

On the importance of political factors and macroeconomic fundamentals in explaining european sovereign default risk

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Abstract

This paper investigates the importance of political factors and macroeconomic fundamentals in explaining the increase in the European sovereign default risk during the recent debt crisis. It shows that much of the increase in the European sovereign spreads, measures of the sovereign relative probability of default, can be explained by political factors and macroeconomic fundamentals. The model that explain sovereign spreads abruptly changes in the first quarter of 2010, when the European Central Bank opposed a rapid bailout of Greece. A possible interpretation is that investors realized that the European Central Bank would not be able to act as a lender of last resort in face of large-scale European debt defaults since then. Therefore, the value of sovereign bonds default risk became closely related to the political factors and macroeconomic fundamentals of each country.

Keywords: sovereign spread, default risk, structural change, political factors, macroeconomic fundamentals.

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Sobre a importância dos fatores políticos e dos fundamentos macroeconômicos na explicação do risco de inadimplência dos títulos soberanos europeus

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Resumo

Esse artigo investiga a importância de fatores políticos e fundamentos macroeconômicos na explicação do aumento do risco de default soberano europeu durante a crise da dívida recente. Mostra-se que muito do aumento nos diferenciais de juros soberanos, medidas da probabilidade relativa de default soberana, podem ser explicadas por fatores políticos e fundamentos macroeconômicos. O modelo para explicar os diferenciais de juros passa por uma alteração abrupta no primeiro trimestre de 2010, quando o Banco Central Europeu se opôs a conceder auxílio financeiro para o resgate da dívida grega. Uma possível interpretação é que os investidores perceberam que o Banco Central Europeu não seria capaz de atuar como um prestador de última instância em face de defaults, em larga escala, da dívida europeia desde então. Portanto, o valor do risco de default dos títulos soberanos se tornou intimamente relacionado a fatores políticos e fundamentos macroeconômicos.

Palavras-chave: spread soberano, risco de inadimplência, mudança estrutural, fatores políticos, fundamentos macroeconômicos.

