cash holding to total debt					0.010*** (0.003)					-0.050*** (0.019)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,318	4,318	4,318	4,318	4,318	2,679	2,679	2,679	2,679	2,679
R-squared	0.362	0.362	0.363	0.363	0.365	0.486	0.491	0.491	0.495	0.496
Number of bond	428	428	428	428	428	555	555	555	555	555
R-squared within	0.362	0.362	0.363	0.363	0.365	0.486	0.491	0.491	0.495	0.496
R-squared between	0.483	0.485	0.482	0.484	0.493	0.0251	0.0314	0.0395	0.0458	0.0419
R-squared overall	0.413	0.415	0.414	0.415	0.417	0.0436	0.0484	0.0571	0.0612	0.0587

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5

Proportion of Long Term debt maturing within a year: Financial Stability versus Financial Distress

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with the proportion of long term debt maturing within a year.

	Proportion LT debt maturing within the year									
	Financial Stability					Financial Distress				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years to maturity	-13.970*** (2.817)	-12.686*** (3.056)	-13.894*** (2.812)	-12.662*** (3.057)	-12.712*** (3.058)	-333.589*** (27.307)	-264.960*** (29.451)	-329.338*** (27.173)	-262.321*** (29.545)	-259.078*** (29.863)
Equity volatility	2.102*** (0.509)	2.523*** (0.552)	2.096*** (0.510)	2.520*** (0.553)	2.514*** (0.552)	0.532 (0.552)	2.853*** (0.808)	0.479 (0.538)	2.750*** (0.798)	2.908*** (0.817)
Credit rating	-22.206*** (4.843)	-30.389*** (5.639)	-22.138*** (4.835)	-30.347*** (5.644)	-30.438*** (5.636)	-82.092*** (21.012)	-65.681*** (21.014)	-83.264*** (20.909)	-69.247*** (21.118)	-66.894*** (21.545)
Operating income to sales	0.007 (0.055)	0.012 (0.056)	0.005 (0.055)	0.012 (0.056)	0.012 (0.056)	-1.177** (0.596)	-1.204* (0.726)	-1.191** (0.588)	-1.199* (0.721)	-1.136 (0.721)
Total debt to asset	2.201*** (0.388)	2.522*** (0.485)	2.257*** (0.386)	2.542*** (0.482)	2.544*** (0.483)	0.493 (2.860)	4.367 (2.767)	-0.284 (2.689)	3.564 (2.659)	3.703 (2.616)
Size	1.376 (10.732)	5.219 (11.130)	1.221 (10.710)	5.226 (11.122)	5.340 (11.106)	48.605 (106.597)	78.518 (84.824)	16.156 (97.459)	47.728 (80.826)	67.006 (81.096)
Sovereign credit rating	-14.843*** (4.349)	-11.798 (10.918)	-14.667*** (4.349)	-11.717 (10.928)	-11.713 (10.921)	-38.136 (32.441)	-47.826 (66.675)	-39.617 (32.093)	-46.245 (66.396)	-62.768 (66.258)
Proportion LT debt maturing within the year		0.268** (0.117)		0.266** (0.117)	0.198 (0.145)		2.706** (1.187)		2.580** (1.174)	4.594*** (1.562)
Cash holding to total debt			0.080 (0.056)	0.026 (0.061)	-0.008 (0.082)			-2.013*** (0.592)	-1.566*** (0.537)	-0.916* (0.537)
Proportion LT debt maturing within the year x Cash holding to total debt					0.003 (0.003)					-0.072** (0.032)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	4,318	3,426	4,318	3,426	3,426	2,679	1,982	2,679	1,982	1,982
R-squared	0.362	0.370	0.363	0.370	0.371	0.486	0.533	0.491	0.537	0.540
Number of bond	428	327	428	327	327	555	409	555	409	409
R-squared within	0.362	0.370	0.363	0.370	0.371	0.486	0.533	0.491	0.537	0.540
R-squared between	0.483	0.483	0.482	0.482	0.482	0.0251	0.0223	0.0395	0.0374	0.0339
R-squared overall	0.413	0.451	0.414	0.451	0.451	0.0436	0.0541	0.0571	0.0702	0.0675

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6
Rollover Risk (ST debt), Cash Holdings and Bond Maturity

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with short term debt to total debt.

