



**UNIVERSIDAD DE CHILE
FACULTAD DE CIENCIAS FÍSICAS Y MATEMÁTICAS
DEPARTAMENTO DE INGENIERIA INDUSTRIAL**

**RIESGO PAÍS Y SPREADS DE BONOS CORPORATIVOS: EVIDENCIA DE
EUROPA.**

MEMORIA PARA OPTAR AL TÍTULO DE INGENIERO CIVIL INDUSTRIAL

CAMILO JAVIER MIRANDA MONTECINOS

**PROFESOR GUÍA:
PATRICIO ANDRÉS VALENZUELA AROS**

**MIEMBROS DE LA COMISIÓN:
HERMAN BENNETT CONTZEN
ALEJANDRO BERNALES SILVA**

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La reciente crisis financiera y los altos niveles de deuda de los países Europeos, afectaron fuertemente al mercado de deuda internacional y produjeron un gran aumento en los spreads de crédito. Dado que los spreads de bonos corporativos son una manifestación del costo de financiamiento para el sector privado, estos pueden afectar las decisiones de inversión de distintas compañías y con ello, afectar al crecimiento económico. Por lo tanto es crucial entender los principales determinantes de los spreads de bonos corporativos.

Ferri y Liu (2002) y Borensztein, Cowan y Valenzuela (2013), muestran que el riesgo de crédito soberano es uno de los principales factores que afectan al costo de financiamiento privado. La evidencia muestra que la relación entre el riesgo de crédito corporativo y el soberano es más fuerte en el sector financiero, porque firmas que pertenecen a este rubro invierten gran cantidad de dinero en bonos soberanos.

Usando una base de datos a nivel de bonos para el periodo 2004-2009, este estudio explora el impacto del riesgo soberano sobre los spreads de bonos corporativos emitidos en el mercado internacional por firmas de países Europeos. La base de datos final consta de 266 bonos emitidos por 73 firmas, localizadas en 13 países europeos. Este trabajo muestra que el riesgo de crédito soberano es un determinante importante de los spreads de bonos corporativos y un incremento en estos, está asociado a un incremento de los spreads de bonos soberanos. Este efecto es más fuerte en periodos de inestabilidad financiera y en firmas pertenecientes al sector financiero.

Estos resultados son robustos a distintos test. Son robustos controlando por los principales determinantes de los spreads de bonos corporativos de acuerdo a los modelos estructurales de riesgo de crédito (Merton, 1974). Son robustos controlando por diferentes efectos fijos: efecto fijo país, efecto fijo industria, efecto fijo tiempo y efecto fijo por bono. Finalmente, los resultados son robustos a especificaciones alternativas.

Los resultados de este trabajo tienen importantes implicancias para los inversionistas que necesitan predecir los spreads de bonos corporativos. También ayudan a los directivos de empresas que necesitan conocer los principales factores que afectan al costo de financiamiento de sus empresas. Finalmente, son relevantes para los políticos que necesitan diseñar políticas públicas para hacer que el mercado financiero sea menos vulnerable ante episodios de inestabilidad financiera global.

COUNTRY RISK AND CORPORATE BOND SPREADS: EVIDENCE FROM EUROPE

The recent global financial crisis and the debt crisis in Europe strongly affected international debt markets and produced a significant widening of credit spreads. Given that corporate bond spreads are a manifestation of the cost of financing for the private sector, they can affect investment decisions and, in turn, economic growth. Therefore, it is crucial to understand the main drivers of corporate bond spreads.

According to Ferri and Liu (2002) and Borensztein, Cowan and Valenzuela (2013), sovereign credit risk is one of the main factors affecting the cost of private borrowing. Additional evidence suggests that the relationship between corporate and sovereign credit risk is stronger in the financial sector as financial firms invest large amount of money on sovereign bonds.

Using a bond-level dataset covering the 2004-2009 period, this study explores the impact of sovereign risk on credit spreads of bonds placed in international market by European firms. The final data contains information of 266 bonds issued by 73 firms located in 13 European countries. This paper shows that sovereign credit risk is indeed an important determinant of corporate bond spreads. Increases in corporate bond spreads are associated with increases in sovereign bond spreads. This effect is statistically significant and economically meaningful. This effect is stronger in periods of financial distress than in periods of financial stability. It is also stronger in firms in the financial sector than in firms in other sectors.

These results are robust to a variety of robustness tests. They are robust even after controlling for the standard determinants of corporate bond spreads according to structural credit risk model (see, e.g., Merton, 1974). They are robust to controlling for different sets of fixed effects: country fixed effects, industry fixed effects, time fixed effects and bond fixed effects. Finally, they are robust to alternative specifications.

The results in this paper have important implications for investors that need to predict corporate bond spreads. They are also helpful for firm managers that need to understand the main factor affecting their cost of financing. Finally, they are relevant for policymakers who need to design the public policies to make financial markets less vulnerable to episodes of financial distress.

DEDICATORIA

Para mi madre, mi padre y mi hermano.

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1. INTRODUCTION

The recent global financial crisis and the debt crisis in Europe strongly affected international debt markets and produced a significant widening of credit spreads. Given that corporate bond spreads are a manifestation of the cost of financing for the private sector, they can affect investment decisions and, in turn, economic growth. Therefore, it is crucial to understand the main drivers of corporate bond spreads.

The determinants of corporate bond spreads have been the subject of several studies as they are very important for both investors and firms. On one hand, investors need to make their investment decisions based on solid foundations. On the other hand, debt issuance and the cost of debt capital are important for firms' investment decisions.

According to Ferri and Liu (2002) and Borensztein, Cowan and Valenzuela (2013), sovereign credit risk is one of the main factors affecting the cost of private borrowing. Additional evidence suggests that the relationship between corporate and sovereign credit risk is stronger in the financial sector as financial firms invest large amount of money on sovereign bonds.

Using a bond-level dataset covering the 2004-2009 period, this study explores the impact of sovereign risk on credit spreads of bonds placed in international market by European firms located within the country of origin of sovereign bonds. Specifically, employs option-adjusted spread (OAS) from Bloomberg. Basically, the OAS is the spread of a non-risk-free bond over the relevant risk-free security after adjusting by optionality of the instrument. The most relevant explanatory variable is the sovereign bond spread. The sovereign spread is measured as the difference of the yield index of a specific government and the yield index of the German government, which debt is assumed to be risk-free. The final data contains information of 266 bonds issued by 73 firms located in 13 European countries.

The econometric approach in this paper is close to the one presented by Valenzuela (2012). In that paper the author examines eight variables as determinants of corporate bond spreads, of which two of them are interacted with measures of illiquidity. These variables are: maturity, volatility of equity, rating of the firm, sales revenue, short-term debt to total debt, total debt to assets, assets, and sovereign rating.

This study differs from Valenzuela (2012) and other empirical finance literature by adding the sovereign credit spread; i.e. it analyzes when the market penalizes in more or less degree to sovereign debt, measured by sovereign spreads, and how they can affect market preferences for private debt, measured by corporate spreads. It also differs because European countries are considered in this database. Furthermore, one the aim of this study is to contribute to the literature with a new set of robust evidence regarding the relationship

between corporate and sovereign risk. Additionally, this paper compares the impact of sovereign credit spread on corporate bond spreads during periods of financial stability versus periods of financial distress and across different industries (i.e., financial firms versus non-financial firms).

The main finding in this paper is that sovereign credit risk is indeed an important determinant of corporate bond spreads. Increases in corporate bond spreads are associated with increases in sovereign bond spreads. This effect is statistically significant and economically meaningful. The impact of sovereign credit spreads on corporate bond spreads is stronger during periods of financial distress and in financial firms. These results are robust to a variety of robustness tests. They are robust even after controlling for the standard determinants of corporate bond spreads according structural credit risk model (see, e.g., Merton, 1974). They are robust to controlling for different sets of fixed effects: country, industry, time, and bond fixed effects. Finally, they are robust to alternative subsamples and alternative specifications.

The results in this paper have important implications for investors that need to predict corporate bond spreads. They are also helpful for firm managers that need to understand the main factor affecting their cost of financing. They are relevant for policymakers who need to design the public policies to make financial markets less vulnerable to episodes of financial distress. Finally, this work aims to contribute to the literature on the determinants of corporate bonds. It contributes to the empirical literature by exploring the sovereign bond spreads; how they can affect in one way or another illiquidity of the debt market and the corporate bond spreads.

The paper is organized as follows. Section 2 describes a literature review on empirical studies that explain what the determinants of spreads are. Section 3 briefly presents the theoretical framework that supports the empirical tests that were studied in this paper. Section 4 describes the characteristics of the data and sample. Section 5 presents the methodology. Section 6 presents the empirical results. Section 7 analyzes the results of the model with different robustness checks. Section 8 shows the conclusions of this paper.

2. LITERATURE REVIEW

Existing literature on bond spreads could be summarized in three groups. First, papers that explore the determinants of corporate bonds. Second, studies that examine the determinants of sovereign bonds. Third, papers that study the relationship between country risk and corporate bond spreads.

In the first group of papers, there is an extensive body of literature examining the influence of default risk and market illiquidity on corporate bond spreads (eg, Merton, 1974; Campbell and Taksler, 2003; Chen, Lesmond, and Wei, 2007; Covitz and Downing, 2007; Altman, 2000). Altman (2010) studies the firm level determinants of idiosyncratic corporate risk (mainly, financial risk factors). These are return on assets (EBIT/Assets) stability of earnings, cumulative profitability (Retained earnings before interest and taxes/Assets), liquidity (Working Capital/Assets), capitalization (Equity/Capital), leverage (Debt/Assets), and size (Total Assets).

Literature expands the set of firm-level variables to include ‘volatility of equity’ because in the framework of Merton (1974) a firm with more volatile equity is more likely to reach the boundary condition for default. Thus, investors should require additional compensation in the form of higher spreads. Campbell and Taksler (2003), in a study of US corporations, find that equity volatility explains about a third of the variation in corporate bond yield spreads.

One of the papers that belongs to the second group, studying the determinants of sovereign bonds, is Poghosyan (2012). This paper studies the determinants of long and short-term sovereign bond spreads of developed economies. It tries to understand which factors affect interest rates on bonds. To perform this analysis, they took a sample of 22 developed economies, with data from 1980 up to 2010 using a panel data. As a determinant of long-term they use the debt-GDP ratio and the growth potential. As short-term measures they use the interest rate on the debt level, inflation, economic growth and fiscal balance. As a result they find that in the long term, the interests of government bonds increase 2 BPS in response to a growth of one percent of the debt-GDP ratio, and by 45 BPS when the rate of potential growth is increased by 1%.

Furthermore, one of the first and most important studies on determinants of sovereign credit risk is Cantor and Packer (1996). The paper concludes that the total variables used by Moody's and Standard and Poor's, six of them play an important role in assessing the sovereign debt of countries. These variables are: fiscal balance, inflation, economic growth, public debt, per capita income and the current account balance.

Among the papers that belong to the third group, i.e. studying the relationship between country risk and corporate bond spreads; it can be found Ferri et al. (2001). That paper finds a significant positive correlation between the changes in private credit ratings and the changes in sovereign credit ratings. This correlation is higher in emerging economies and for rating downgrades. Moreover, William et al (2013) show that changes on sovereign rating have a significant effect on bank rating. They also affirm that the sensitivity of bank rating changes on sovereign rating changes is affected by macroeconomics conditions and the countries’ economy and financial freedom.

Furthermore, the paper by Borensztein et al. (2013) determines if sovereign ratings remain being a "ceiling" for the corporate ratings. Their data consists of firm-level observations for the period 1995 to 2004, a period spanning episodes of substantial instability in emerging markets. As an example, the Asian financial crisis that gripped much of East Asia began in July 1997 and raised fears of a worldwide economic meltdown due to financial contagion. The crisis started in Thailand with the financial collapse of the Thai Baht (Thailand currency). The Russian financial crisis (1998) is another case of instability in emerging markets which took place due to a decrease in commodity prices as oil, natural gas, metals and wood. These commodities made up more than 80% of Russian exports. Oil was the main resource to get higher tax revenues and non-payment of taxes on energy and manufacturing industries also affected the Russian instability period. This crisis brought an enormous devaluation of the ruble (Russian currency).

The main source of information of Borensztein et al. (2013) is the Bloomberg database on publicly traded firms, which also includes accounting data for the credit-rated firms. Their main dependent variable is the private credit rating issued by S&P. The independent variables are firm-level determinants of idiosyncratic risk, dummy variables for industry sectors, country-level macroeconomic variables that affect the risk level of all firms in the economy, and sovereign rating. The parameter of interest in this estimation is the last one. They conclude that the sovereign "ceiling" is not an absolute restriction, but it is a limitation that tends to reduce the corporate rating, when these are greater than the rating of the country. They also suggests that the so-called 'transfer risk' between sovereign rating and corporate risk is positive and significant, that is, the risk when the government finds difficulties in servicing its debts, will be transferred to the local private sector.

Moreover, there are at least three reasons to expect a positive correlation between sovereign and corporate credit ratings (Borensztein et al. 2013). The first reason relates to the country-specific macro-level vulnerabilities that make both forms of debt risky. Exposure to large external shocks (via terms of trade, for example) is one such source of vulnerability. Increasing the variance of profits for firms and the tax receipts for governments with higher macro-level volatility increases the probability of default.

The second reason for a positive correlation is the 'spillover' effect from the sovereign default to private debtors. A sovereign in default may undertake measures that directly affect the private sector's ability to repay. Inflationary financing and tax increases are both examples of spillovers. This spillover effect generates a positive correlation between the probabilities of sovereign and corporate default; firms in countries with riskier governments, *ceteris paribus*, should be more risky than their counterparts in countries with safer government debt.

The final reason for the positive correlation between corporate and sovereign credit ratings is the closure of the capital account or foreign exchange rate markets in times of sovereign default. If the sovereign defaults, then the private sector must also default on the external debt because they cannot access the dollars they need and/or get them out of the country.

The transition of spreads of this European crisis reflects both an increase in the credit risk as an increase in the liquidity premium. The increase of these premiums is a result of the interaction between common factors and other idiosyncratic factors. Barbosa and Costa (2010) try to identify the contribution of these factors in the evolution of sovereign spreads during the last time. They conclude that once the subprime crisis started in September 2008, markets have penalized more interest rates to countries with major macroeconomic imbalances and/or to those countries that have lower liquidity of sovereign bonds. The authors also note that since the fall of Lehman Brothers, indicators of credit risk and liquidity have played a more important role in corporate bond spread.

However, the investigation of the macro variables in the corporate debt markets is still in its infancy. In that sense, this paper seeks to enrich the literature to better understand the relationship between country risk and corporate bonds.