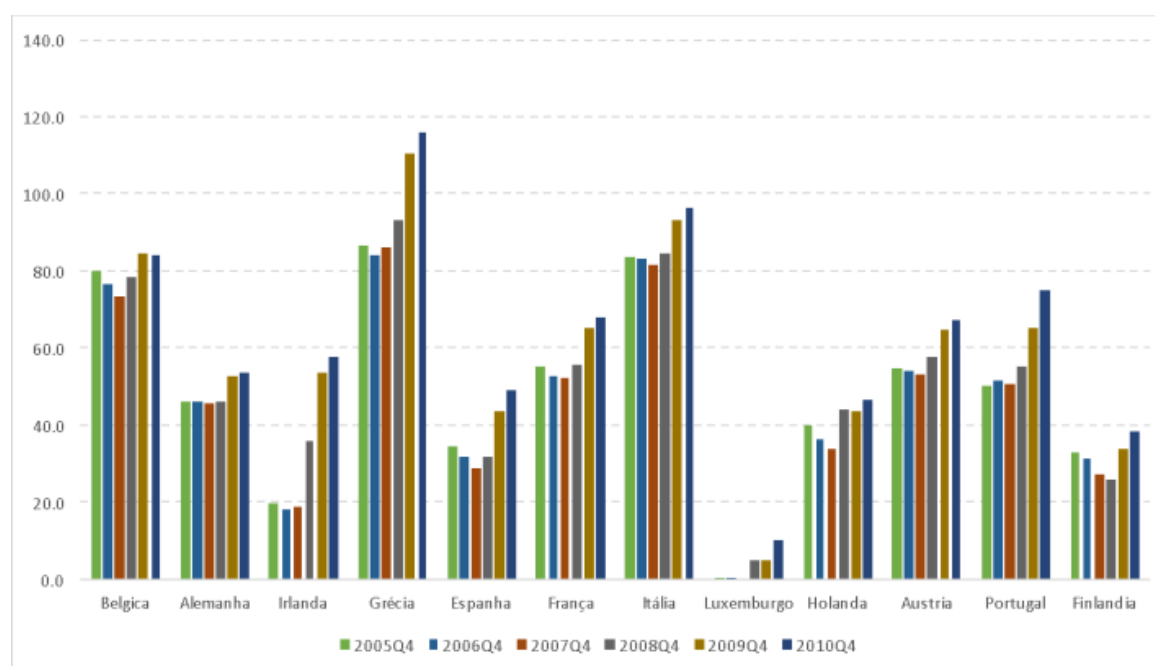
1. Introduction

Until 2007, European Union countries experienced a growth phase driven by a period of high global liquidity and low risk aversion in the financial markets. During this pre-crisis period, peripheral countries such as Portugal, Spain, Italy, Ireland and Greece inherited the credibility of the central countries. The belief in the economic convergence of Eurozone countries resulted in the access to increasingly low funding rates for the member states.

With the high liquidity of the international market and artificially low rates, peripheral countries experienced the ability to raise large volumes of low-cost debt, which eventually led to an unsustainable stock of debt. This debt flow was partially masked by the growth that peripheral countries were experiencing.

The problem came to light when the European economy began to weaken after the impact of the subprime crisis. Several European banks held large positions in US toxic assets and some peripheral Eurozone countries had to deal with their own real estate crises. Some member states had to intervene in the bailout of their financial institutions and did so at the expense of increasing public deficit. Debt grew as GDP shrank, which drew attention to the high level of leverage in peripheral economies (Figure 1).

Figure 1. Evolution of Debt-to-GDP ratio in the EU member states



Source: Data from Eurostat.

As a result of the increase in the debt-to-gdp ratios and the implied fiscal fragility, these countries were characterized by having higher sovereign default risk, which is the probability, expected by financial markets, that a government will not honor its debt obligations. Therefore, investors required higher yields in order to lend to them.

Standard & Poor's (1998) defines default as the inability of a debt holder of fully honoring its due yields or the principal on the dates specified on the original debt contract. A sovereign default is an extreme situation, however markets define a new equilibrium cost of sovereign debt, or sovereign yield, associated with any political or economic change that leads to a change in the probability of default.

Sovereign spread is a measure of relative default risk, defined by the difference in a government yield, or cost of debt, and the yield of the anchor country, assuming that debt obligations of both countries have the same maturity. The anchor country is the country with the lowest risk of default, usually Germany when comparing European countries. Intuitively, sovereign spread reflects the additional financial gains that a investor requires to lend to a government characterized by a relatively higher probability of default than the anchor country. The EU's fiscal fragility drastically impacted the peripheral European sovereign spreads, as the bonds of member states suffered heavy speculative attacks. Since then, European sovereign spreads have been an extremely relevant issue in the financial environment, giving rise to studies in the world's leading political and financial research centers.

De Grauwe and Ji (2013) and Aizenman et al (2013) show that a significant part of the increase in the peripheral pricing of European sovereign risk was not explained by concomitant changes in macroeconomic fundamentals. They suggest these economies have moved to a "self-fulfilling bad equilibrium", where the investors overreacted to the European debt crisis.

This paper adds to the literature by arguing that much of the increase in the European interest rates can be explained by political factors and macroeconomic fundamentals in a model that allows for a structural break since the first quarter of 2010, when European Central Bank opposed a rapid bailout of Greece.

After that bail-out refusal, this paper shows not only a greater impact of political factors related to the debt-to-GDP ratio, but also an increase on the importance of variations in the real GDP growth rate and the real effective exchange rate in explaining the peripheral European sovereign spreads.

A possible interpretation is that investors realized that the European Central Bank would not be able to act as a lender of last resort in face of large-scale European debt defaults. Therefore, they increased the value of default risk explained by political factors and macroeconomic fundamentals.