	ST debt to total debt											
	Years to maturity ≤ 3				3 < Years to maturity < 7				Years to maturity ≥ 7			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years to maturity	-87.627*** (19.080)	-87.243*** (18.551)	-85.833*** (18.713)	-80.789*** (18.971)	-46.189*** (7.612)	-46.679*** (7.583)	-47.494*** (7.276)	-47.480*** (7.301)	-42.416*** (8.084)	-42.407*** (8.101)	-42.661*** (8.113)	-42.253*** (8.131)
Equity volatility	-0.765 (0.684)	-0.668 (0.653)	-0.722 (0.671)	-0.171 (0.727)	0.295 (0.667)	0.254 (0.657)	0.258 (0.650)	0.260 (0.651)	0.591 (0.678)	0.618 (0.684)	0.612 (0.681)	0.633 (0.685)
Credit rating	-106.369*** (39.529)	-104.834*** (40.056)	-106.922*** (39.357)	-102.868*** (39.112)	-50.624*** (11.647)	-49.503*** (11.670)	-50.417*** (11.644)	-50.382*** (11.665)	-35.625*** (7.672)	-34.821*** (7.585)	-35.050*** (7.597)	-34.676*** (7.553)
Operating income to sales	-0.135 (0.497)	-0.134 (0.513)	-0.151 (0.498)	-0.104 (0.496)	-0.236 (0.301)	-0.210 (0.302)	-0.232 (0.300)	-0.233 (0.300)	-0.763 (0.589)	-0.739 (0.582)	-0.749 (0.585)	-0.762 (0.586)
Total debt to asset	-0.376 (3.998)	-0.053 (4.141)	-0.799 (3.998)	-0.788 (3.960)	1.156 (1.272)	0.939 (1.261)	0.776 (1.168)	0.772 (1.164)	2.702* (1.441)	2.468* (1.413)	2.445* (1.396)	2.308* (1.382)
Size	-74.738 (96.166)	-101.955 (99.185)	-101.522 (97.061)	-105.468 (95.788)	-30.485 (40.577)	-15.881 (42.090)	-32.542 (38.480)	-32.281 (39.344)	-31.233 (27.487)	-30.406 (26.801)	-32.606 (27.791)	-31.229 (27.715)
Sovereign credit rating	19.660 (46.772)	22.565 (49.086)	14.451 (45.177)	-4.218 (42.606)	-8.303 (10.284)	-7.970 (10.453)	-9.444 (10.193)	-9.484 (10.054)	-29.553* (17.094)	-30.583* (17.106)	-30.425* (17.073)	-30.585* (17.013)
ST debt to total debt	2.610 (1.912)		2.719 (1.920)	4.145* (2.170)	1.925*** (0.706)		1.894*** (0.681)	1.919** (0.843)	0.320 (0.305)		0.323 (0.308)	0.654 (0.425)
Cash holding to total debt		-0.993 (0.622)	-1.098 (0.686)	0.042 (0.514)		-0.664* (0.340)	-0.636** (0.319)	-0.623** (0.311)		-0.325 (0.212)	-0.326 (0.212)	-0.151 (0.178)
ST debt to total debt x Cash holding to total debt				-0.061*** (0.023)				-0.001 (0.012)				-0.012 (0.011)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	958	958	958	958	3,330	3,330	3,330	3,330	2,707	2,707	2,707	2,707
R-squared	0.516	0.513	0.517	0.521	0.550	0.547	0.552	0.552	0.593	0.593	0.593	0.594
Number of bond	197	197	197	197	415	415	415	415	332	332	332	332
R-squared within	0.516	0.513	0.517	0.521	0.550	0.547	0.552	0.552	0.593	0.593	0.593	0.594
R-squared between	0.506	0.477	0.500	0.512	0.531	0.499	0.514	0.514	0.433	0.427	0.430	0.435
R-squared overall	0.475	0.435	0.462	0.475	0.519	0.501	0.508	0.509	0.457	0.453	0.455	0.461

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7
Rollover Risk (Proportion of LT debt), Cash Holdings and Bond Maturity

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with the proportion of long term debt maturing within a year.