3. THEORETICAL FRAMEWORK

The framework of this work includes three techniques widely used in economics that are combined to estimate a better model. First, the panel data models also known as longitudinal or cross-sectional time-series data refer to multiple data sets consisting of observations on each sampling unit. Second, the technique of models fixed effects and third, cluster technique to estimate the errors of regressions.

In finance and economics, one of the most common causes of endogeneity is omitted relevant variables. Panel data can sometimes offer a partial solution to this problem, but by no means it is the total solution. Another advantage of panel data sets is its ability to control individual heterogeneity. They are also better to identify and estimate effects that are simply not detectable in cross-sections or time-series data. In particular, panel data sets are used to study complex issues of dynamic behavior.

The fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics. By one side, effect of the features of fixed-effects models is that they cannot be used to investigate time-invariant causes of dependent variables. Technically, time-invariant characteristics of the individuals are perfectly collinear with the person dummies. Substantively, fixed-effects models are designed to

study the causes of changes within a person. Fixed effects can improve endogeneity concerns, but, as it is the case with all econometric techniques, they should be used only after thinking carefully about the economic forces that might cause fixed effects to be a problem. Furthermore, in some instances fixed effects eliminate the most interesting or important variation that researchers wish to explain.

In order to estimate the errors of regressions, the cluster technique is used. The usual assumption is that errors are independently and identically distributed but this is clearly violated in many cases. A natural generalization is to assume “clustered errors” i.e. that observations within group i are correlated in some unknown way, inducing correlation in errors within i , but groups i and j do not have correlated errors. In the presence of clustered errors, OLS estimates are still unbiased but standard errors might be wrong, leading to incorrect inference in a surprisingly high proportion of finite samples. The cluster-robust standard error estimator converges to the true standard error as the number of clusters M approaches infinity, not the number of observations N . Kézdi (2004) shows that 50 clusters (with roughly equal cluster sizes) is often close enough to infinity for accurate inference. With a small number of clusters ($M \ll 50$), or very unbalanced cluster sizes, inference using the cluster-robust estimator may be incorrect. A. Nichols (2007).

4. DATA

The database is from January 2004 to July 2009. The dependent variable is the corporate bond spread. The independent variables of interest are sovereign bond spreads, bond maturity, equity volatility, operations income on sales, short term debt on total debt, debt on asset, rating and size. The database contains data of bonds that have been issued in 13 European countries: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, Norway, Spain, Sweden, Switzerland and Netherlands. Each spread of corporate bond has as independent variable its respective sovereign bond spread from the country of origin, of similar maturity.

The descriptions of database are as follows. Figure 1 shows the distribution of bonds per firm and country. There are 7446 number of observations in the database, 266 bonds and 73 firms. In most of the firms the amount of bonds analyzed are equal or less than 5. Table 1 shows the main variables, their names, descriptions, units and sources. Table 2 shows the statistics of the main variables.

4.1 Corporate Bond Spreads

The data set consists of month-end data and considers all fixed-rate corporate bonds that are denominated in U.S. dollars and it also contains bonds issued by publicly traded firms in the financial and non-financial sectors. The data set has a period of stability (2004-2007) and the Sub Prime Crisis (2008-2009). It is important to emphasize that international debt denominated in U.S. dollars have become an important financing source for firms (Allen, Qian, Carletti and Valenzuela, 2012). Using data from 1991 to 2005, Gozzi et al. (2010), show that the capital obtained through debt issuance was raised to 35% in the international markets. Moreover, international debt issues tend to be denominated in foreign currencies (Hausmann, and Panizza, 2010; Gozzi et al., 2012).

The histogram of corporate bond spreads (OAS) that are included in this study is shown in figure 2. Over 60% of the observations are less than 170 basis points. There are less than 500 observations with more than 670 basis points.

The average corporate spreads by country from January 2004 up to July 2009 is shown in figure 3. There are also some countries that have data for a shorter period of time. It can be seen that Spain is below average. This is possibly due to a bias in the sample data, because the bond spreads of Spain belong only to two companies, both of them with ratings between BBB+ and A- in the period of study. Without further analysis, it can be proved that Finland is above average; probably this is also due to a bias because the data base has bond spreads of only two companies whose ratings ranging from BBB- and BB+ in the period studied. This does not mean necessarily that all bond spreads of Finnish companies are higher on average. However, this paper demonstrates that if the data has few companies in some countries, this does not affect the robustness of results.

Corporate bond spreads on the financial and non-financial industry during the period 2004-2009 of the database is shown in figure 4. As it can be seen, both of them begin increasing almost at the same time in the mid of 2007. They increased by more than 200 basis points on average after the crisis broke out.

4.2 Sovereign Bond Spreads

Sovereign bond spread were calculated as a difference between interest rates of government bonds of each country and interest rates paid by the German government bonds of the same maturity. German government bonds are used in different investigations as a risk free reference rate when calculating spreads in European countries. For example in Barbosa and Costa (2010) and Schwarz (2010).

Interest rates are obtained from Merrill Lynch, through Datastream data base. Monthly spreads are used and measured in basis point (BPS), in which 100 BPS is a 1%. The spreads for each of the countries studied were calculated as follows:

$$\text{Spread}_{it}^m = \text{Yield index}_{it}^m - \text{German Yield index}_t^m, \quad (1)$$

where:

i is the country.

t the date when the spread is calculated.

m is the remaining time before the debt matures.

Five ranges of maturity were defined, bonds coming to maturity in: 1-3 years, 3-5 years, 5-7 years, 7-10 years and 10 or more years. For example, the interest with maturity 1-3 years is the average interest paid by bonds of country i that mature in 1-3 years, at time t .

The histogram of sovereign bond spreads which are included in this study is shown in figure 5. Spreads equal to 0 are bonds issued by Germany and negative spreads are bonds issued by countries that have less interest rate than that of German bonds at the same time. This research analyzes the behavior of corporate and sovereign spread over time.

The monthly average of European corporate and sovereign bonds of the database is shown in figure 6. It is demonstrated that these two types of debt instruments suffered a strong rise in the period of financial instability, showing first an increase in corporate bond spreads in the mid of 2007 and then a rise in sovereign spreads in the mid of 2008. Both debt instruments showed their highest increase at the end of 2008 and the beginning of 2009. That is to say, the cost of financing grew up for companies and governments. This makes sense because the crisis affected companies first, and due to this, solvency in order to pay the obligations of the companies decreased, causing an increase in the cost of private debt. Afterwards market preferred to indebt with governments increasing demand of sovereign bonds. Other factors such as over-indebtedness of countries and the transfer of default risk of companies to their governments brought an increase in sovereign spreads. Just some of this risk is transferred as a result of public bailout of failed banks and from different other measures that governments take in global economic crisis situation.

The averages of sovereign spreads by country during the period of this study are shown in figure 7. Spain is the country that has a greater rise in interest rates during the crisis period. Special case is Switzerland that has lower rates than Germany.

5. METHODOLOGY

This empirical study has been done through a panel data model to control variables over time. This model is a set of data where the same cross section is followed over time; the model has a time and a cross dimension. Panel data model is particularly useful when controlling non-observable and constant factors in time that could be correlated with the independent variables of the model. Behavior may be tested, individual heterogeneity and invariable parameters over time also may be controlled.

Additionally, the panel data model has several advantages when analyzing a set of heterogeneous data. However, it also has its limitations. The discussion focuses on the ideas presented in Baltagi (2008). Among the benefits, panel data can better control the heterogeneity of individuals, given that it assumes that the individuals behave differently. In the case of series of time and cross-section approaches they may exclude this effect, so, there is a risk of getting biased results.

Among the variables, panel data model also has more information, variability, degrees of freedom, efficiency and less collinearity. Frequently, studies of time series have multicollinearity problems, obtaining biased results. Finally, the panel data model is better in order to study the dynamics of adjustment. The time series and cross-sectional analysis cannot identify the dynamics in time. However, the use of panel data model has its limitations. For example, problems in obtaining data and measurement errors. But in this work these problems are out of this study because the data was directly extracted from Bloomberg.

The dependent variable is the OAS. As described in Huang and Kong (2003), this credit spread on corporate bonds is the extra yield offered to compensate investors for a variety of risks, such as: (1) expected default loss, (2) credit risk premium due to the uncertainty of default losses, and (3) liquidity and tax premiums. It is precisely the origin of this extra yield that it is investigated in this paper using a new panel data set.

The literature on corporate bonds indicates that are basically three types of variables that affect the spread: bonds features, characteristics of the firm and macro variables. As independent variables, within the bonds features, the model has maturity. In relation to the characteristics of the firm, the model has volatility of equity, operating income to sales, short-term debt to total debt, total debt to assets, rating and total assets. Finally this paper studies sovereign bond spread within the macro variables of determinants on corporate bond spreads.

The basic econometric model is analyzed by using country fixed effect. However, this paper also investigates about fixed effects of country and industry, country and time, and

bond fixed effect. Besides, clustering errors by bond, i.e. it is assumed that the errors ϵ_{bfct} of the model are correlated when observations are of the same bond so as to have better estimations of errors; in this way, the model can have better estimations of beta coefficients obtaining robust results.

The baseline econometric model takes the following form:

$$S_{bfct} = \alpha + \beta_1 Mat_{bfct} + \beta_2 EV_{fct} + \beta_3 O.I/Sales_{fct} + \beta_4 STD/D_{fct} + \beta_5 D/A_{fct} + \beta_6 Rtg_{ft} + \beta_7 Sze_{ft} + \beta_8 SBS_{ct} + A_c + \epsilon_{bfct}, \quad (2)$$

where:

S_{bfct} is corporate bond spread of bond b of firm f of the country c in month t.

Mat_{bfct} is maturity bond b of firm f of country c in month t.

EV_{fct} is equity volatility of the firm f of country c in month t.

$O.I/Sales_{fct}$ is operating income over sales of the firm f of the country c in month t.

STD/D_{fct} is short term debt over total debt of firm f of the country c in month t.

D/A_{fct} is total debt over assets of firm f of the country c in month t.

SBS_{ct} is sovereign bond spread of firm f of country c in month t.

A_c is country fixed effect.

The following econometric model is also studied to prove if the results from financial and non-financial bonds differ.

$$S_{bfct} = \alpha + \beta_1 Mat_{bfct} + \beta_2 EV_{fct} + \beta_3 O.I/Sales_{fct} + \beta_4 STD/D_{fct} + \beta_5 D/A_{fct} + \beta_6 Rtg_{ft} + \beta_7 Sze_{ft} + \beta_8 SBS_{ct} + \beta_9 FfxSBS_{ct} + A_c + \epsilon_{bfct}, \quad (3)$$

with the same variables than equation (2), but adding the interaction $F_f \times SBS_{ct}$, where F_f is a binary variable that takes the value 1 if the firm f belongs to the financial industry and takes value 0 if it does not.

This work analyzes how a change of sovereign bond spreads may affect the corporate bond spread through the following equation:

$$\frac{\partial S_{bfc_t}}{\partial SBS_{ct}} = \beta_8 + \beta_9 F_f . \quad (4)$$

If model finds that the coefficient β_9 is statistically significant and higher than zero, it is possible to say that the effect of sovereign spreads on corporate bond spreads will be amplified if the last ones belong to financial industry.

Sub samples bonds are tested to see if there is a change in the behavior of these variables. The data has been separated in periods of stability from 2004 to 2007 with 3452 observations and instability from years 2008-2009 with 3837 observations. Besides, it was taken a sub sample of financial bonds with 3602 observations and other 3687 non-financial ones.

6. RESULTS

This section reports the major findings of this paper. Table 3 shows the results from estimating Eq(2) by ordinary least squares with cluster errors by bond. Columns 1 to 5 report the result of the whole sample of bonds. Illustratively column (1) shows the coefficient associated with the variable of sovereign bond spread without any fixed effect. This is away from showing the real effect of the main variable, but it is shown any way. From now on, this work focuses only on four models, that is to say fixed effects by country, by country and industry, country and time, and by bonds.

The effect of sovereign bond spreads on corporate bond is 3.35 (Column (2) of table 3), i.e. if the sovereign bond spread increases by 1 basis point, the corporate spread increases by 3.35 basis points. This happens if the model is controlled by country fixed effects, i.e. the model consider within dummy variables, all the characteristics that belong to each country and that are not relevant in this paper, for example, corruption.

The effect of sovereign bond spreads on corporate bond is 3.58 (Column (3) of table 3), i.e. if the sovereign bond spread increases by 1 basis point, the corporate spread increases by

3.58 basis points. This happens if the model is controlled by country and industry sector fixed effects.

The above results show that there is a difference, which is not big, in the impact of the sovereign spread when the model considers industry fixed effects. On the other hand, if all the impact of macro instability (country and time fixed effects) is left apart, the impact of the sovereign spread is 0.96 (Column 4, table 3). As a result, the sovereign bond spread is actually a reflex of how a particular country reacts to eventual global macro shock instability. When these variables are controlled by time fixed effect, the effect of sovereign bond spread tends to disappear.

It is essential to mention the importance of the time variable in this study. The values of time fixed effects of the model are shown in Figure 8. This means that while approaching the period of crisis, these binary variables of each month and each year are increasing, and in this way, they absorb a lot of volatility of corporate bond spreads. In other words this means that binary variables of time have increased mostly due to the period of strong global financial instability that took place in those years and part of this variance of corporate bonds is not assigned to the others variables of the model.

If the model is controlled by bond fixed effect, the effect of sovereign bond spreads on corporate bond is 2.28 (Column (5) of table 3). If 2.28 is added to the previous result of 0.96 with time fixed effect, the result is 3.24, so closed to the first result of 3.35 with country fixed effects. It is remarkable that when bond fixed effects are used, it is being the most restrictive possible since this variable brings the variance that belongs to each bond and which is of a particular industry in a particular country, of particular maturity, etc. It seems that when it is considered the whole sample the effect of sovereign bond spreads can be separated by these two components, the effect when controlling by time dummies and the effect when controlling by bond dummies.

Table 4 shows the results from estimating Eq(2) by ordinary least squares with cluster errors by bond, columns 1 to 4 report the results of a sub-sample, excluding non-financial bonds. Henceforth, the regression without fixed effects are ignored in order to make better inferences of results and to have right conclusions. The effect is significant and around 3.4 basis points in columns 1 and 2. These results make sense because the sub-sample only has financial bonds of industries that belong to that category and these industries are banking and financial ones. Examples of non-banking financial companies are insurance companies and real assets. This effect falls to 1.4 basis points and to 2.49 when the model is controlled by time and bonds fixed effects respectively. Again the effect falls when the binary variables of time absorb a greater proportion of the variance in corporate spreads.

