LISBON SCHOOL OF ECONOMICS & MANAGEMENT
UNIVERSIDADE DE LISBOA

MASTER

MONETARY AND FINANCIAL ECONOMICS

MASTER´S FINAL WORK

DISSERTATION

SOVEREIGN DEBT CRISIS IN PORTUGAL AND SPAIN

NUNO MIGUEL CRUZ GUIMARÃES VERDIAL

SEPTEMBER - 2019

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SUPERVISION:

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To my friends, with whom I share every victory and defeat.

SOVEREIGN DEBT CRISIS IN PORTUGAL AND SPAIN

By Nuno Verdial

Abstract

The 2007-2008 financial crisis and the European sovereign debt crisis effects rippled through the financial system, banks and sovereign states. The crises exposed the most vulnerable economies and caused profound changes on how risk is assessed, including sovereign risk, raising sovereign bond yields spreads across the Eurozone. This dissertation analyzes these events, focusing on the Portuguese and Spanish case after providing an insight into the Eurozone. The change in the pricing of sovereign risk was assessed by performing an OLS/2SLS fixed effects panel analysis on a pool of Eurozone countries and a SUR regression with Portugal and Spain covering the period 1999:11 until 2019:6. Our main results show that the pricing of sovereign risk changed with the crisis and the "whatever it takes" speech of Mario Draghi. Specifically, markets pricing of the Eurozone credit risk, liquidity risk and the risk appetite increased after the crisis and it relaxed after Mario Draghi´s speech. We did not find evidence of pricing regime changes after the speech in the Portuguese and Spanish case.

Key Words: Sovereign bonds, Spreads, Crises, Unconventional Monetary Policy, Portugal, Spain

JEL: C23, E44, E52, G01

SOVEREIGN DEBT CRISIS IN PORTUGAL AND SPAIN

By Nuno Verdial

Resumo

Os efeitos da crise financeira de 2007-2008 e da crise das dividas soberanas Europeias espalharam-se pelo sistema financeiro, os bancos e os estados soberanos. Estas crises expuseram as economias mais vulneráveis e causaram mudanças profundas na maneira como o risco é avaliado, incluindo o risco das dividas soberanas, aumentando o spread dos juros dos títulos de divida soberana. Esta dissertação analisa estes eventos, focando-se no caso Português e Espanhol depois de abordar a situação Europeia. A mudança do preço do risco soberano foi averiguada através de, uma análise em painel OLS/2SLS fixed effects num conjunto de países da Zona Euro e uma regressão SUR com Portugal e Espanha, ambas abrangendo o período entre 1999:11 até 2019:6. Os resultados mostram que o preço do risco soberano mudou com a crise e com o discurso "whatever it takes" de Mario Draghi. Nomeadamente, o preço atribuido ao risco de crédito, risco de liquidez e apetitite de risco da Zona Euro pelos mercados aumentou após as crises e diminui a seguir ao discurso de Mario Draghi. Não encontramos provas de mudanças no regime de preços após o discurso no caso Português e Espanhol.

Palavras chave: Títulos de Divida Soberana, Spreads, Crises, Política Monetária Não Convencional,Portugal, Espanha

JEL: C23, E44, E52, G01

Contents

1-Introduction

Financial and economic crisis are not new, they can be traced as far back as to the Roman Empire. The most recent one, the 2007 subprime crisis, ignited the fuel which gave rise to the global financial crisis of 2007 and later the European sovereign debt crisis. The latter would result in an increase in the yields of government debt of several European countries, compromising their ability to meet their financial obligations. This raised fears of default amid the financial markets, which would in turn raise these yields yet again, causing a spiral debt, or a self-fulfilling speculative attack for the affected countries. Coupled with the global economic recession at this period, this liquidity and sustainability problem reached dire levels; resulting in financial support programs in Ireland, Greece and Portugal. Up until the global financial crisis, the European Monetary Union (EMU) growth was consistent, the fiscal scenario was good, with limited deficits and debt levels rising gently (Beirne & Fratzscher, 2013); the yields of sovereign bonds were converging to German values and were below 50 bps (Bernoth & Erdogan, 2010). It is of the utmost importance to understand what the drivers of this change were and why they changed with the crisis. This can contribute to more informed decisions regarding monetary and fiscal policies, making them more effective in preventing, shortening and decreasing the severity of such events. It is generally accepted in the literature that the factors that make up the yields of sovereign debt are a combination of international and country specific factors, which mirror the risk of the debt. The major and sudden increase in the yields spread cannot be explained only by the change in the macroeconomic

fundamentals; the pricing of risk can change across time (Afonso & Jalles, 2018; Beirne & Fratzscher, 2013; Bernoth & Erdogan, 2010).