	Years to maturity ≤ 3				Proportion LT debt maturing within the year 3 < Years to maturity < 7				Years to maturity ≥ 7			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Years to maturity	-86.945*** (23.516)	-85.864*** (23.123)	-87.243*** (18.551)	-77.274*** (23.725)	-29.495*** (8.142)	-30.941*** (7.783)	-46.679*** (7.583)	-31.002*** (7.804)	-28.371*** (8.483)	-28.770*** (8.498)	-42.407*** (8.101)	-28.479*** (8.479)
Equity volatility	-0.193 (1.188)	-0.161 (1.172)	-0.668 (0.653)	1.130 (1.437)	3.111*** (0.867)	3.045*** (0.838)	0.254 (0.657)	3.046*** (0.838)	2.749*** (0.869)	2.759*** (0.872)	0.618 (0.684)	2.768*** (0.873)
Credit rating	-75.578*** (28.228)	-76.669*** (28.626)	-104.834*** (40.056)	-67.996** (28.657)	-56.733*** (14.415)	-56.987*** (14.432)	-49.503*** (11.670)	-57.071*** (14.462)	-21.847*** (7.911)	-21.256*** (7.952)	-34.821*** (7.585)	-21.421*** (7.939)
Operating income to sales	-0.241 (0.604)	-0.248 (0.606)	-0.134 (0.513)	-0.146 (0.602)	-0.149 (0.300)	-0.144 (0.299)	-0.210 (0.302)	-0.144 (0.299)	-0.868 (0.652)	-0.846 (0.644)	-0.739 (0.582)	-0.848 (0.645)
Total debt to asset	-4.815 (4.397)	-5.229 (4.503)	-0.053 (4.141)	-4.172 (4.283)	1.778 (1.646)	1.396 (1.547)	0.939 (1.261)	1.402 (1.546)	5.767*** (1.635)	5.531*** (1.573)	2.468* (1.413)	5.502*** (1.560)
Size	-119.609 (102.466)	-145.677 (107.485)	-101.955 (99.185)	-151.287 (108.740)	-22.124 (44.130)	-26.206 (41.507)	-15.881 (42.090)	-26.243 (41.532)	-43.338 (28.494)	-45.170 (28.880)	-30.406 (26.801)	-44.498 (28.601)
Sovereign credit rating	21.024 (57.119)	17.682 (56.452)	22.565 (49.086)	4.313 (47.167)	0.222 (26.595)	-1.654 (26.533)	-7.970 (10.453)	-1.616 (26.531)	-32.393 (28.613)	-33.059 (28.636)	-30.583* (17.106)	-33.178 (28.578)
Proportion LT debt maturing within the year	2.073 (1.871)	2.051 (1.874)		4.864* (2.524)	1.278** (0.527)	1.291** (0.526)		1.226* (0.645)	-0.347 (0.295)	-0.302 (0.287)		-0.047 (0.310)
Cash holding to total debt		-0.745 (0.600)	-0.993 (0.622)	0.756 (0.672)		-0.519* (0.282)	-0.664* (0.340)	-0.542* (0.300)		-0.297 (0.229)	-0.325 (0.212)	-0.167 (0.247)
Proportion LT debt maturing within the year x Cash holding to total debt				-0.119** (0.057)				0.003 (0.011)				-0.011 (0.014)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	664	664	958	664	2,628	2,628	3,330	2,628	2,114	2,114	2,707	2,114
R-squared	0.513	0.514	0.513	0.522	0.600	0.602	0.547	0.602	0.659	0.660	0.593	0.660
Number of bond	139	139	197	139	321	321	415	321	268	268	332	268
R-squared within	0.513	0.514	0.513	0.522	0.600	0.602	0.547	0.602	0.659	0.660	0.593	0.660
R-squared between	0.429	0.424	0.477	0.467	0.644	0.634	0.499	0.634	0.492	0.488	0.427	0.490
R-squared overall	0.409	0.397	0.435	0.430	0.595	0.587	0.501	0.587	0.470	0.467	0.453	0.469

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8
Bank & Financial versus Other sector (ST debt)

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with short term debt to total debt.