An important point is when considering only financial bonds in the models, the coefficient beta of sovereign is significant at 99%, i.e. the sovereign bond spread is a relevant variable in the cost of borrowing of private companies.

Table 5 shows the results from estimating Eq(2) by ordinary least squares with cluster errors by bond of the subsample of non-financial bonds, for example, bond energy industries such as oil and gas, consumer goods industries such as food, producers of basic materials like paper, telecommunication industries, production of construction materials or electronic industries, etc. As a result the effect of the sovereign is significant only in the first two regressions; with values of 1.29 and 1.13 basis points respectively, different from the 3.4 basis point found in the sub-sample of financial bonds.

When controlling by time and bonds fixed effects, variable is not significant. This may give an indication that sovereign interest rate above the risk-free rate affects in a different way to the cost of corporate borrowing depending on industry. It is likely to happen because the financial bonds are issued by companies which are partly indebted with the government of that country. The cost of borrowing from financial industry is more sensitive to the sovereign bond than the cost of borrowing of a bond from a non-financial company, which is less likely to get this type of financing.

Table 6 shows the results from estimating Eq(2) by ordinary least squares with cluster errors by bond, columns 1 to 4 report the results of a sub-sample from the years 2004 to 2007 (financial stability). Column 1 and 2 show that the sovereign amplifies corporate bond spreads in 0.37 and 0.45 basis point respectively, both statistically significant. On the other hand, when controlling with time fixed effect, the coefficient is not significant and when controlling by bond fixed effects the impact of sovereign is 0.34. That is to say, in all regressions the value does not go over 0.5 basis points.

Now period of instability is studied. Table 7 shows the results from estimating Eq(2) by ordinary least squares with cluster errors by bond, columns 1 to 4 report the results of a sub-sample from years 2008 to 2009 (financial instability). Columns 1 and 2 show that if the sovereign spread increases by one basis point, the corporate spread increases by 2.52 and 2.92 basis points respectively. Again the result falls to 0.96 basis points when including time dummies and drops to 1.95 when including variables 0 or 1 in each bond. Notice that in the four regressions the effect of the sovereign is statistically significant at 95% or more.

The effect of the sovereign is increased in periods of instability than periods of stability. That is to say, during the years 2008 and 2009 market penalized more to companies that were domiciled in countries with higher macro economic imbalances; because it is more difficult for governments to take action in order to help these big corporations from defaulting.

The model of equation (3) is estimated in order to study if this effect differs depending if bonds are financial or non-financial. Table 8 shows the results from estimating Eq(3) by ordinary least squares with cluster errors by bond. Now the author is not interested neither in industry binary variables nor bonds dummies, because this paper studies how the industry can influence if sovereign bond spread impact on corporate bond spreads in a greater or less degree and this is reflected in the coefficient of the interaction. As it can be seen, this coefficient is not significant for any of the three regressions, so there are no important differences.

Table 9 shows the results from estimating Eq(3) by ordinary least squares with cluster errors by bond, for the sub-sample in the period of financial stability and table 10 shows the results from estimating Eq(3) by ordinary least squares with cluster errors by bond, for sub-sample in financial instability period. In any case the interaction coefficient is not significant. This means that for the moment there is no clear evidence that the bond industry makes that the impact of the sovereign bond spread on corporate bond spread differs.

When do not consider fixed effects by time, idiosyncratic and global sovereign effect in corporate bonds are shown in the coefficient of interest. However, when fixed effects by time are consider as independent variables, the model control by the systemic risk isolating the effect of the financial crisis and the global economic cycle in corporate bonds. This means that if an investor wants to invest in a financial company, should expect at least if the sovereign spread increases by one basis point, on average corporate bonds must increase in more than one. Furthermore, European governments should take special care when they want to issue debts in international markets, overall in the global instability period because if the market increases the cost of sovereign borrowing, this has an impact on average by almost the same quantity to the cost of private debt. Being harder to get financing for companies and therefore, tend to decrease their investment.

7. ROBUSTNESS

In order to prove whether results are consistent, robustness checks are tested. This chapter is divided into three parts. First the model is replicated with a sub-sample of data. Then cluster errors are made with other criteria, specifically clustering errors by time. Finally slightly different specifications are done in the model so as to see how the results change.

7.1 Sub-Samples

First the model is replicated only with greater or equal to zero sovereign spreads. In this work the sovereign German bonds are considered as risk-free rate for Europe. Germany has been a country recognized for accomplishing its domestic and international financial obligations. So bonds of a country that pays a lower interest than the German one of the same maturity will have a negative spread.

The sub-sample consists in 5.723 observations. In Appendix A1, the table indicates that results do not change significantly when negative spreads are excluded from the sample, this is, spreads on sovereign bonds again significantly affect the corporate bond spreads. It is observed that the effect falls when controlling by macro shock instability (time fixed effect). Once again, when using dummies variables by country, the effect of sovereign on corporate bonds can be separated between the effect of controlling with dummies variables by time and when doing it with bonds. The sum of the latter ones is very similar to the first.

Appendix A2 shows financial bonds and A3 shows non-financial bonds. This also does not differ from the results, that is, in financial bonds the effect of sovereign bonds appears to be more significant. In the appendix A4 and A5, the results are shown in periods of stability and instability. Once again this work finds that interest rates of sovereign bond spreads over risk free rate are more significant in periods of financial instability than in periods of stability.

7.2 Cluster Errors

As other robustness checks of the results, instead of cluster the errors by bonds, they were clustered by time. Thus, it is assumed that within a month, model errors can be correlated but not in different months. As a result the estimations of errors obtained are very similar to the errors of the original model. The significance of the coefficients of the independent variables does not change. To see more details, the information is in Appendix B1 to B5.

7.3 Alternative Specifications

The alternative specifications of the model are shown in Appendix C1 to C5 which indicate the results of the base model without the rating of the firm variable. The reason to exclude this variable is to avoid possible problems of sub controlling variable of interest. For example, in a financial crisis it is expected that the rating of the company falls down and also that sovereign bond spreads increase, that is to say, there could be two manifestations of the same effect and both could be reduced between each other.

The results are quite similar to the original econometric model. The effect again is significant in sovereign spreads on corporate bonds. The effect can also be separated when controlling by country effects in two: when controlling by time fixed effect plus when controlling by bond fixed effect, the sum of these two is not far from the first. It happens the same when separating industries from bonds. In financial bonds the sovereign spread effect is more significant than in non-financial ones. According to main results, this effect appears to be more important in times of financial instability.

Appendix D1 to D5 show results of base model without the variable equity volatility, precisely because it could also be in the presence of an under valuation of the coefficient that goes with the sovereign bond spread. The reason is the possible dependence between these two variables. The results are similar to the main model, that is to say, the spread of sovereign bonds are significant as determinant of the cost of corporate borrowing. Again, this effect can be broken into two: when controlling by time dummies and when doing it by bond. Furthermore, this effect appears to be most significant in periods of instability than in periods of stability.

However, when separating the subsamples of bonds belonging to financial and non-financial industries, the results are different. That is because it was considered the interaction between sovereign bond spreads and bond industry, as it was explained in the chapter of methodology of this research.

Appendix E1 shows that apparently there is no difference on the effect of sovereign bond depending if corporate bonds belong or do not belong to the financial industry. However, this result is different when the sub sample is separated in periods of stability and instability (Appendix E2 and E3). Indeed, in a period of instability if the bond belongs to the financial industry, the cost of government borrowing affects more on the cost of corporate borrowing, but it does not happen the same in periods of stability. The reason possibly is because governments tend to save financial sector in an economic crisis, that is, if the credit risk of governments increases, falls the probability that the financial sector is rescued. Another reason is because European banks have on their property considerable amounts of sovereign debt, so that the concerns about solvency of the European banking systems and the solvency of sovereign debt are negatively reinforced.

Finally, Appendix F1 to F5 show the estimations of the model without the variable rating and equity volatility, and the results were not significantly different.

8. CONCLUSION

This paper explores how sovereign credit risk affects corporate credit risk of companies located within the country of origin of sovereign bonds. This study analyzes observations from 13 European countries, 73 firms and 266 bonds. The econometric approach is based in panel data models.

This article reports novel results on the relationship between sovereign bond spreads and corporate bond spreads. It finds that sovereign bond spreads positively affect corporate bond spreads through the country risk in European countries. This effect is statistically significant even after controlling for the standard determinants of corporate bond spreads and after controlling by country, industry and time fixed effects. Additionally, this study shows that sovereign bond spreads have a stronger effect in bonds issued by financial institutions. A potential reason for this result is that firms operating in this sector have significant capital invested in sovereign bonds, increasing their exposure to the variation of cost of government borrowing.

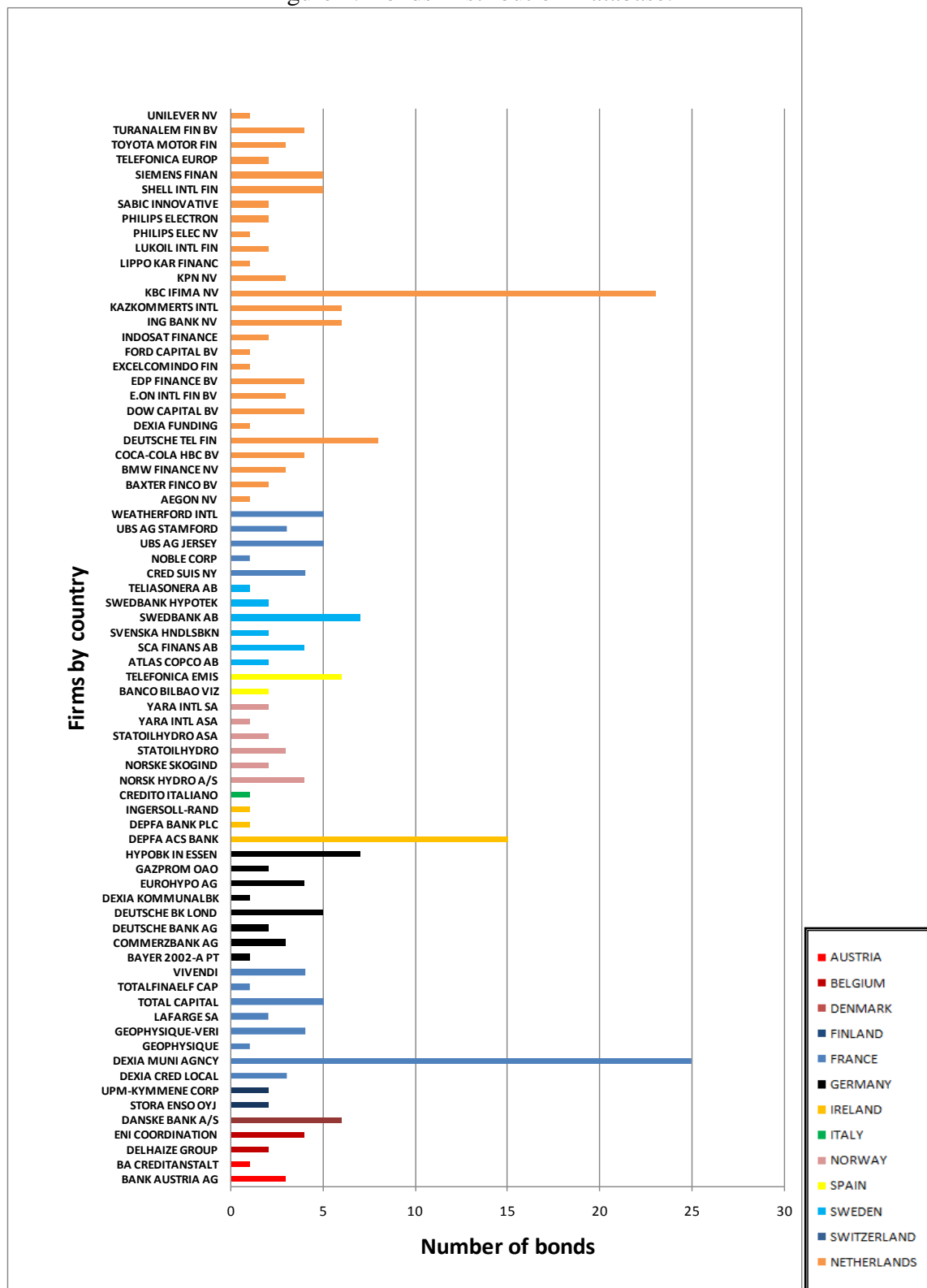
On the other hand the effect of sovereign spreads on corporate bond spreads tends to increase in periods of instability. Especially in the financial industry, the spread of corporate bonds are the most affected when the cost of borrowing of governments grows during these periods. The reason possibly is because governments tend to save financial sector in an economic crisis, that is, if the credit risk of governments increases, falls the probability that the financial sector is rescued.

In times of crisis both corporate and sovereign bonds spreads increase significantly in financial or non-financial bonds, something that was corroborated throughout this work. Furthermore, before the crisis the market did not punish companies domiciled in a country with major costs of sovereign borrowing. However, once the crisis was triggered, the market requires higher rates to companies that are located in countries with higher sovereign spreads.

It is important to mention that these results have important implications for investors that invest in fixed income instruments, business leaders that need to raise capital in international debt markets and policy makers who need to understand the main vulnerabilities during episodes of financial instability and how sovereign spread could affect the private sector.