2. The importance of bail-out expectations

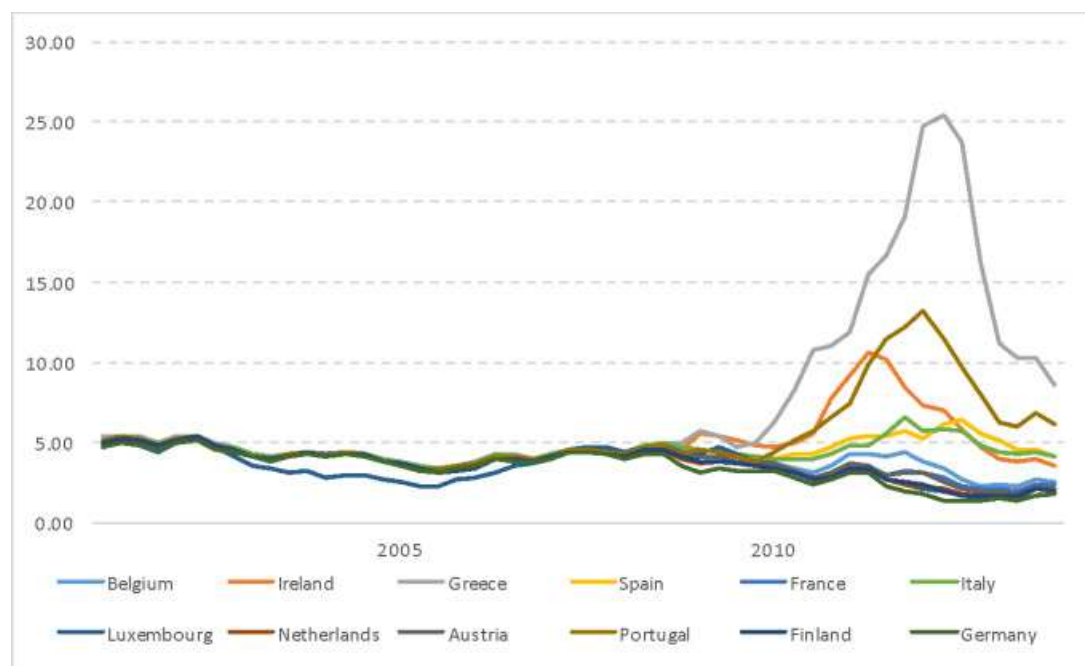
Lamfalussy (1989) argued that, although the Maastricht Treaty had a no-bail-out clause, the sovereign yields of some member states did not reflect their fiscal realities. It suggested that investors expected the existence of solidarity among the member states so that, in a situation of fiscal stress in a member state, there would be a pressure on the European Union states to buy the troubled country's bonds. That measure would prevent a local fiscal problem from spreading to the European system.

This problem was evidenced during the European debt crisis, when the sovereign bond yields took off. The spreads of peripheral economies sharply increased possibly because the market realized that, although some European states formed a single currency zone, they had quite different economic characteristics and the bailout of peripheral economies by core economies in the event of default was uncertain.

Greece's sovereign spread in relation to Germany, or the risk premium that Greece had to pay in addition to Germany's to raise funds within the same ten-year period, went from 46 basis points in the first quarter of 2008 to 265 basis points in the first quarter of 2009. The peak took place in the second quarter of 2012, when the spread was on average 2,398 basis points more than Germany (Eurostat, 2016).

Until 2009, markets priced Greece (and other European countries) considering an implicit bailout clause. In the first quarter of 2010, European Central Bank's choice not to repurchase Greek bonds introduced a previously non-existent default risk. Not only Greek yields rose rapidly, but also the yields from other European countries, such as Portugal and Spain, what reflected the situation of their poor financial and macroeconomic fundamentals (Arghyrou and Tsoukalas, 2011). Figure 2 shows the evolution of 10-year bond yield of EU member states.

Figure 2. Evolution of 10-year bond yield of EU member states



Source: Data from Eurostat.

Although Greece is the most prominent case, the first phase of the crisis in Europe began in Ireland. Irish growth was heavily anchored to real estate growth. With the onset of the US financial crisis in 2007/08, the existence of a housing bubble became evident in Ireland, which caused real estate prices to drop more than 50% in a few months.

Irish banks had a credit portfolio filled with loans to developers, which transferred the problem to the Irish financial system. In order to avoid a collapse of the national financial system, the Irish government had to guarantee the banks' commitments. At the same problem, the country's tax revenues were decreasing due to the economic crisis, what implied higher public deficits (Baselga-Pascual et al, 2015).