Due to the global and European crisis, the European Central Bank (ECB) resorted to unconventional monetary policy to restore financial stability in Europe.

The objective of the dissertation is to contribute to the existing literature by analyzing the Portuguese and Spanish case, this will be done by assessing how the price of sovereign risk changed and which fundamentals contributed the most. Our main results show that while the price of sovereign risk increased after the crisis and it has slightly reduced after the "whatever it takes" (WIT) speech of Mario Draghi, these changes were not of the same magnitude and not all countries were affected equally, namely Portugal and Spain in which we did not find evidence of a price regime modification after Draghi´s speech. This study is organized as follows. Section 2 is the Literature review. Section 3 provides a brief description of the events from the Financial Crisis until the WIT, with a focus on Portugal and Spain. Section 4 describes the econometrics methodology used. Section 5 presents the data used and the results obtained from the analysis. Section 6 consists of a recap and the key findings.

2-Literature review

There is a substantial amount of literature regarding the determinants of sovereign risk. Most of the literature follows one of the following measures in order to assess sovereign risk: government bond yield spreads (Ferrucci, 2003; Beirne & Fratzscher, 2013; Hilscher & Nosbuch, 2010; Bernoth & Erdogan, 2010;

Edwards, 1984), government bond yields (Afonso & Silva, 2017), credit default swaps (CDS) spreads (Aizenman *et al*, 2011; Beirne & Fratzscher, 2013) or sovereign debt credit rating (Afonso *et al*., 2007; Cantor & Pecker, 1996).

A key study by Edwards (1984) concluded that national macroeconomic fundamentals such as public debt, foreign reserves, current account balance and inflation were influential drivers for the government bond spreads.

Another study worth pointing out, by Bernoth & Erdogan (2010), concluded that the impact of the domestic fiscal variables and the risk appetite on the yield spreads can shift substantially over time. Before the crisis the government deficit was largely ignored by the financial markets when pricing sovereign risk, while the debt/GDP ratio was relevant; after the sovereign debt crisis, markets also began to consider the government's budget balance.

One of the effects of the European crisis is a higher sensitivity to countries fundamentals relative to pre-crisis periods, what is called "wake-up call", especially in Greece, Ireland, Portugal, Spain and Italy (Beirne & Fratzscher, 2013).

In a recent paper, Afonso & Silva (2017) analyzed the determinants of sovereign yields of Portugal and Ireland. The results show both Portuguese and Irish bond yields were influenced by the quarterly variation of the German bond yield and by financial integration (measured by cross holding of government bonds). Also noteworthy was the rise of the Portuguese sovereign yield during the Securities Markets Programme (SMP), which consists of ECB´s purchases of government bonds. While under the economic financial assistance programme (EFAP) the debt/GDP ratio and the 3-month Euribor (proxy for monetary policy stance) were also significant and positive determinants of the yields in Portugal

and Ireland; the debt/GDP ratio had a non-linear effect on the increase of the yields.

3-The story so far

3.1 The Financial Crisis

The financial crisis of 2007 was triggered by a combination of multiple factors concerning governments, private banks, central banks and households. Perhaps the most important ones are bank governance problems, inadequate supervision and regulatory framework, expansionary monetary policy, increase in securitization and risk modelling problems. The interaction of these factors culminated in the U.S. subprime crisis. The low interest rates available made it easy to be granted a loan; nonetheless the banks were not properly considering the risk of the loans. Mortgage loans were securitized into asset backed securities (ABS) and could be even further processed into collateralized debt obligations (CDO). Through financial engineering, high risk mortgage loans were repacked by the financial system into AAA investment grade securities.