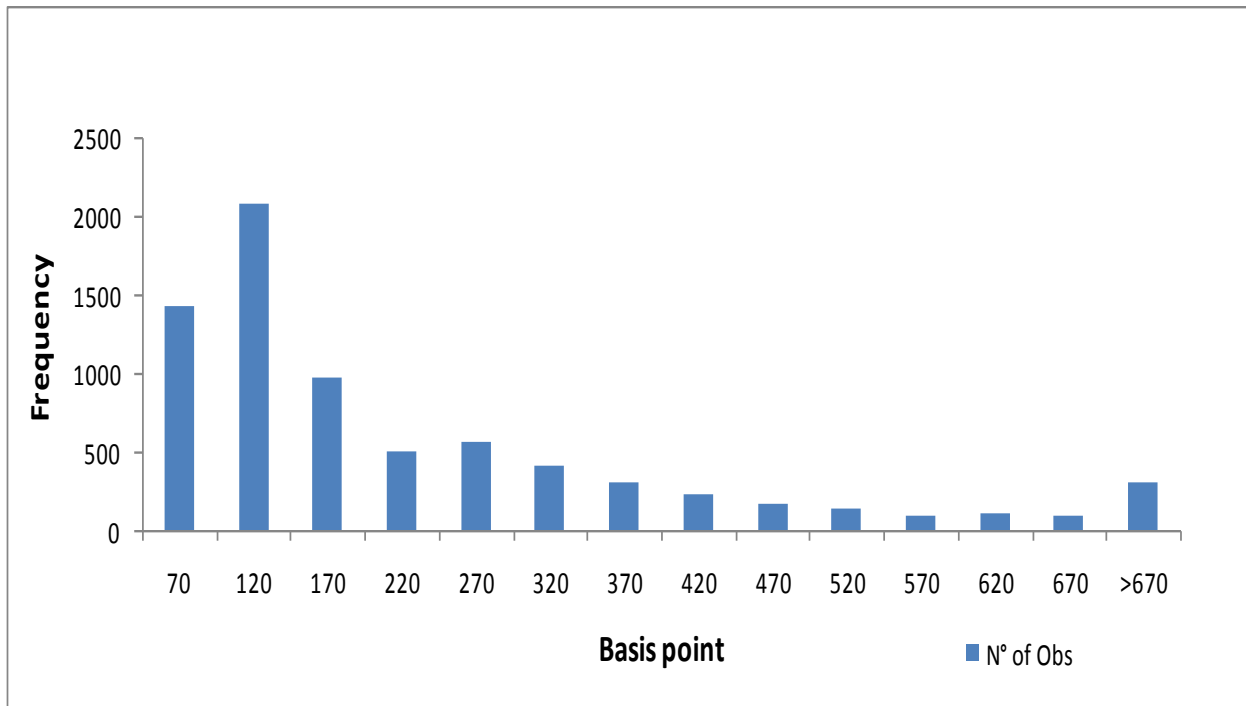
FIGURES

Figure 1: Bonds Distribution Database.



Source: Author's own elaboration.

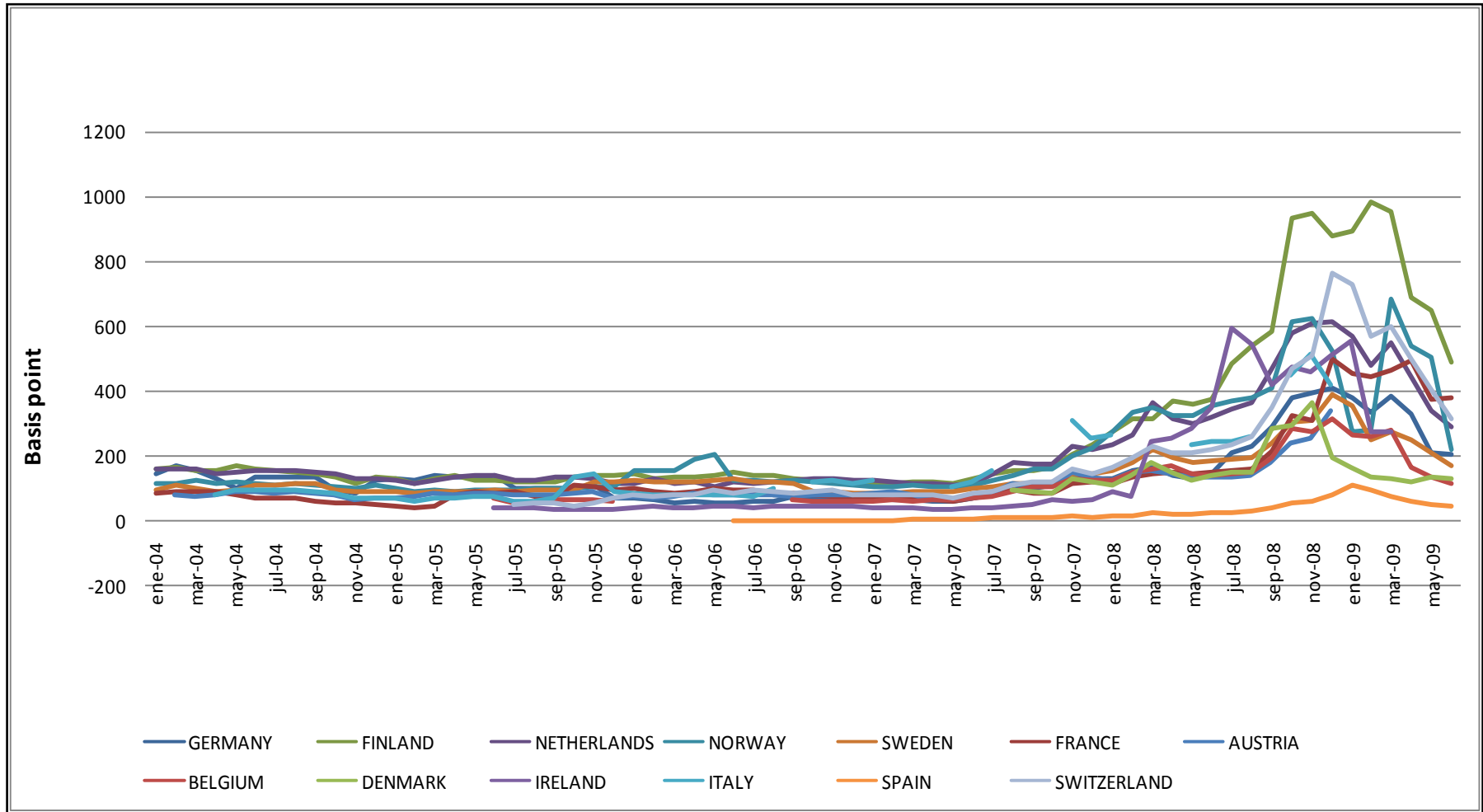
Figure 2: Histogram Corporate Bond Spreads.



Note: The first bar shows there are five thousand observations of spreads that are less than 70 basis point, the second bar shows there are over a thousand observations that are higher than 70 and less than 120 basis points.

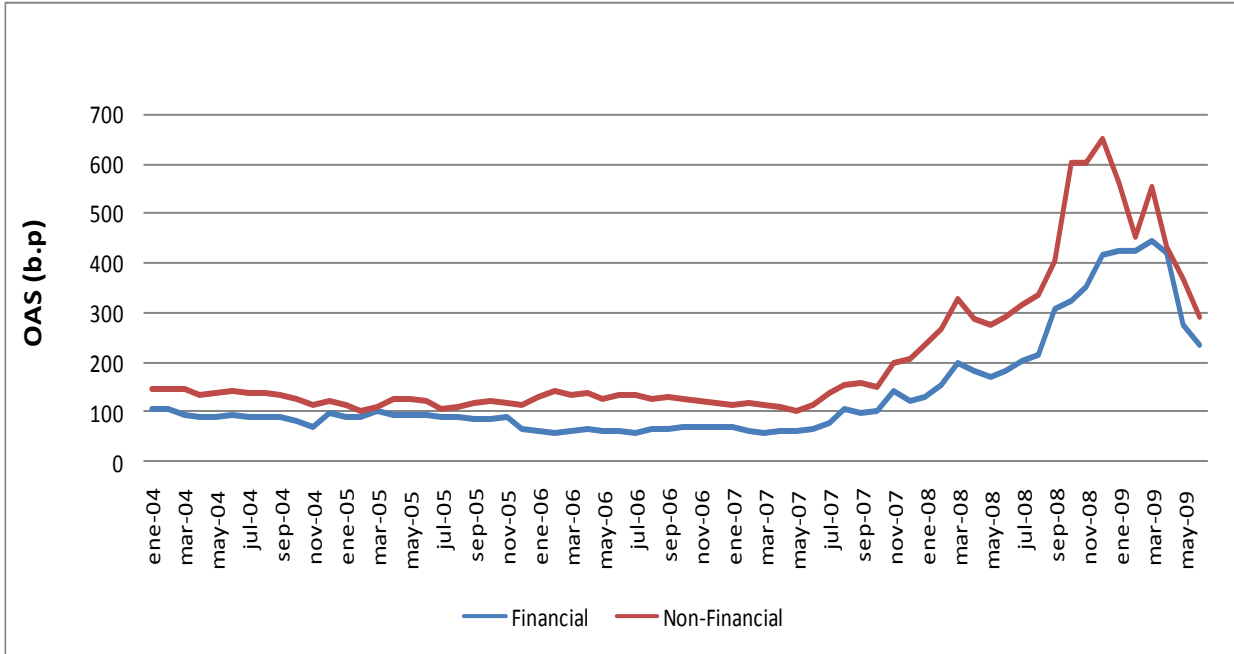
Source: Author's own elaboration.

Figure 3: Corporate Bond Spreads by Country.



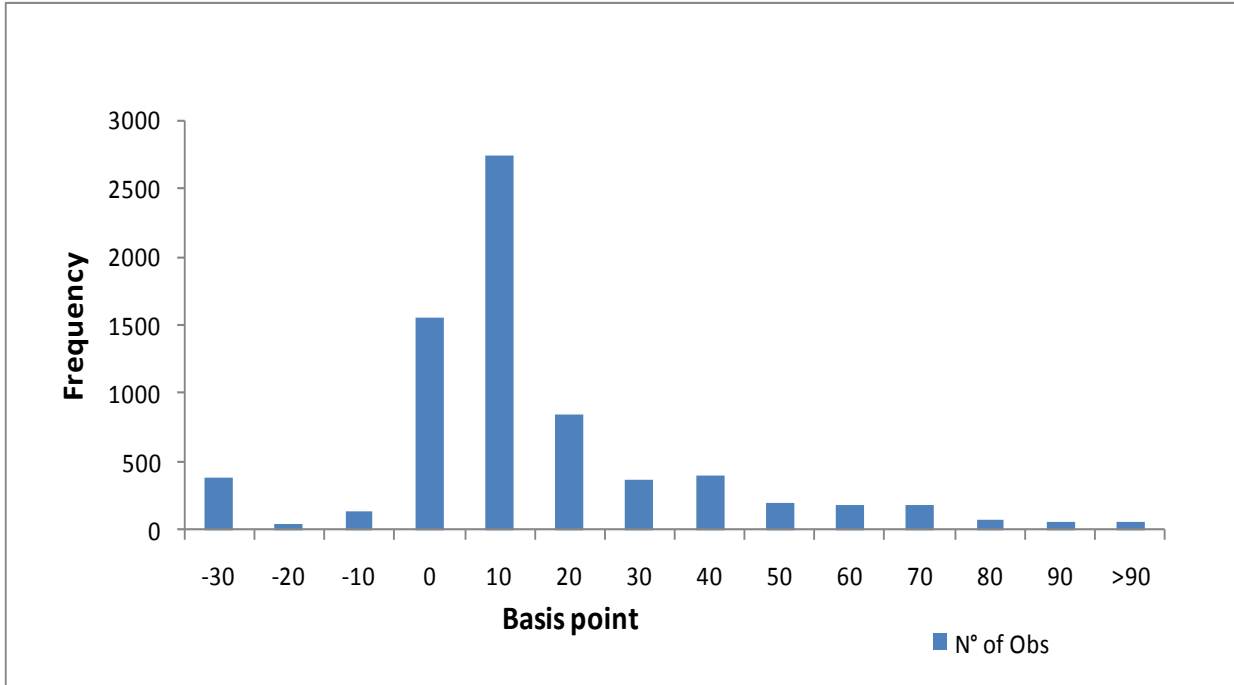
Source: Author's own elaboration.

Figure 4: Corporate Bond Spreads in time by sector.



Source: Author's own elaboration.

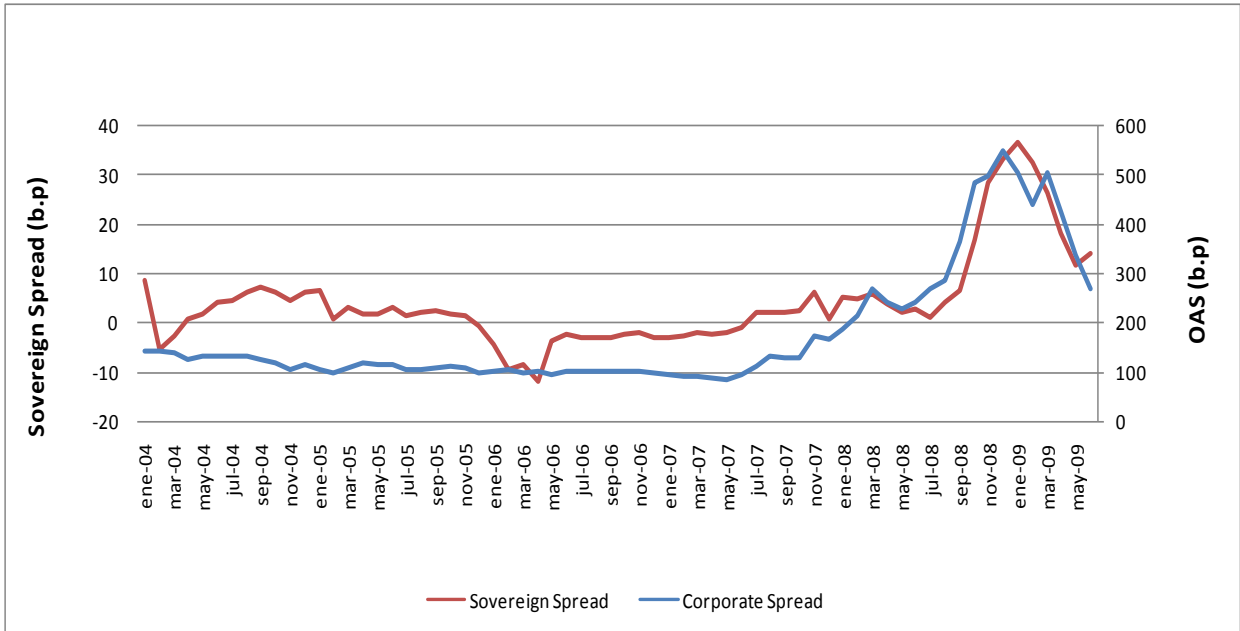
Figure 5: Histogram Sovereign Bond Spreads.



Note: The highest bar means there are about two thousand and eight hundred observations of sovereign spreads that are between 0 and 10 basis point, and so on.