	ST debt to total debt							
	Bank & Financial				Other sectors			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years to maturity	-78.055*** (11.746)	-80.320*** (11.949)	-79.801*** (12.202)	-79.517*** (12.175)	-18.549*** (5.562)	-18.007*** (5.691)	-18.715*** (5.518)	-18.564*** (5.584)
Equity volatility	-2.295*** (0.639)	-2.295*** (0.641)	-2.290*** (0.638)	-2.211*** (0.644)	3.872*** (0.706)	3.861*** (0.718)	3.863*** (0.706)	3.856*** (0.705)
Credit rating	-32.020*** (8.993)	-32.035*** (8.857)	-31.932*** (9.006)	-31.369*** (8.984)	-63.211*** (12.163)	-62.455*** (12.424)	-63.267*** (12.165)	-63.089*** (12.164)
Operating income to sales	-0.234 (0.237)	-0.228 (0.239)	-0.225 (0.238)	-0.233 (0.238)	-1.780*** (0.668)	-1.735*** (0.666)	-1.768*** (0.666)	-1.774*** (0.666)
Total debt to asset	-0.415 (1.393)	-0.516 (1.380)	-0.504 (1.388)	-0.627 (1.387)	-0.153 (1.041)	0.062 (1.078)	-0.253 (1.026)	-0.299 (1.020)
Size	-76.582 (67.694)	-85.869 (65.134)	-83.757 (68.767)	-84.009 (68.817)	-16.482 (27.263)	-6.958 (27.702)	-17.093 (27.036)	-15.878 (27.528)
Sovereign credit rating	61.717 (39.942)	56.710 (39.940)	57.899 (40.049)	56.384 (39.760)	-4.434 (9.920)	-4.170 (9.958)	-4.611 (9.933)	-4.925 (9.833)
ST debt to total debt	-0.180 (0.609)		-0.186 (0.609)	0.277 (0.735)	2.162*** (0.507)		2.159*** (0.505)	2.399*** (0.702)
Cash holding to total debt		-0.381 (0.284)	-0.383 (0.285)	-0.103 (0.268)		-0.129 (0.189)	-0.115 (0.183)	0.000 (0.191)
ST debt to total debt x Cash holding to total debt				-0.018** (0.009)				-0.009 (0.012)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,968	1,968	1,968	1,968	5,029	5,029	5,029	5,029
R-squared	0.525	0.526	0.526	0.526	0.644	0.638	0.644	0.644
Number of bond	209	209	209	209	378	378	378	378
R-squared within	0.525	0.526	0.526	0.526	0.644	0.638	0.644	0.644
R-squared between	0.154	0.172	0.167	0.168	0.699	0.693	0.698	0.699
R-squared overall	0.233	0.244	0.242	0.245	0.625	0.620	0.625	0.626

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 9
Bank & Financial versus Other sector (Proportion of LT debt)

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table show the results of the case in which rollover risk is modelled with the proportion of long term debt maturing within a year.