Named the "Celtic Tiger", Ireland went from accelerated growth to financial collapse within just three years. In the first quarter of 2010, when European Central Bank decided not to rapidly bailout the Greek economy, the crisis quickly spread to the other peripheral European countries, such as Portugal, Italy and Spain. Those peripheral countries were experiencing substantial instabilities in their economies, with high national debt levels and public deficit as a ratio of GDP.

The president of the European Commission, José Manuel Durão Barroso, identified the three main causes of the European Crisis:

1. Unsustainable public debt: the stock of public debt was rapidly increasing and the European countries, mainly the peripheral ones, would eventually not be able to repay their debt obligations.
2. Differences in competitiveness among the European Union Member States: in the fixed exchange rate regime, the central European countries were facing real devaluations in their currency due to relatively lower inflation rates in relation to peripheral countries. As a result, the peripheral countries became less competitive in the international trade.
3. Lack of regulation in the financial sector: the European banks hold a large fraction of their portfolio assets in subprime portfolios and other low quality credit assets that were not being properly repaid.

In 2012, European authorities agreed on the establishment of a bank union in order to restore the confidence on the European financial system. It would imply more adequate capital requirements, a higher degree of safety to the holders of bank deposits and efficient monitoring mechanisms for the European financial institutions.

In order to diminish public deficit and the stock of public debt, peripheral governments have adopted austerity measures such as the increase in taxes and decrease in government spendings, what may have increased unemployment and aggravated the initial crisis. The European debt crisis evidenced the fiscal problems that can arise in a monetary union and the importance of rethinking the management rules of the political, financial and economic system.

3. Data description

In order to explain the determinants of European sovereign yield spreads, the literature defines both international variables, associated with the market's level of risk aversion, and country-specific variables.

In this study, the measure of sovereign spread, which is the dependent variable, is the 10-year bond spread. The spread was calculated based on the average 10-year bond yield of each country, reported by Eurostat, subtracted from Germany's bond yield. Following most of the literature, it assumes that Germany's interest rate is the best estimate of the risk-free interest rate in Europe (Maltritz, 2012).

The first explanatory variable is the leverage or, the amount of debt in relation to GDP. Alesina and Tabellini (1989) and Ozler and Tabellini (1991) show that higher political instability and polarization may lead to higher uncertainty regarding future macroeconomic policies, capital flight and stronger preference for present, as opposed to future government expenditure. In order to finance a higher level of present consumption, the government over-accumulates debt. In turn, several authors report the association between debt, default risk and sovereign spread (Lemmen and Goodhart, 1999; Faini, 2006; Bernoth et al., 2006; Hallerberg and Wolff, 2008 and Maltritz, 2012). A greater leverage would represent more debt obligations to repay, consequently, a greater spread in relation to the anchor country.

Another measure of leverage included in the analysis is the current account balance. Current account deficits can be interpreted as an increase in the level of external debt, as the country imports more than it exports, remaining with a commitment to repay its current account deficit. According to Gros (2011), the level of external debt, as opposed to total public debt, was the main cause of the recent turmoil in the Eurozone. Belgium, for instance, had a greater ratio of total public debt-to-GDP than Portugal, and faced high political polarization and instability during the crisis.

Nevertheless, Belgium was a net creditor to the rest of the world and faced lower default risk, measured by sovereign spread. To capture the impact of the current account balance on the financial capacity of the countries, we work with the accumulated current account balance of the period of analysis (De Grauwe and Ji, 2013).

According to the economic theory, GDP growth affects the tax collection capacity and, consequently, the country's capacity to repay. Growing countries have greater financial capacity, while countries in recession may have trouble paying for their commitments. The economic growth also brings a predictive component for tax collection in the upcoming years.

As a measure of competitiveness in international trade, we include the real effective exchange rate. A country experiencing an appreciation in the real exchange rate can have lower regional competitiveness in international trade, what may lead to possible deficits and debt problems (Lemmen and Goodhart, 1999; De Grauwe and Ji, 2012). This may be a reason why investors may require a risk premium to buy sovereign debt from countries with inflationary problems.