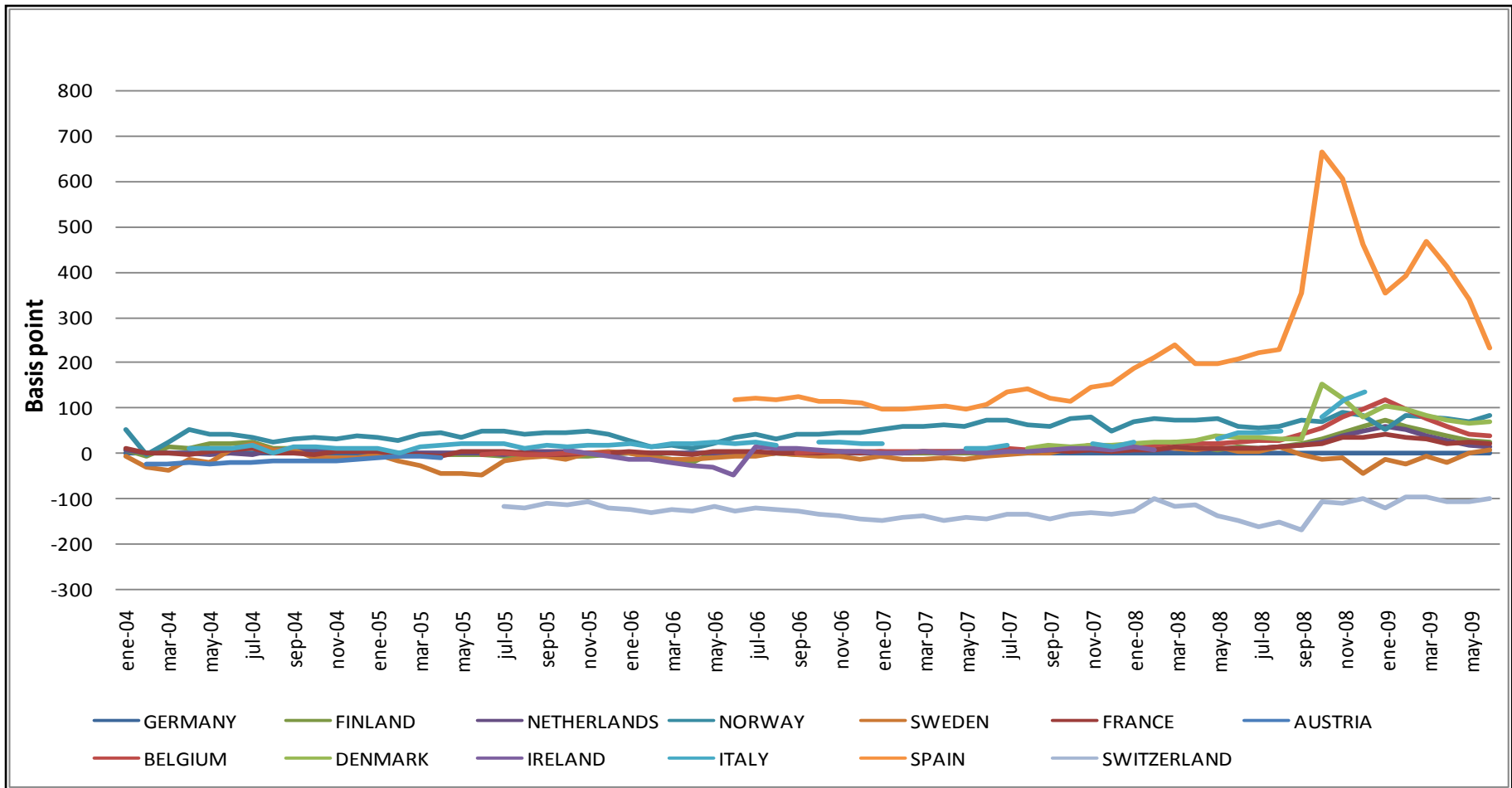
Source: Author's own elaboration.

Figure 6: Sovereign and Corporate Bond Spreads in time



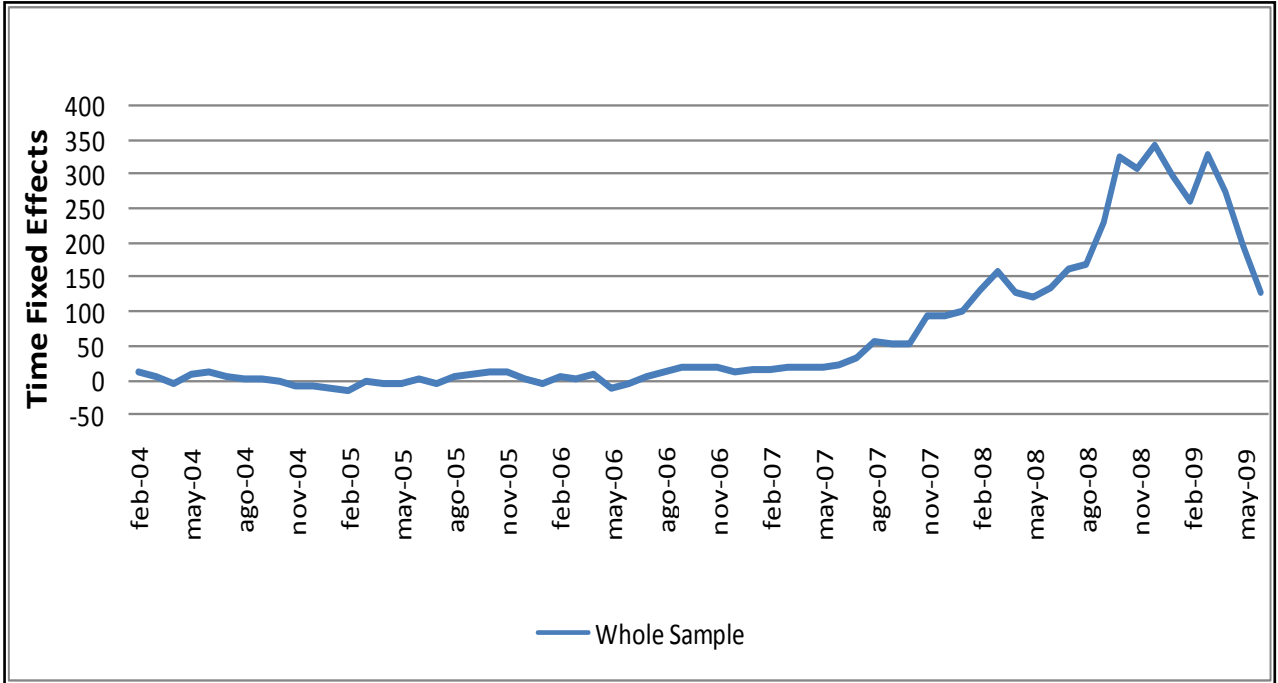
Source: Author's own elaboration.

Figure 7: Sovereign Bond Spreads by Country.



Source: Author's own elaboration.

Figure 8: Time Fixed Effect over time.



Source: Author's own elaboration.

TABLES

Table 1: Description of Variables.

This table describes the variables used in the empirical model, presenting the variable's names, descriptions, units and sources.

Name	Description	Unit	Source
Corporative Bond Spread	Option-adjusted spread	Basis point	Bloomberg
Sovereign Bond Spread	Difference in relation to the interest rates paid by the German Government Bonds	Basis point	Merry Linch, Data Stream
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
Operating Income to Sales	Operating income divided by net sales	Ratio	Bloomberg
ST Debt to Total Debt	Short-term debt divided by total debt	Ratio	Bloomberg
Debt to Assets	Total debt divided by total assets	Ratio	Bloomberg
Credit Rating	Standard and Poor's firm rating, long-term debt, foreign currency	(1=D,..., 21=AAA)	S&P
Size	Amount issued	US\$ (in log)	Bloomberg

Table 2: Descriptive Statistics.

Descriptive Statistics					
Variable	Obs	Mean	S.D.	Min.	Máx.
Corporate Bond Spread	7446	215.2	251.4	25.3	2656.9
Sovereign Bond Spread	7289	6.1	37.1	-203.5	186.9
Maturity bond	7446	5.9	2.8	0.1	14.0
Equity Volatility	7446	38.1	26.5	7.6	142.7
Operations Income/Sales	7446	0.1	0.2	-1.6	0.9
Short Term Debt/Total Debt	7446	0.4	0.3	0.0	1.0
Debt/Assets	7446	0.4	0.2	0.0	0.9
Rating	7446	16.3	2.9	6.0	21.0
Size	7446	11.8	1.7	6.7	15.1

Table 3. Effect of Sovereign Bond Spread: Whole Sample

This Table reports the results from estimating equation (1) for whole sample by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Whole Sample				
	(1)	(2)	(3)	(4)	(5)
Sovereign Bond Spread	0.890*** (0.197)	3.351*** (0.430)	3.583*** (0.471)	0.964** (0.413)	2.289*** (0.381)
Bond Maturity	-2.273 (2.357)	-2.509 (2.092)	-3.694* (1.947)	3.718* (2.251)	-37.212*** (7.937)
Equity Volatility	3.976*** (0.275)	2.927*** (0.262)	2.535*** (0.314)	0.919** (0.424)	2.227*** (0.353)
Operating Income to Sales	-170.406*** (37.224)	-149.314*** (32.365)	-171.150*** (38.347)	-113.524*** (31.339)	-168.604*** (38.886)
Short Term Debt/ Total Debt	134.836*** (26.902)	142.670*** (27.915)	11.699 (55.333)	187.620*** (28.974)	38.336 (43.975)
Debt/Asset	-76.764*** (20.999)	-15.018 (34.278)	-63.028 (55.732)	18.865 (34.487)	41.155 (120.037)
Rating	-50.098*** (4.804)	-53.471*** (4.799)	-51.153*** (4.880)	-55.299*** (4.829)	-51.353*** (10.482)
Size	6.014 (5.730)	10.960** (5.530)	-7.713 (9.669)	7.794 (5.537)	-37.798 (42.995)
Observations	7,289	7,289	7,289	7,289	7,289
Adjusted R-squared	0.502	0.555	0.572	0.608	0.722
Country Fixed Effect	NO	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	NO	YES	NO	NO
Time Fixed Effect	NO	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	NO	YES
Robust standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

Table 4. Effect of Sovereign Bond Spread: Financial Bonds

This Table reports the results from estimating equation (1) for a sub-sample of Financial Bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	3.418*** (0.704)	3.463*** (0.675)	1.409*** (0.481)	2.491*** (0.547)
Bond Maturity	-3.086 (2.348)	-4.034* (2.279)	4.722* (2.772)	-66.064*** (14.278)
Equity Volatility	1.540*** (0.408)	1.762*** (0.344)	-1.502 (1.152)	0.796 (0.506)
Operating Income to Sales	-274.755*** (52.922)	-241.826*** (45.188)	-228.225*** (54.545)	-205.016*** (42.063)
Short Term Debt/ Total Debt	135.279*** (49.264)	12.827 (95.084)	162.322*** (52.955)	-48.354 (58.399)
Debt/Asset	21.490 (96.305)	-178.303 (129.974)	8.441 (96.148)	-313.504** (132.675)
Rating	-73.691*** (14.620)	-65.475*** (11.773)	-74.337*** (15.942)	-36.518*** (6.338)
Size	19.051 (27.859)	-47.670 (33.848)	12.337 (26.175)	-184.150*** (63.971)
Observations	3,602	3,602	3,602	3,602
Adjusted R-squared	0.601	0.660	0.645	0.794
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 5. Effect of Sovereign Bond Spread: Non-Financial Bonds

This Table reports the results from estimating equation (1) for a sub-sample of Non-Financial Bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Non-Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	1.297*** (0.398)	1.132*** (0.412)	0.061 (0.589)	0.667 (0.458)
Bond Maturity	-3.926 (2.647)	-3.134 (3.086)	-1.180 (3.162)	-6.820 (7.356)
Equity Volatility	6.742*** (0.719)	7.112*** (0.725)	5.720*** (1.325)	7.201*** (0.905)
Operating Income to Sales	-185.775** (88.911)	-171.173 (112.415)	-181.999* (92.358)	-355.793*** (84.203)
Short Term Debt/ Total Debt	86.113 (57.569)	78.117 (57.819)	71.814 (61.790)	213.082*** (47.655)
Debt/Asset	198.176*** (71.295)	83.374 (83.915)	198.303*** (74.609)	-10.162 (218.530)
Rating	-33.279*** (3.988)	-31.332*** (6.645)	-34.784*** (3.957)	-59.888*** (16.088)
Size	23.166*** (6.579)	24.212* (14.095)	21.061*** (7.011)	23.887 (43.644)
Observations	3,687	3,687	3,687	3,687
Adjusted R-squared	0.619	0.622	0.659	0.690
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Table 6. Effect of Sovereign Bond Spread: Period of Stability

This Table reports the results from estimating equation (1) for a sub-sample of period of Stability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Stability (2004-2007)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	0.374** (0.155)	0.453*** (0.160)	0.262 (0.170)	0.349** (0.148)
Bond Maturity	-0.577 (1.222)	-0.185 (1.226)	-0.862 (1.363)	-3.542 (4.026)
Equity Volatility	1.107 (0.841)	0.734 (0.808)	0.694 (1.050)	1.314*** (0.286)
Operating Income to Sales	-11.701 (49.114)	-62.385* (33.546)	-5.077 (53.156)	-41.524* (21.407)
Short Term Debt/ Total Debt	61.433*** (20.839)	51.051*** (19.476)	64.792*** (19.988)	7.002 (10.845)
Debt/Asset	22.537 (32.389)	-85.587** (42.376)	18.850 (32.274)	49.315 (45.668)
Rating	-26.722*** (4.253)	-24.415*** (4.827)	-27.212*** (4.309)	-15.865* (8.285)
Size	9.528 (6.916)	1.987 (11.199)	9.206 (7.093)	-19.346* (11.600)
Observations	3,452	3,452	3,452	3,452
Adjusted R-squared	0.574	0.603	0.584	0.848
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 7. Effect of Sovereign Bond Spread: Period of Instability

This Table reports the results from estimating equation (1) for a sub-sample of period of Instability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Instability (2008-2009)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	2.528*** (0.408)	2.929*** (0.459)	0.964** (0.441)	1.952*** (0.422)
Bond Maturity	-0.331 (2.937)	-0.494 (2.878)	2.454 (3.094)	-146.603*** (28.845)
Equity Volatility	2.332*** (0.250)	1.628*** (0.341)	1.152*** (0.415)	0.026 (0.679)
Operating Income to Sales	-219.457*** (48.785)	-234.453*** (49.427)	-160.224*** (49.760)	-254.712*** (61.291)
Short Term Debt/ Total Debt	209.514*** (43.284)	-84.483 (80.551)	271.516*** (48.054)	197.248** (97.492)
Debt/Asset	-39.193 (40.200)	-218.185*** (58.617)	-16.512 (41.395)	-322.756 (239.677)
Rating	-72.688*** (6.810)	-67.483*** (6.725)	-75.061*** (7.018)	-69.214*** (12.587)
Size	1.652 (8.450)	-27.783** (12.204)	4.620 (8.596)	-89.566 (95.505)
Observations	3,837	3,837	3,837	3,837
Adjusted R-squared	0.567	0.610	0.599	0.733
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Table 8. Effect of Sovereign Bond Spread: Whole Sample
Adding 'Industry Sector x Sovereign Bond' Variable