	Proportion LT debt maturing within the year							
	Bank & Financial				Other sectors			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years to maturity	-55.926*** (14.866)	-80.320*** (11.949)	-55.565*** (15.336)	-51.946*** (15.505)	-14.204** (5.723)	-18.007*** (5.691)	-14.429** (5.613)	-14.324** (5.620)
Equity volatility	-0.362 (1.094)	-2.295*** (0.641)	-0.363 (1.095)	-0.162 (1.088)	4.195*** (0.696)	3.861*** (0.718)	4.183*** (0.693)	4.188*** (0.694)
Credit rating	-40.782** (17.112)	-32.035*** (8.857)	-40.806** (17.094)	-40.271** (16.978)	-57.939*** (10.110)	-62.455*** (12.424)	-57.985*** (10.129)	-57.742*** (10.185)
Operating income to sales	-0.213 (0.240)	-0.228 (0.239)	-0.215 (0.243)	-0.226 (0.245)	-1.414** (0.697)	-1.735*** (0.666)	-1.398** (0.695)	-1.383** (0.691)
Total debt to asset	0.178 (2.754)	-0.516 (1.380)	0.197 (2.769)	0.251 (2.794)	1.468 (1.131)	0.062 (1.078)	1.348 (1.095)	1.316 (1.088)
Size	-54.529 (66.568)	-85.869 (65.134)	-53.103 (68.531)	-45.109 (70.165)	-4.643 (28.787)	-6.958 (27.702)	-5.790 (28.276)	-6.195 (28.082)
Sovereign credit rating	156.588*** (46.329)	56.710 (39.940)	157.430*** (47.042)	163.891*** (49.492)	-11.431 (14.593)	-4.170 (9.958)	-11.623 (14.594)	-12.053 (14.578)
Proportion LT debt maturing within the year	3.608 (2.527)		3.605 (2.529)	4.230 (2.912)	0.843*** (0.300)		0.849*** (0.303)	1.279*** (0.412)
Cash holding to total debt		-0.381 (0.284)	0.048 (0.247)	0.598 (0.477)		-0.129 (0.189)	-0.140 (0.187)	0.017 (0.198)
Proportion LT debt maturing within the year x Cash holding to total debt				-0.027 (0.018)				-0.018 (0.013)
Bonde FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	937	1,968	937	937	4,471	5,029	4,471	4,471
R-squared	0.579	0.526	0.579	0.580	0.653	0.638	0.653	0.654
Number of bond	106	209	106	106	335	378	335	335
R-squared within	0.579	0.526	0.579	0.580	0.653	0.638	0.653	0.654
R-squared between	0.0597	0.172	0.0575	0.0513	0.726	0.693	0.724	0.725
R-squared overall	0.202	0.244	0.200	0.190	0.651	0.620	0.650	0.650

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 10
Speculative Grade Bonds versus Investment Grade Bonds

This table presents estimates from a panel regression of corporate option-adjusted spreads against the variables listed below. All regressions control for bond and time fixed effects. The sample covers from January 2004 to June 2009. ***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively. This table contains the results for both representations of rollover risk: short term debt to total debt and the proportion of long term debt maturing within a year.