In addition to country-specific variables, some variables related to the global financial conditions are also important to explain the sovereign spreads (Caballero and Krishnamurthy (2008), Krishnamurthy (2010) and Arghyrou and Kontonikas (2010)). The interest rate on 10-year US bonds (Treasury Rate) and the equity market volatility (VIX) are the measures of international interest rate and aggregate risk aversion included in the study. Arghyrou and Kontonikas (2010) found that the international factors measured by Treasury and VIX, in addition to a country-specific factor representing international competitiveness, are the main factors that contribute to the pricing of sovereign spreads during financial crises.

Table 1. Description of the variables

No.	Variable	Definition	Source
0	Sovereign spread	Sovereign 10-yr bond yield spread (based on Germany 10-yr bond yield)	Eurostat
1	GDP	Real GDP growth rate yoy	Eurostat
2	Debt	Total government debt to GDP	Eurostat
3	REER	Real effective exchange rate	Eurostat
4	CACC	Accumulated current account balance to GDP	Calculated from Eurostat
5	Treasury	10-yr U.S. Government interest rate	Bloomberg
6	Vix	Implied volatility of S&P 500 index options	Bloomberg

The model is estimated using panel data from January 2001 to June 2014, for the 12 European countries that were in the EU in January 2001.

4. Methodology

The main aim of this paper is to study the importance of political factors and macroeconomic fundamentals in explaining the increase in the peripheral European sovereign spreads. The simplest model of spreads in the literature (Edwards (1986), Eichengreen and Mody (1998), Hilscher, J. and Nosbusch, Y. (2010)) are represented by linear regressions on macroeconomic variables:

$$y = \sum_{j=1}^J b_j x^j + e$$

where “y” represents the sovereign spreads, “x”, the ‘J’ explanatory variables and “b” are ‘J’ parameters to be estimated.

De Grauwe and Ji (2013) and Aizenman, Hutchison, and Jinjark (2013) suggest that much of the increase in the European sovereign spreads after 2010 cannot be explained by macroeconomic fundamentals. They suggest that market sentiments became relatively important to explain the pricing of European sovereign debt.

In this paper, we argue that much of the increase in the European interest rates can be explained by political factors and macroeconomic fundamentals. In the first quarter of 2010, when European Central Bank decided not to repurchase Greek bonds, their yields rose sharply. According to Arghyrou and Tsoukalas (2011), at that moment, the yields started to reflect the real situation of the national macroeconomic fundamentals, characterized by high national debt levels and public deficit as a ratio of GDP. The rapid rise in the EU sovereign yields was possibly showing that markets were not considering the existence of an implicit EU bailout clause anymore. To test that hypothesis, we estimate a linear regression that allows for a structural change since the first quarter of 2010:

$$y = \sum_{j=1}^J b_j x^j + \sum_{j=1}^J d_j q^* x^j + e$$

where “y” represents the sovereign spreads, “x”, the ‘J’ macroeconomic variables, “q*” is a dummy variable that takes the value 0 before the first quarter of 2010 and 1 after that, which multiplies the macroeconomic variables “x”. The parameters “b” are the impacts of the macroeconomic variables on sovereign spreads before the first quarter of 2010 and “b+d” are the respective impacts after that. The parameters “d” allows for a change in the pricing mechanism after European Central Bank refused to bail-out Greece.

To implement the model, we regress the “y” variable on the “x” variables and the “x” multiplied by “q*”, the dummy variable. In this paper, we will test whether those interactions between “x” and “q*” are jointly statistically and economically important, what would mean the presence of a structural break in the model could not be rejected.

5. Results

In order to compare our results to the literature, we first estimate a linear model of sovereign spreads as a function of domestic macroeconomic conditions, which does not allow for structural breaks.

First, all the parameter estimates have the expected signs. A one percent point increase in debt to GDP increases sovereign spreads by approximately 0.1 percentage points. In addition, an increase in the ability to repay, measured by an increase in the real GDP growth and the accumulated current account, decreases sovereign spreads significantly. The real effective exchange rate is not significant at the 5% significance level (Table 2-column named “Linear Model”).