This Table reports the results from estimating equation (2) for whole sample by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Whole Sample		
	(1)	(2)	(3)
Sovereign Bond Spread	1.052*** (0.239)	3.388*** (0.397)	0.823* (0.448)
Bond Maturity	-2.337 (2.347)	-2.479 (2.057)	3.703 (2.249)
Equity Volatility	4.014*** (0.281)	2.946*** (0.294)	0.799 (0.527)
Operating Income to Sales	-164.843*** (39.621)	-147.648*** (36.121)	-119.364*** (35.460)
Short Term Debt/ Total Debt	140.187*** (26.837)	143.706*** (27.298)	186.503*** (28.579)
Debt/Asset	-70.947*** (21.201)	-14.112 (33.912)	16.884 (34.059)
Rating	-49.785*** (4.992)	-53.291*** (5.209)	-55.927*** (5.295)
Size	4.825 (6.023)	10.412* (6.278)	9.301 (6.133)
Financial x Sovereign Bond Spread	-0.361 (0.434)	-0.103 (0.432)	0.304 (0.470)
Observations	7,289	7,289	7,289
Adjusted R-squared	0.503	0.555	0.608
Country Fixed Effect	NO	YES	YES
Industry Sector Fixed Effect	NO	NO	NO
Time Fixed Effect	NO	NO	YES
Bond Fixed Effect	NO	NO	NO
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1			

Table 9. Effect of Sovereign Bond Spread: Stability
Adding 'Industry Sector x Sovereign Bond' Variable

This Table reports the results from estimating equation (2) for a sub-sample of period of Stability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Stability (2004-2007)	
	(1)	(2)
Sovereign Bond Spread	0.458** (0.200)	0.326* (0.190)
Bond Maturity	-0.535 (1.230)	-0.821 (1.376)
Equity Volatility	1.144 (0.839)	0.724 (1.046)
Operating Income to Sales	-8.806 (50.602)	-2.938 (54.526)
Short Term Debt/ Total Debt	60.964*** (20.747)	64.385*** (19.832)
Debt/Asset	21.870 (32.385)	18.408 (32.304)
Rating	-26.630*** (4.352)	-27.139*** (4.399)
Size	9.155 (7.280)	8.924 (7.453)
Financial x Sovereign Bond Spread	-0.152 (0.188)	-0.115 (0.187)
Observations	3,452	3,452
Adjusted R-squared	0.574	0.584
Country Fixed Effect	YES	YES
Industry Sector Fixed Effect	NO	NO
Time Fixed Effect	NO	YES
Bond Fixed Effect	NO	NO
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

Table 10. Effect of Sovereign Bond Spread: Instability
Adding 'Industry Sector x Sovereign Bond' Variable

This Table reports the results from estimating equation (2) for a sub-sample of period of Instability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Instability (2008-2009)	
	(1)	(2)
Sovereign Bond Spread	2.282*** (0.367)	0.556 (0.458)
Bond Maturity	-0.599 (2.893)	2.329 (3.090)
Equity Volatility	2.178*** (0.320)	0.779 (0.574)
Operating Income to Sales	-232.166*** (54.372)	-179.575*** (55.977)
Short Term Debt/ Total Debt	196.379*** (43.542)	262.951*** (47.884)
Debt/Asset	-49.637 (39.963)	-28.299 (41.214)
rating	-74.382*** (7.650)	-77.734*** (8.119)
size	6.562 (10.058)	11.006 (10.118)
Financial x Sovereign Bond Spread	0.665 (0.564)	0.905 (0.613)
Observations	3,837	3,837
Adjusted R-squared	0.569	0.601
Country Fixed Effect	YES	YES
Industry Sector Fixed Effect	NO	NO
Time Fixed Effect	NO	YES
Bond Fixed Effect	NO	NO
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

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APPENDIX

APPENDIX I: ENDOGENEITY

This section deals about the most common endogeneity problems in empirical studies of corporate finance. This section also describes what to do in order to avoid these risks, and which of them still persist in specifications. One of the books taken as reference to explain the theory is Robert and Whited (2012).

Endogeneity can be defined as a correlation between the explanatory variables and the error term in a regression. Leading to biased and inconsistent parameter estimates that make reliable inference virtually impossible. In many cases, endogeneity can be severe enough to reverse even qualitative inference. However, there is no way to empirically test whether a variable is correlated with the regression error term because the error term is non-observable. Consequently, there is no way to statistically ensure that an endogeneity problem has been solved.

This paper begins by briefly reviewing the sources of endogeneity; omitted variables, simultaneity, and measurement error; and their implications for inference.

Omitted Variables

Omitted variables refer to those variables that should be included in the vector of explanatory variables, but for some reasons they are not included. For example, executive compensation depends on executive's abilities, which are difficult to quantify and observe.

The inability to observe these determinants means that instead of appearing among the explanatory variables, X , these omitted variables appear in the error term, u . If these omitted variables are uncorrelated with the included explanatory variables, then there is no problem for inference; the estimated coefficients are consistent and, under the stronger assumption of zero conditional mean, unbiased. If the two sets of variables are correlated, then there is an endogeneity problem that causes inference to break down (Roberts et al. 2012).

The variables included in this model are based on what literature indicates as the most important determinants of sovereign bond spreads, however, there can still be omitted variables that may be correlated with explanatory variables and thus with the dependent variable. Estimate a panel data helps to solve this problem but it is not enough, so it is a risk to consider in this paper.

Simultaneity

Simultaneity bias occurs when y and one or more of the x 's are determined in equilibrium so that it can plausibly be argued either that x causes y or y causes x . In this study, it could be argued that the spread of sovereign bonds affect corporate bonds, but the latter also affects the former, so it cannot say what the causality is. Therefore, a panel data provides a partial solution, but it does not necessarily solve the whole problem, as it was explained in the theoretical framework of this study.

Measurement Error

Most empirical studies in corporate finance use proxies for non-observable variables or the difficult ones to quantify. Any discrepancy between the true variable of interest and the proxy leads to measurement error. These discrepancies arise not only because data collectors record variables incorrectly but also because of conceptual differences between proxies and their unobservable counterparts. When variables are measured imperfectly, the measurement error becomes part of the regression error (Roberts et al. 2012). However, all variables are extracted from Bloomberg, except the spread of sovereign bonds that were calculated from the DataStream database and corporate rating that was extracted from the S&P agency. Errors in data collection are not relevant.

APPENDIX II: TABLES

Appendix A1. Effect of Sovereign Bond Spread
Robustness - Sub Sample Sovereign Bond Spread higher or equal than zero.

This Table reports the results from estimating equation (1) for whole sample by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Whole Sample				
	(1)	(2)	(3)	(4)	(5)
Sovereign Bond Spread	2.461*** (0.470)	4.020*** (0.537)	4.379*** (0.592)	1.192* (0.679)	3.230*** (0.540)
Bond Maturity	-2.861 (2.591)	-2.835 (2.492)	-4.729** (2.275)	4.339 (2.669)	-43.680*** (9.799)
Equity Volatility	3.165*** (0.324)	2.537*** (0.309)	2.140*** (0.363)	1.002** (0.465)	1.487*** (0.429)
Operating Income to Sales	-180.129*** (48.572)	-151.563*** (45.876)	-156.264*** (48.853)	-122.788*** (46.679)	-187.054*** (54.823)
Short Term Debt/ Total Debt	209.089*** (30.492)	169.894*** (29.921)	-18.004 (67.204)	210.819*** (31.182)	37.916 (56.817)
Debt/Asset	-58.865** (23.365)	-22.290 (35.479)	-88.278 (63.498)	12.647 (35.064)	-30.355 (156.608)
Rating	-56.520*** (5.687)	-58.787*** (5.827)	-54.824*** (5.905)	-59.628*** (5.917)	-58.166*** (13.283)
Size	3.997 (7.067)	13.257* (7.246)	-10.786 (10.925)	8.723 (7.280)	-46.910 (47.851)
Observations	5,723	5,723	5,723	5,723	5,723
Adjusted R-squared	0.520	0.561	0.588	0.603	0.726
Country Fixed Effect	NO	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	NO	YES	NO	NO
Time Fixed Effect	NO	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1					

Appendix A2. Effect of Sovereign Bond Spread: Financial Bonds
Robustness - Sub Sample Sovereign Bond Spread higher or equal than zero.

This Table reports the results from estimating equation (1) for a sub-sample of Financial Bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	4.319*** (1.049)	4.641*** (1.080)	1.968** (0.945)	4.518*** (1.064)
Bond Maturity	-2.753 (2.979)	-2.841 (2.908)	4.352 (3.277)	-91.176*** (22.185)
Equity Volatility	1.001* (0.526)	1.180** (0.460)	-2.161* (1.279)	-0.323 (0.751)
Operating Income to Sales	-310.402*** (71.131)	-266.944*** (59.237)	-313.281*** (82.659)	-178.346*** (56.670)
Short Term Debt/ Total Debt	180.705*** (62.983)	56.366 (105.194)	251.146*** (71.900)	-129.510 (84.992)
Debt/Asset	-25.132 (92.013)	-249.399* (143.414)	-21.013 (98.238)	-454.976** (201.217)
Rating	-86.292*** (16.939)	-78.936*** (14.092)	-93.782*** (20.095)	-37.480*** (8.735)
Size	26.835 (29.282)	-33.689 (38.965)	28.122 (30.470)	-242.091*** (83.258)
Observations	2,833	2,833	2,833	2,833
Adjusted R-squared	0.621	0.678	0.659	0.809
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Appendix A3. Effect of Sovereign Bond Spread: Non-Financial Bonds
Robustness - Sub Sample Sovereign Bond Spread higher or equal than zero.

This Table reports the results from estimating equation (1) for a sub-sample of period of Instability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Non-Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	1.343*** (0.498)	1.265** (0.510)	-0.361 (0.860)	0.867 (0.589)
Bond Maturity	-2.879 (2.871)	-1.836 (3.436)	0.803 (3.348)	-3.835 (8.501)
Equity Volatility	6.904*** (0.961)	7.175*** (0.962)	7.061*** (1.669)	7.455*** (1.115)
Operating Income to Sales	-256.553*** (95.891)	-221.594 (139.515)	-268.372** (105.297)	-433.664*** (96.200)
Short Term Debt/ Total Debt	94.883 (74.176)	81.672 (73.424)	22.834 (77.263)	288.994*** (61.912)
Debt/Asset	241.299*** (73.325)	161.682* (94.424)	295.567*** (82.823)	-190.693 (288.622)
Rating	-34.181*** (4.726)	-32.363*** (6.974)	-31.764*** (4.557)	-66.394*** (19.091)
Size	26.105*** (7.559)	26.808* (13.896)	25.358*** (8.465)	38.836 (46.547)
Observations	2,890	2,890	2,890	2,890
Adjusted R-squared	0.618	0.620	0.664	0.685
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix A4. Effect of Sovereign Bond Spread: Period of Stability
Robustness - Sub Sample Sovereign Bond Spread higher or equal than zero.

This Table reports the results from estimating equation (1) for a sub-sample of period of Stability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Stability (2004-2007)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	0.401 (0.293)	0.564* (0.313)	-0.022 (0.278)	0.492 (0.312)
Bond Maturity	0.335 (1.308)	0.822 (1.401)	0.438 (1.332)	-2.849 (3.554)
Equity Volatility	1.326 (0.894)	1.175 (0.829)	0.774 (1.152)	1.789*** (0.389)
Operating Income to Sales	-34.547 (62.510)	-96.625** (46.448)	-26.642 (65.350)	-81.340*** (30.513)
Short Term Debt/ Total Debt	85.675*** (21.227)	72.589*** (26.031)	92.010*** (20.022)	27.082 (19.238)
Debt/Asset	-4.156 (30.903)	-85.608** (39.359)	-10.535 (30.207)	12.291 (51.428)
Rating	-25.724*** (3.987)	-22.857*** (4.840)	-26.390*** (4.116)	-18.861** (7.809)
Size	6.817 (7.082)	-1.744 (12.024)	6.397 (7.244)	-16.195* (9.598)
Observations	2,247	2,247	2,247	2,247
Adjusted R-squared	0.621	0.646	0.639	0.879
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix A5. Effect of Sovereign Bond Spread: Period of Instability
Robustness - Sub Sample Sovereign Bond Spread higher or equal than zero.