	ST debt to total debt										Proportion LT debt maturing within the year							
	Speculative grade					Investment grade					Speculative grade				Investment grade			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Years to maturity	-59.803*** (10.396)	-59.804*** (10.396)	-63.754*** (10.392)	-63.760*** (10.403)	-62.437*** (10.373)	-21.069*** (4.160)	-22.196*** (3.937)	-21.245*** (4.058)	-22.366*** (3.850)	-22.440*** (3.875)	-43.720*** (13.090)	-63.754*** (10.392)	-49.699*** (13.600)	-50.256*** (12.780)	-15.132*** (5.693)	-21.245*** (4.058)	-15.427*** (5.518)	-15.335*** (5.532)
Equity volatility	2.792*** (1.000)	2.791*** (1.003)	2.793*** (0.988)	2.796*** (0.990)	2.834*** (0.987)	1.079*** (0.328)	1.081*** (0.328)	1.087*** (0.330)	1.089*** (0.330)	1.077*** (0.334)	4.376*** (1.120)	2.793*** (0.988)	4.217*** (1.111)	4.232*** (1.093)	2.310*** (0.626)	1.087*** (0.330)	2.320*** (0.627)	2.336*** (0.629)
Credit rating	-79.211*** (15.982)	-79.238*** (16.010)	-78.199*** (15.646)	-78.139*** (15.662)	-77.284*** (15.798)	-33.253*** (5.968)	-34.139*** (6.108)	-33.001*** (5.987)	-33.889*** (6.119)	-34.006*** (6.078)	-77.447*** (16.149)	-78.199*** (15.646)	-76.736*** (15.821)	-72.967*** (16.164)	-46.563*** (8.580)	-33.001*** (5.987)	-46.363*** (8.614)	-46.425*** (8.639)
Operating income to sales	-3.819*** (0.753)	-3.819*** (0.752)	-3.687*** (0.732)	-3.686*** (0.731)	-3.720*** (0.730)	0.045 (0.215)	0.024 (0.214)	0.048 (0.216)	0.026 (0.214)	0.028 (0.214)	-2.437*** (0.848)	-3.687*** (0.732)	-2.336*** (0.821)	-2.297*** (0.773)	-0.090 (0.247)	0.048 (0.216)	-0.081 (0.247)	-0.082 (0.247)
Total debt to asset	0.101 (1.588)	0.099 (1.582)	-0.682 (1.598)	-0.680 (1.597)	-0.988 (1.551)	1.362 (0.919)	1.241 (0.897)	1.224 (0.853)	1.105 (0.838)	1.141 (0.834)	2.188 (1.528)	-0.682 (1.598)	1.511 (1.554)	1.026 (1.419)	1.487 (1.287)	1.224 (0.853)	1.281 (1.208)	1.283 (1.206)
Size	13.470 (45.299)	13.580 (45.449)	-1.787 (45.536)	-2.052 (45.566)	0.821 (45.973)	21.303 (23.236)	13.557 (22.554)	20.500 (22.720)	12.786 (22.137)	12.498 (22.265)	56.994 (46.680)	-1.787 (45.536)	38.634 (47.661)	35.172 (46.059)	-1.564 (23.879)	20.500 (22.720)	-3.495 (23.016)	-3.742 (22.903)
Sovereign credit rating	-17.331 (12.045)	-17.303 (11.997)	-22.982* (12.723)	-23.054* (12.658)	-24.077* (12.647)	14.193 (15.194)	11.294 (14.840)	13.623 (15.193)	10.740 (14.863)	11.076 (14.718)	-73.515** (30.059)	-22.982* (12.723)	-84.033*** (31.098)	-92.257*** (29.852)	11.001 (16.860)	13.623 (15.193)	10.320 (16.862)	10.348 (16.881)
ST debt to total debt		0.046 (0.823)		-0.098 (0.838)	1.011 (1.170)		0.937*** (0.361)		0.935*** (0.360)	0.811* (0.438)								
Cash holding to total debt			-1.519** (0.736)	-1.522** (0.729)	-1.238 (0.759)			-0.210 (0.182)	-0.206 (0.179)	-0.278 (0.189)		-1.519** (0.736)	-1.347* (0.746)	-0.988 (0.701)		-0.210 (0.182)	-0.264 (0.182)	-0.203 (0.199)
ST debt to total debt x Cash holding to total debt					-0.036 (0.025)				0.005 (0.006)									
Proportion LT debt maturing within the year											0.106 (0.645)		0.127 (0.623)	4.162*** (1.492)	0.840** (0.412)		0.855** (0.416)	0.973* (0.501)
Proportion LT debt maturing within the year x Cash holding to total debt														-0.152*** (0.050)				-0.005 (0.007)
Bond FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,551	1,551	1,551	1,551	1,551	5,446	5,446	5,446	5,446	5,446	1,328	1,551	1,328	1,328	4,080	5,446	4,080	4,080
R-squared	0.724	0.724	0.727	0.727	0.727	0.617	0.619	0.617	0.619	0.619	0.746	0.727	0.749	0.754	0.646	0.617	0.646	0.646
Number of bond	158	158	158	158	158	481	481	481	481	481	128	158	128	128	362	481	362	362
R-squared within	0.724	0.724	0.727	0.727	0.727	0.617	0.619	0.617	0.619	0.619	0.746	0.727	0.749	0.754	0.646	0.617	0.646	0.646
R-squared between	0.471	0.471	0.435	0.435	0.431	0.170	0.185	0.175	0.189	0.191	0.478	0.435	0.429	0.381	0.361	0.175	0.368	0.370
R-squared overall	0.557	0.557	0.526	0.526	0.523	0.416	0.435	0.420	0.439	0.439	0.492	0.526	0.446	0.416	0.492	0.420	0.494	0.495
F	44.47	42.83	43.56	42.07	40.44	77.86	74.82	74.69	71.42	69.13	38.30	43.56	38.62	34.08	68.67	74.69	66.09	63.79

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

ILLUSTRATIONS

Figure 1
Corporate Bond Spreads

This table figure presents the historical evolution of average of OAS from the corporate bond spreads of the original dataset. The period of the sample starts in January 2004 and finish in June 2009.