Next, in order to test whether investors increased the default risk explained by political factors and macroeconomic fundamentals after European Central Bank opposed to bail-out Greece, we allow for a structural change since the first quarter of 2010. The VIX index and the 10-year U.S. Treasury rate are added to control for changes in international risk aversion and the world interest rates. The results are presented in the column named “Structural break(1)” of Table 2.

The parameters associated with the interactions between “x” and “q*”, the dummy variable, are jointly statistically significant. Therefore, the presence of a structural break in the model cannot be rejected and the estimates of the “linear model” would probably be biased. It is important to note that the only variable that explains European sovereign spreads significantly before the first quarter of 2010 is debt to GDP ratio. That result suggests that political instability and polarization may have been important in explaining sovereign spreads until that moment. According to Alesina and Tabellini (1989) and Ozlen and Tabellini (1991), higher political instability and polarization may lead to higher uncertainty regarding future fiscal policies and to a greater preference for present consumption, as opposed to future consumption. Therefore, it may lead to more debt accumulation. After the first quarter of 2010, all macroeconomic variables considered are important to explain variations in spreads, showing that investors started to price macroeconomic fundamentals more consciously after the 2010 crisis. It is also important to mention that even the magnitude of the debt to GDP impact increases by more than 20 percent after 2010 (from 0.051 to 0.063, which is the sum of 0.051 to 0.012).

The VIX index, measuring global risk aversion, is also important in the model, having a positive and significant impact. Caballero and Krishnamurthy (2008) and Krishnamurthy (2010) show that when global risk aversion increases the demand for riskier assets decrease, while the demand for safer assets increase. This phenomenon was named “flight-to-quality” and helps explain European sovereign spreads.

We also test whether there was a change in the parameters measuring international conditions after 2010. The results are presented in the column named “Structural break(2)” of Table 2. If investors really considered peripheral European assets riskier after European Central Bank opposed to bail-out Greece, the impact of changes in global risk aversion should also be higher after 2010. Our results show exactly that: changes in the VIX are priced only after 2010, demonstrating that investors considered European peripheral countries less safe after European Central Bank decided not to bail-out Greece.

Allowing for a structural break in the model and controlling for changes in the parameters measuring international conditions increases the R-square from 0.52 (Linear Model) to 0.76 (Structural break 2).

Table 2. Results

	Linear	Structural break (1)	Structural break (2)
GDP	-0.1605 (0.000)***	-0.1297 (0.646)	-0.340 (0.220)
DEBT	0.0980 (0.000)***	0.05142 (0.000)***	0.05115 (0.000)***
REER	0.0640 (0.093)*	-0.0595 (0.065)*	-0.0643 (0.032)**
CACC	-0.0021 (0.001)***	0.0010 (0.200)	0.0005 (0.474)
GDPd2010		-0.5912 (0.000)***	-0.6306 (0.000)***
DEBTd2010		0.0124 (0.020)**	0.0154 (0.02)***
REERd2010		0.0089 (0.031)**	0.0302 (0.000)***
CACCd2010		-0.0020 (0.000)***	-0.0014 (0.007)***
Treasury		0.1403 (0.114)	-0.0509 (0.650)
Vix		0.0311 (0.000)***	0.0077 (0.235)
Treasuryd2010			0.2240 (0.199)
Vixd2010			0.1362 (0.000)***
_cons	-10.9699 (0,005)**	2.1465 (0.537)	4.0139 (0.216)
R-sq	0.5195	0.7277	0.7672

De Grauwe, Paul and Yuemei Ji (2013) assert there should be a structural break in this model to account for the 2007-2008 worldwide financial crisis. In Table 3, we allow for this break, but the variables multiplied by the crisis dummy do not enter the regression significantly, individual or jointly.