This Table reports the results from estimating equation (1) for a sub-sample of period of Instability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Instability (2008-2009)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	3.211*** (0.501)	3.760*** (0.566)	1.252* (0.717)	2.749*** (0.598)
Bond Maturity	-1.497 (3.280)	-2.446 (3.211)	2.312 (3.540)	-137.640*** (32.672)
Equity Volatility	1.943*** (0.304)	1.201*** (0.395)	1.070** (0.494)	-0.416 (0.772)
Operating Income to Sales	-227.386*** (67.734)	-227.223*** (65.075)	-181.943** (72.624)	-273.678*** (79.023)
Short Term Debt/ Total Debt	220.040*** (44.656)	-100.718 (82.838)	270.506*** (50.162)	180.860* (106.982)
Debt/Asset	-29.024 (41.048)	-204.613*** (63.335)	-4.664 (42.057)	-371.573 (279.417)
Rating	-75.346*** (7.957)	-69.238*** (8.266)	-76.479*** (8.364)	-72.721*** (14.382)
Size	7.377 (11.028)	-24.936 (15.337)	7.022 (11.118)	-98.549 (108.359)
Observations	3,476	3,476	3,476	3,476
Adjusted R-squared	0.576	0.627	0.601	0.743
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Appendix B1. Effect of Sovereign Bond Spread: Whole Sample
Robustness - clustering errors by time

This Table reports the results from estimating equation (1) for whole sample by OLS with clustering errors by time. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Whole Sample				
	(1)	(2)	(3)	(4)	(5)
Sovereign Bond Spread	0.890*** (0.118)	3.351*** (0.353)	3.583*** (0.371)	0.964*** (0.130)	2.289*** (0.256)
Bond Maturity	-2.273*** (0.844)	-2.509** (0.953)	-3.694*** (1.050)	3.718*** (1.218)	-37.212*** (6.072)
Equity Volatility	3.976*** (0.367)	2.927*** (0.353)	2.535*** (0.366)	0.919** (0.432)	2.227*** (0.385)
Operating Income to Sales	-170.406*** (36.521)	-149.314*** (31.786)	-171.150*** (31.159)	-113.524*** (35.091)	-168.604*** (33.200)
Short Term Debt/ Total Debt	134.836*** (16.227)	142.670*** (19.530)	11.699 (34.465)	187.620*** (23.163)	38.336 (34.089)
Debt/Asset	-76.764*** (12.470)	-15.018 (16.875)	-63.028** (27.706)	18.865 (12.169)	41.155 (99.833)
Rating	-50.098*** (5.011)	-53.471*** (4.953)	-51.153*** (4.669)	-55.299*** (5.107)	-51.353*** (8.109)
Size	6.014** (2.887)	10.960*** (3.531)	-7.713 (5.568)	7.794** (3.249)	-37.798 (24.790)
Observations	7,289	7,289	7,289	7,289	7,289
Adjusted R-squared	0.502	0.555	0.572	0.608	0.722
Country Fixed Effect	NO	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	NO	YES	NO	NO
Time Fixed Effect	NO	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1					

Appendix B2. Effect of Sovereign Bond Spread: Financial Bonds
Robustness - clustering errors by time

This Table reports the results from estimating equation (1) for a sub-sample of Financial Bonds by OLS with clustering errors by time. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	3.418*** (0.391)	3.463*** (0.357)	1.409*** (0.334)	2.491*** (0.305)
Bond Maturity	-3.086* (1.637)	-4.034** (1.586)	4.722** (1.912)	-66.064*** (12.173)
Equity Volatility	1.540*** (0.448)	1.762*** (0.408)	-1.502 (1.043)	0.796 (0.499)
Operating Income to Sales	-274.755*** (44.896)	-241.826*** (39.273)	-228.225*** (53.690)	-205.016*** (36.971)
Short Term Debt/ Total Debt	135.279*** (31.896)	12.827 (40.440)	162.322*** (26.034)	-48.354 (46.977)
Debt/Asset	21.490 (39.411)	-178.303*** (43.769)	8.441 (48.116)	-313.504* (172.797)
Rating	-73.691*** (10.319)	-65.475*** (9.122)	-74.337*** (12.289)	-36.518*** (9.381)
Size	19.051 (14.284)	-47.670*** (15.199)	12.337 (16.133)	-184.150*** (52.686)
Observations	3,602	3,602	3,602	3,602
Adjusted R-squared	0.601	0.660	0.645	0.794
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix B3. Effect of Sovereign Bond Spread: Non-Financial Bonds
Robustness - clustering errors by time

This Table reports the results from estimating equation (1) for a sub-sample of Non-Financial Bonds by OLS with clustering errors by time. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Non-Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	1.297*** (0.295)	1.132*** (0.296)	0.061 (0.196)	0.667* (0.339)
Bond Maturity	-3.926*** (1.282)	-3.134** (1.258)	-1.180 (1.411)	-6.820** (2.792)
Equity Volatility	6.742*** (0.568)	7.112*** (0.610)	5.720*** (0.383)	7.201*** (0.672)
Operating Income to Sales	-185.775*** (63.333)	-171.173** (74.747)	-181.999** (71.096)	-355.793*** (115.877)
Short Term Debt/ Total Debt	86.113*** (31.111)	78.117** (32.562)	71.814** (29.069)	213.082*** (58.214)
Debt/Asset	198.176*** (20.850)	83.374** (41.231)	198.303*** (27.108)	-10.162 (95.226)
Rating	-33.279*** (3.487)	-31.332*** (4.320)	-34.784*** (3.285)	-59.888*** (10.326)
Size	23.166*** (4.427)	24.212*** (4.781)	21.061*** (3.472)	23.887* (13.055)
Observations	3,687	3,687	3,687	3,687
Adjusted R-squared	0.619	0.622	0.659	0.690
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix B4. Effect of Sovereign Bond Spread: Period of Stability
Robustness - clustering errors by time

This Table reports the results from estimating equation (1) for a sub-sample of period of Stability by OLS with clustering errors by time. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Stability (2004-2007)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	0.374** (0.157)	0.453** (0.182)	0.262** (0.100)	0.349** (0.134)
Bond Maturity	-0.577 (0.419)	-0.185 (0.457)	-0.862** (0.384)	-3.542* (1.872)
Equity Volatility	1.107*** (0.273)	0.734** (0.317)	0.694*** (0.219)	1.314*** (0.300)
Operating Income to Sales	-11.701 (16.688)	-62.385*** (14.545)	-5.077 (17.411)	-41.524*** (15.341)
Short Term Debt/ Total Debt	61.433*** (8.888)	51.051*** (8.619)	64.792*** (7.946)	7.002 (11.431)
Debt/Asset	22.537*** (4.648)	-85.587*** (8.273)	18.850*** (3.951)	49.315** (22.865)
Rating	-26.722*** (1.006)	-24.415*** (1.197)	-27.212*** (0.972)	-15.865*** (2.363)
Size	9.528*** (1.545)	1.987 (2.369)	9.206*** (1.620)	-19.346*** (6.695)
Observations	3,452	3,452	3,452	3,452
Adjusted R-squared	0.574	0.603	0.584	0.848
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix B5. Effect of Sovereign Bond Spread: Period of Instability
Robustness - clustering errors by time

This Table reports the results from estimating equation (1) for a sub-sample of period of Instability by OLS with clustering errors by time. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Instability (2008-2009)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	2.528*** (0.326)	2.929*** (0.327)	0.964*** (0.138)	1.952*** (0.374)
Bond Maturity	-0.331 (1.567)	-0.494 (1.805)	2.454 (1.538)	-146.603*** (38.984)
Equity Volatility	2.332*** (0.358)	1.628*** (0.413)	1.152*** (0.333)	0.026 (0.517)
Operating Income to Sales	-219.457*** (44.060)	-234.453*** (40.812)	-160.224*** (44.225)	-254.712*** (49.608)
Short Term Debt/ Total Debt	209.514*** (34.265)	-84.483 (61.311)	271.516*** (35.137)	197.248** (71.732)
Debt/Asset	-39.193** (18.575)	-218.185*** (38.371)	-16.512 (18.410)	-322.756 (242.709)
Rating	-72.688*** (5.916)	-67.483*** (5.285)	-75.061*** (6.275)	-69.214*** (12.923)
Size	1.652 (6.449)	-27.783** (11.117)	4.620 (6.368)	-89.566 (83.771)
Observations	3,837	3,837	3,837	3,837
Adjusted R-squared	0.567	0.610	0.599	0.733
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix C1. Effect of Sovereign Bond Spread: Whole Sample
Robustness – Without Rating

This Table reports the results from estimating equation (1) for whole sample by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS	Whole Sample				
VARIABLES	(1)	(2)	(3)	(4)	(5)
Sovereign Bond Spread	0.673*** (0.213)	3.155*** (0.455)	3.553*** (0.501)	1.176** (0.460)	2.167*** (0.383)
Bond Maturity	-2.121 (2.998)	-1.255 (2.992)	-0.712 (2.199)	4.279 (3.256)	-41.316*** (10.248)
Operating Income to Sales	4.671*** (0.327)	3.889*** (0.287)	3.392*** (0.316)	2.569*** (0.516)	2.733*** (0.359)
Short Term Debt/ Total Debt	-143.709*** (42.329)	-99.026** (39.916)	-141.286*** (42.863)	-55.417 (41.985)	-113.022*** (40.384)
Debt/Asset	22.119 (30.184)	27.051 (32.406)	-143.358** (69.742)	49.564 (40.833)	14.838 (44.370)
Rating	8.028 (30.696)	120.168** (54.465)	-111.932 (70.756)	148.881*** (54.824)	23.353 (127.647)
Size	-46.743*** (8.455)	-48.851*** (9.705)	-82.906*** (11.945)	-51.887*** (10.690)	-92.420* (55.163)
Observations	7,289	7,289	7,289	7,289	7,289
Adjusted R-squared	0.363	0.425	0.485	0.471	0.706
Country Fixed Effect	NO	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	NO	YES	NO	NO
Time Fixed Effect	NO	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	NO	YES
Robust standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

Appendix C2. Effect of Sovereign Bond Spread: Financial Bonds
Robustness – Without Rating

This Table reports the results from estimating equation (1) for a sub-sample of Financial Bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	3.588*** (0.812)	3.493*** (0.726)	1.378*** (0.516)	2.573*** (0.572)
Bond Maturity	4.447 (3.214)	-1.336 (2.619)	11.967*** (4.160)	-55.342*** (14.767)
Operating Income to Sales	2.932*** (0.271)	2.842*** (0.280)	0.629 (1.014)	1.333*** (0.482)
Short Term Debt/ Total Debt	-144.918*** (36.729)	-135.956*** (35.938)	-44.109 (27.944)	-168.117*** (40.420)
Debt/Asset	-47.643 (62.686)	-208.624 (128.144)	-37.855 (55.532)	-57.604 (57.861)
Rating	-105.218 (98.227)	-214.169 (160.161)	-117.211 (92.334)	-442.461*** (146.413)
Size	-96.004*** (22.931)	-146.365*** (37.642)	-99.156*** (20.881)	-190.144** (74.371)
Observations	3,602	3,602	3,602	3,602
Adjusted R-squared	0.526	0.613	0.578	0.788
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Appendix C3. Effect of Sovereign Bond Spread: Non-Financial Bonds
Robustness – Without Rating

This Table reports the results from estimating equation (1) for a sub-sample of Non-Financial bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Non-Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	1.008** (0.443)	1.028** (0.401)	0.301 (0.594)	0.242 (0.417)
Bond Maturity	-5.637* (2.974)	-3.662 (3.230)	-3.300 (3.456)	-20.120** (9.466)
Operating Income to Sales	7.293*** (0.791)	7.783*** (0.771)	7.667*** (1.432)	7.389*** (0.999)
Short Term Debt/ Total Debt	-307.648*** (101.839)	-216.981** (108.724)	-313.099*** (106.830)	-411.798*** (90.858)
Debt/Asset	21.816 (62.951)	38.879 (59.677)	-10.945 (69.764)	195.651*** (50.374)
Rating	558.172*** (91.678)	155.284 (95.107)	583.468*** (91.639)	352.814* (187.957)
Size	-0.349 (9.058)	-21.583** (10.017)	1.331 (10.291)	-34.928 (53.235)
Observations	3,687	3,687	3,687	3,687
Adjusted R-squared	0.564	0.593	0.607	0.668
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix C4. Effect of Sovereign Bond Spread: Stability
Robustness – Without Rating

This Table reports the results from estimating equation (1) for a sub-sample of period of Stability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Stability (2004-2007)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	0.313** (0.147)	0.474*** (0.151)	0.416** (0.208)	0.301** (0.136)
Bond Maturity	-2.091 (1.892)	0.153 (1.132)	-3.022 (2.287)	-3.305 (4.946)
Operating Income to Sales	4.150** (1.818)	2.798** (1.310)	4.589** (2.268)	1.462*** (0.291)
Short Term Debt/ Total Debt	40.837 (72.805)	-69.207 (44.954)	40.347 (77.866)	-48.145* (26.692)
Debt/Asset	13.099 (29.171)	9.682 (25.372)	13.683 (28.687)	3.006 (11.214)
Rating	93.001** (43.710)	-61.989 (50.755)	91.698** (42.321)	90.077** (40.777)
Size	-12.162 (8.481)	-27.474*** (10.357)	-11.137 (9.336)	-23.864 (17.901)
Observations	3,452	3,452	3,452	3,452
Adjusted R-squared	0.316	0.444	0.326	0.838
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix C5. Effect of Sovereign Bond Spread: Instability
Robustness – Without Rating

This Table reports the results from estimating equation (1) for a sub-sample of period of Instability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Instability (2008-2009)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	1.991*** (0.400)	2.517*** (0.473)	1.021** (0.474)	1.831*** (0.430)
Bond Maturity	4.214 (4.012)	5.983* (3.191)	5.580 (4.155)	-147.431*** (30.679)
Operating Income to Sales	3.607*** (0.279)	2.632*** (0.366)	3.265*** (0.508)	0.745 (0.639)
Short Term Debt/ Total Debt	-236.640*** (61.744)	-241.194*** (60.725)	-178.380*** (67.368)	-205.603*** (59.681)
Debt/Asset	-10.831 (47.204)	-379.813*** (96.768)	5.649 (55.629)	167.263* (95.483)
Rating	171.947** (72.253)	-307.027*** (74.945)	182.204*** (69.306)	-353.487 (259.462)
Size	-89.051*** (13.461)	-133.561*** (15.183)	-86.276*** (14.272)	-100.562 (104.724)
Observations	3,837	3,837	3,837	3,837
Adjusted R-squared	0.405	0.512	0.429	0.720
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix D1. Effect of Sovereign Bond Spread: Whole Sample
Robustness – Without Equity Volatility

This Table reports the results from estimating equation (1) for whole sample by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Whole Sample				
	(1)	(2)	(3)	(4)	(5)
Sovereign Bond Spread	1.299*** (0.313)	5.241*** (0.448)	5.164*** (0.442)	0.902** (0.414)	3.090*** (0.386)
Bond Maturity	-9.624*** (2.676)	-7.174*** (2.172)	-8.389*** (2.069)	3.750* (2.264)	-57.224*** (7.547)
Operating Income to Sales	-393.137*** (38.133)	-254.783*** (29.750)	-266.545*** (30.986)	-131.759*** (28.203)	-254.241*** (29.029)
Short Term Debt/ Total Debt	151.987*** (33.638)	177.940*** (31.387)	7.089 (58.279)	207.184*** (28.544)	8.915 (41.293)
Debt/Asset	-128.968*** (28.268)	-41.551 (38.226)	-77.309 (63.630)	21.363 (35.309)	62.039 (128.766)
Rating	-58.370*** (5.166)	-60.469*** (4.857)	-58.258*** (4.955)	-57.046*** (4.636)	-63.073*** (9.852)
Size	15.429** (6.961)	17.698*** (5.742)	-3.481 (9.334)	8.006 (5.447)	-74.732 (45.275)
Observations	7,289	7,289	7,289	7,289	7,289
Adjusted R-squared	0.371	0.503	0.536	0.605	0.706
Country Fixed Effect	NO	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	NO	YES	NO	NO
Time Fixed Effect	NO	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1					

Appendix D2. Effect of Sovereign Bond Spread: Financial Bonds
Robustness – Without Equity Volatility

This Table reports the results from estimating equation (1) for a sub-sample of Financial Bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	4.407*** (0.575)	4.602*** (0.591)	1.530*** (0.512)	2.662*** (0.515)
Bond Maturity	-6.941** (2.677)	-8.120*** (2.550)	5.034* (2.867)	-84.254*** (7.393)
Operating Income to Sales	-346.992*** (37.240)	-325.874*** (33.417)	-201.113*** (42.195)	-231.919*** (30.293)
Short Term Debt/ Total Debt	152.191*** (54.195)	41.253 (98.277)	137.982*** (47.323)	-47.472 (59.682)
Debt/Asset	11.287 (100.134)	-188.487 (136.073)	-3.405 (89.912)	-314.879** (131.795)
Rating	-86.462*** (12.558)	-81.295*** (10.490)	-67.825*** (12.593)	-44.374*** (5.833)
Size	40.049 (25.607)	-20.077 (35.758)	4.230 (23.118)	-242.085*** (47.252)
Observations	3,602	3,602	3,602	3,602
Adjusted R-squared	0.587	0.642	0.641	0.792
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix D3. Effect of Sovereign Bond Spread: Non-Financial Bonds
Robustness – Without Equity Volatility

This Table reports the results from estimating equation (1) for a sub-sample of Non-Financial Bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Non-Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	5.104*** (0.543)	4.950*** (0.556)	0.253 (0.662)	3.079*** (0.590)
Bond Maturity	-10.293*** (3.011)	-11.737*** (3.730)	0.606 (3.159)	-46.266*** (8.262)
Operating Income to Sales	-316.029*** (81.482)	-331.396** (128.107)	-220.735** (88.808)	-515.958*** (86.503)
Short Term Debt/ Total Debt	-30.913 (68.407)	-29.764 (66.169)	81.759 (62.565)	126.427*** (44.913)
Debt/Asset	128.077 (82.290)	271.573** (115.229)	118.779 (72.228)	538.241** (222.579)
Rating	-40.204*** (4.320)	-45.008*** (7.121)	-44.171*** (4.725)	-66.256*** (19.505)
Size	18.991*** (6.482)	27.661** (13.764)	12.563* (7.523)	-8.346 (51.868)
Observations	3,687	3,687	3,687	3,687
Adjusted R-squared	0.479	0.487	0.617	0.601
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix D4. Effect of Sovereign Bond Spread: Stability
Robustness – Without Equity Volatility

This Table reports the results from estimating equation (1) for a sub-sample of period of Stability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Stability (2004-2007)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	0.393*** (0.150)	0.467*** (0.154)	0.241 (0.165)	0.358** (0.145)
Bond Maturity	-0.345 (1.286)	-0.090 (1.253)	-0.652 (1.460)	-3.472 (4.130)
Operating Income to Sales	-11.930 (51.146)	-64.241* (33.094)	-4.220 (53.781)	-50.949** (21.768)
Short Term Debt/ Total Debt	63.552*** (21.409)	49.858*** (18.864)	66.463*** (20.711)	6.632 (10.957)
Debt/Asset	16.430 (33.688)	-90.617** (42.265)	15.259 (33.683)	42.190 (45.831)
Rating	-27.934*** (4.388)	-25.138*** (4.807)	-27.997*** (4.408)	-16.449* (8.534)
Size	8.750 (7.047)	0.878 (10.708)	8.703 (7.089)	-18.698 (12.345)
Observations	3,452	3,452	3,452	3,452
Adjusted R-squared	0.570	0.601	0.583	0.845
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Appendix D5. Effect of Sovereign Bond Spread: Instability
Robustness – Without Equity Volatility

This Table reports the results from estimating equation (1) for a sub-sample of period of Instability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Instability (2008-2009)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	3.949*** (0.396)	3.905*** (0.397)	0.949** (0.437)	1.954*** (0.417)
Bond Maturity	-4.214 (3.112)	-3.548 (3.032)	2.422 (3.189)	-147.517*** (14.217)
Operating Income to Sales	-268.455*** (45.990)	-268.563*** (44.259)	-171.830*** (47.780)	-255.328*** (48.812)
Short Term Debt/ Total Debt	275.651*** (47.272)	-76.599 (80.173)	320.607*** (45.926)	197.823* (101.512)
Debt/Asset	-59.339 (44.624)	-235.300*** (62.658)	-12.438 (43.821)	-324.250 (219.044)
Rating	-80.200*** (6.502)	-73.317*** (6.083)	-78.176*** (6.684)	-69.388*** (10.562)
Size	10.644 (8.048)	-22.148* (12.385)	6.284 (8.442)	-90.358 (84.539)
Observations	3,837	3,837	3,837	3,837
Adjusted R-squared	0.537	0.597	0.595	0.733
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Appendix E1. Effect of Sovereign Bond Spread: Whole Sample
Robustness – Without Equity Volatility, adding Industry Sector x Sovereign Bond

This Table reports the results from estimating equation (2) for whole sample by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Whole Sample		
	(1)	(2)	(3)
Sovereign Bond Spread	1.142*** (0.429)	4.884*** (0.453)	0.672 (0.424)
Bond Maturity	-9.496*** (2.692)	-7.161*** (2.172)	3.716 (2.262)
Operating Income to Sales	-396.365*** (37.405)	-261.619*** (29.976)	-137.737*** (29.132)
Short Term Debt/ Total Debt	146.763*** (34.497)	168.828*** (30.923)	200.831*** (28.053)
Debt/Asset	-133.998*** (28.981)	-46.753 (37.421)	17.373 (34.679)
Rating	-58.591*** (5.220)	-61.414*** (5.082)	-57.738*** (4.784)
Size	16.469** (6.725)	21.296*** (6.383)	10.564* (5.833)
Financial x Sovereign Bond Spread	0.342 (0.605)	0.736* (0.429)	0.525 (0.394)
Observations	7,289	7,289	7,289
Adjusted R-squared	0.372	0.505	0.607
Country Fixed Effect	NO	YES	YES
Industry Sector Fixed Effect	NO	NO	NO
Time Fixed Effect	NO	NO	YES
Bond Fixed Effect	NO	NO	NO
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Appendix E2. Effect of Sovereign Bond Spread: Stability
 Robustness – Without Equity Volatility, adding Industry Sector x Sovereign Bond

This Table reports the results from estimating equation (2) for a sub-sample of period of Stability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Stability (2004-2007)	
	(1)	(2)
Sovereign Bond Spread	0.452** (0.198)	0.291 (0.188)
Bond Maturity	-0.310 (1.292)	-0.613 (1.470)
Operating Income to Sales	-9.922 (52.953)	-2.507 (55.565)
Short Term Debt/ Total Debt	63.275*** (21.380)	66.198*** (20.640)
Debt/Asset	15.824 (33.697)	14.790 (33.705)
Rating	-27.898*** (4.460)	-27.966*** (4.477)
Size	8.473 (7.431)	8.463 (7.484)
Financial x Sovereign Bond Spread	-0.106 (0.194)	-0.091 (0.193)
Observations	3,452	3,452
Adjusted R-squared	0.570	0.583
Country Fixed Effect	YES	YES
Industry Sector Fixed Effect	NO	NO
Time Fixed Effect	NO	YES
Bond Fixed Effect	NO	NO
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1		

Appendix E3. Effect of Sovereign Bond Spread: Instability
Robustness – Without Equity Volatility, adding Industry Sector x Sovereign Bond

This Table reports the results from estimating equation (2) for a sub-sample of period of Instability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Instability (2008-2009)	
	(1)	(2)
Sovereign Bond Spread	3.196*** (0.413)	0.429 (0.423)
Bond Maturity	-4.237 (3.049)	2.274 (3.154)
Operating Income to Sales	-289.377*** (48.036)	-191.949*** (50.846)
Short Term Debt/ Total Debt	236.907*** (47.816)	289.043*** (46.283)
Debt/Asset	-79.482* (42.808)	-29.348 (42.547)
Rating	-82.844*** (6.855)	-80.323*** (7.050)
Size	20.185** (8.791)	13.829 (9.213)
Financial x Sovereign Bond Spread	1.471*** (0.489)	1.167** (0.481)
Observations	3,837	3,837
Adjusted R-squared	0.544	0.600
Country Fixed Effect	YES	YES
Industry Sector Fixed Effect	NO	NO
Time Fixed Effect	NO	YES
Bond Fixed Effect	NO	NO
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Appendix F1. Effect of Sovereign Bond Spread: Whole Sample
Robustness – Without Equity Volatility, Without Rating

This Table reports the results from estimating equation (1) for whole sample by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Whole Sample				
	(1)	(2)	(3)	(4)	(5)
Sovereign Bond Spread	1.125*** (0.285)	5.742*** (0.539)	5.767*** (0.506)	1.012** (0.471)	3.168*** (0.405)
Bond Maturity	-10.984*** (3.270)	-7.505** (3.081)	-6.722*** (2.395)	4.424 (3.377)	-68.432*** (10.353)
Operating Income to Sales	-407.888*** (43.340)	-236.322*** (37.435)	-269.396*** (36.536)	-103.996** (40.639)	-207.450*** (31.230)
Short Term Debt/ Total Debt	20.354 (33.926)	55.011 (34.228)	-180.070** (75.605)	94.601** (40.470)	-30.188 (44.383)
Debt/Asset	-38.200 (39.536)	107.895* (65.253)	-141.521* (84.696)	168.449*** (62.234)	45.126 (143.503)
Size	-45.891*** (9.166)	-50.364*** (9.863)	-91.629*** (11.202)	-56.844*** (10.734)	-156.362*** (58.691)
Observations	7,289	7,289	7,289	7,289	7,289
Adjusted R-squared	0.177	0.330	0.417	0.451	0.681
Country Fixed Effect	NO	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	NO	YES	NO	NO
Time Fixed Effect	NO	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	NO	YES
Robust standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

Appendix F2. Effect of Sovereign Bond Spread: Financial Bonds
Robustness – Without Equity Volatility, Without Rating

This Table reports the results from estimating equation (1) for a sub sample of Financial Bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	5.890*** (0.829)	5.663*** (0.754)	1.318** (0.550)	2.943*** (0.560)
Bond Maturity	-1.311 (3.369)	-7.837*** (2.939)	12.122*** (4.106)	-86.483*** (10.237)
Operating Income to Sales	-257.233*** (35.036)	-246.656*** (33.090)	-49.365** (24.981)	-205.300*** (31.793)
Short Term Debt/ Total Debt	-81.044 (73.943)	-256.106* (143.521)	-34.599 (56.910)	-59.776 (59.938)
Debt/Asset	-177.850 (112.192)	-249.857 (184.180)	-116.810 (93.735)	-499.547*** (131.254)
Rating	-93.614*** (22.268)	-139.272*** (41.020)	-99.951*** (20.812)	-306.260*** (71.395)
Size	40.049 (25.607)	-20.077 (35.758)	4.230 (23.118)	-242.085*** (47.252)
Observations	3,602	3,602	3,602	3,602
Adjusted R-squared	0.463	0.555	0.578	0.782
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Appendix F3. Effect of Sovereign Bond Spread: Non-Financial Bonds
Robustness – Without Equity Volatility, Without Rating

This Table reports the results from estimating equation (1) for a sub sample of Non-Financial Bonds by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Non-Financial Bonds			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	5.130*** (0.595)	5.335*** (0.584)	0.679 (0.696)	2.677*** (0.537)
Bond Maturity	-13.034*** (3.550)	-13.746*** (4.212)	-1.510 (3.562)	-62.161*** (12.222)
Operating Income to Sales	-478.866*** (127.828)	-422.692*** (129.984)	-422.473*** (147.265)	-582.716*** (102.741)
Short Term Debt/ Total Debt	-121.666* (63.652)	-103.812* (59.169)	-29.227 (63.230)	104.586** (50.530)
Debt/Asset	563.463*** (114.245)	405.934*** (118.230)	619.499*** (133.976)	956.766*** (254.361)
Size	-10.326 (10.652)	-40.463*** (11.227)	-19.067 (12.814)	-74.527 (63.286)
Observations	3,687	3,687	3,687	3,687
Adjusted R-squared	0.398	0.424	0.524	0.575
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				

Appendix F4. Effect of Sovereign Bond Spread: Stability
Robustness – Without Equity Volatility, Without Rating

This Table reports the results from estimating equation (1) for a sub sample of period of Stability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS	Period of Stability (2004-2007)			
VARIABLES	(1)	(2)	(3)	(4)
Sovereign Bond Spread	0.383*** (0.125)	0.534*** (0.130)	0.286* (0.164)	0.309** (0.133)
Bond Maturity	-1.392 (1.894)	0.589 (1.082)	-1.860 (2.218)	-3.217 (5.090)
Operating Income to Sales	50.058 (81.837)	-77.766 (47.806)	57.446 (85.289)	-58.946** (27.675)
Short Term Debt/ Total Debt	12.785 (30.021)	-0.373 (25.529)	15.234 (29.376)	2.429 (12.243)
Debt/Asset	80.536* (47.590)	-80.009 (51.172)	79.945* (47.018)	83.795** (40.393)
Size	-19.704*** (7.132)	-35.714*** (7.075)	-19.739*** (7.234)	-23.327 (18.846)
Observations	3,452	3,452	3,452	3,452
Adjusted R-squared	0.248	0.418	0.257	0.834
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

Appendix F5. Effect of Sovereign Bond Spread: Instability
Robustness – Without Equity Volatility, Without Rating

This Table reports the results from estimating equation (1) for a sub sample of period of Instability by OLS with clustering errors by bond. Robust standard errors are shown in parenthesis. ***p<0.01, **p<0.05, *p<0.1.

Dependent Variable: OAS VARIABLES	Period of Instability (2008-2009)			
	(1)	(2)	(3)	(4)
Sovereign Bond Spread	4.228*** (0.451)	4.123*** (0.455)	0.984** (0.493)	1.902*** (0.423)
Bond Maturity	-1.381 (4.221)	1.724 (3.442)	5.880 (4.483)	-175.280*** (16.848)
Operating Income to Sales	-319.859*** (59.027)	-300.431*** (56.012)	-216.290*** (65.502)	-220.572*** (49.779)
Short Term Debt/ Total Debt	60.249 (48.601)	-409.953*** (93.083)	122.373** (51.657)	182.450* (99.152)
Debt/Asset	174.689** (84.399)	-349.368*** (88.058)	219.994*** (81.604)	-401.242* (235.188)
Size	-89.676*** (13.865)	-139.556*** (16.022)	-92.740*** (14.778)	-125.474 (97.540)
Observations	3,837	3,837	3,837	3,837
Adjusted R-squared	0.327	0.475	0.396	0.719
Country Fixed Effect	YES	YES	YES	NO
Industry Sector Fixed Effect	NO	YES	NO	NO
Time Fixed Effect	NO	NO	YES	NO
Bond Fixed Effect	NO	NO	NO	YES
Robust standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				