Table 3. Worldwide and European crisis - Structural break

	Structural break (3)
GDP	-00727 (0.097)*
DEBT	0.0497 (0.000)***
REER	-0.0734 (0.017)**
CACC	0.0011 (0.288)
GDPd2008	0.0671 (0.205)
DEBTd2008	0.0019 (0.747)
REERd2008	-0.0001 (0.972)
CACCd2008	-0.0005 (0.480)
GDPd2010	-0.6533 (0.000)***
DEBTd2010	0.0145 (0.025)*
REERd2010	-0.0282 (0.001)***
CACCd2010	-0.0144 (0.019)**
Treasury	0.0070 (0.957)
Vix	0.0071 (0.275)
Treasuryd2010	0.1518 (0.413)
Vixd2010	0.1359 (0.000)***
_cons	4.8299 (0.005)**
R-sq	0.7686

However, all of our test results could be misleading in the presence of cross-sectional dependence. We apply the Pesaran test for cross-sectional independence and show that we reject the hypothesis of no cross-sectional dependence. Therefore, we apply Driscoll and Kraay standard errors, which are robust to cross-sectional dependence (Hoechle, 2007). Table 4 shows that our test results still hold. Mainly, all domestic macroeconomic variables and the external conditions become more important to explain variations in European sovereign spreads after European Central Bank refused to bail-out Greece.

Table 4. Robust results

	Structural break (2)	Structural break (2) Robust
GDP	-0.3408 (0.220)	-0.0341 (0.046)**
DEBT	0.05115 (0.000)***	0.0511 (0.000)***
REER	-0.0643 (0.032)**	-0.0643 (0.089)*
CACC	0.005 (0.474)	0.0005 (0.131)
GDPd2010	-0.6306 (0.000)***	-0.6306 (0.000)***
DEBTd2010	0.0154 (0.002)***	0.0154 (0.000)*
REERd2010	0.0302 (0.000)***	-0.0302 (0.093)*
CACCd2010	-0.0014 (0.007)***	-0.0014 (0.022)**
Treasury	-0.0509 (0.650)	-0.0509 (0.566)
Vix	0.0077 (0.235)	0.0077 (0.027)**
Treasuryd2010	0.2240 (0.199)	0.2240 (0.678)
Vixd2010	0.1362 (0.000)***	0.1362 (0.000)***
_cons	4.0139 (0.216)	4.0139 (0.305)
R-sq	0.7672	0.7672

6. Conclusion

Countries wish to control their cost of borrowing, measured by sovereign spreads, in order to reduce their financial instability, to properly manage public accounts and to improve social welfare. At the same time, investors wish to understand the variables that impact the sovereign spreads in order to make better investments.

The consequences of the European debt crisis are the subject of a vast and rich academic literature. Several studies were conducted to evaluate the macroeconomic and financial variables that are the main determinants of the sovereign yield spreads. However, the variability of results and the lack of a consensus on which variables are important suggest the model may not be linear.

Our contribution lies in testing whether there was a structural break in the European sovereign bonds pricing model after the first quarter of 2010, when European Central Bank opposed a bailout of Greece. The model is estimated using panel data from January 2001 to June 2014, for the twelve European countries that were in the EU in January 2001.

In the period from 2001 to the first quarter of 2010, the only relevant macroeconomic variable was debt-to-GDP ratio, suggesting that political instability and polarization may have been key factors in determining default risk. As pointed out by Alesina and Tabellini (1989) and Ozlen and Tabellini (1991), political instability and polarization may lead to higher uncertainty regarding future macroeconomic policies and a stronger preference for present, as opposed to future government consumption. Therefore, they are associated with higher debt levels to finance present consumption. After European Central Bank opposed to bail-out Greece, the model undergoes a structural break and the macroeconomic conditions, measured by the GDP growth, the real effective exchange rate and the current account balance, became more relevant in the explanation of sovereign yield spreads. It should also be noted that even the magnitude of the debt impact increases after the first quarter of 2010, suggesting that political factors have always been important to price sovereign bonds and became even more relevant recently. Corroborating our analysis, we note that the variable VIX, which is the risk aversion measure, is also statistically important after 2010.

The results suggest that investors realized that the European Central Bank would not be able to act as a lender of last resort in face of large-scale European debt defaults in the first quarter of 2010. Since then, they started to price European sovereign bonds according to the political factors and macroeconomic fundamentals of each country.

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