This recipe proved to be disastrous, a real estate bubble was built on top of these factors, which eventually collapsed with the tightening of the monetary policy and with the increase in non-performing loans. U.S. banks suffered huge losses, this led some institutions, such as Lehman Brothers, to file for bankruptcy. Investor´s confidence was shaken, even the biggest financial institution could fall. This greatly hampered the banks' ability to finance themselves, they could neither get the funding needed in the capital markets nor in the interbank market. The financial institutions found themselves with their balance sheet full of illiquid

and depreciated assets and without the ability to access their pre-crisis funding sources (Faeh *et al*, 2009*)*

The impact was felt across the entire world due to the interconnections of the financial system, namely because the previously mentioned ABS and CDO were sold across the globe but also CDS.

3.2-Sovereign Debt Crisis in Europe

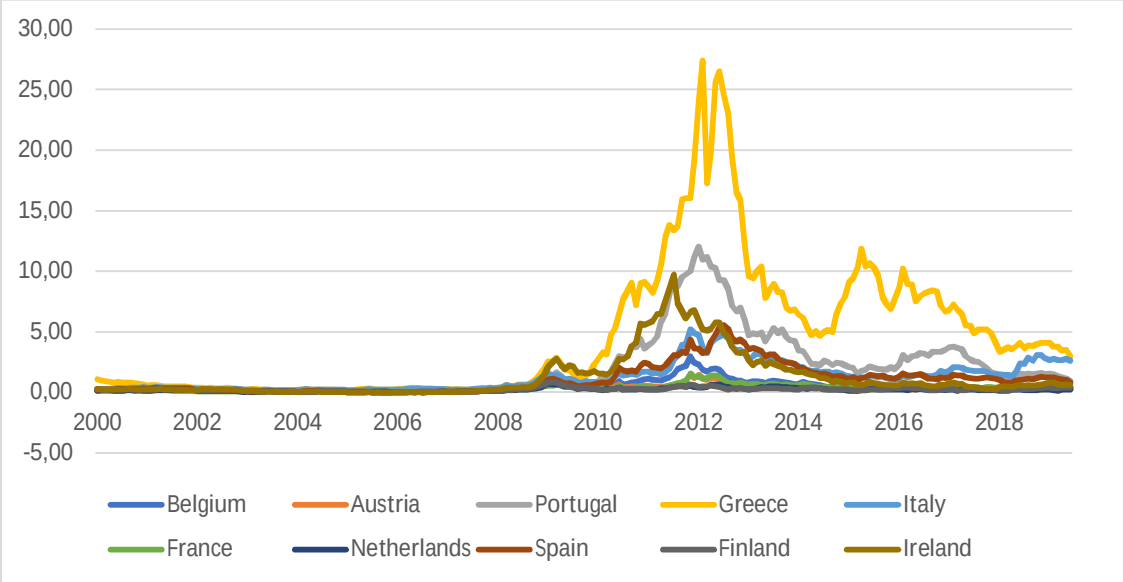
The outlook on Europe was not better than in the U. S. The banks were also devasted by the financial crisis and the mistrust spillover crossed the Atlantic Ocean. As in the U.S, banks and the economy also suffered a liquidity crisis. To keep the banks afloat, the governments intervened in multiple ways, such as asset purchases, capital injections, asset guarantee and debt guarantee (Faeh *et al*, 2009). This was done so as not to carry the risk of further destabilizing the economy and the financial system. Besides having to inject liquidity in the financial system, the European Union (EU) countries acting on accordance with the plan drawn by the European Commission, the European Economic Recovery Plan (EERP), enacted a fiscal stimulus programme.

To mitigate the pernicious effects of the recession brought by the global crisis and to avoid a downward spiral "...that investment and consumer purchases will be put off, sparking a vicious cycle of falling demand, downsized business plans, reduced innovation, and job cuts" as described by the Commission of the European Communities (2008), a series of counter cyclical macroeconomic measures led to governments increased spending with the purpose of breathing some air into the economy. This programme would put more pressure on the countries with the most fragile fiscal balances.

This plan´s aim was to avoid a deep recession, by increasing demand through a fiscal stimulus, amounting to €200 bn (1.5% of EU GDP); €170 bn should come from national governments budgets and €30 bn from the EU funding (Commission of the European Communities, 2008). In April and June 2009, the fiscal support amounted to 3.3% and 5% of the EU GDP respectively. In average, the fiscal balances and the debt/GDP in EU worsened, from -0.9% to -6.6% and 57.5% to 73.4% respectively between 2007 and 2009.

Before the crisis, even with disparate macroeconomic and fiscal positions (Lane, 2012), the markets were assuming a convergence of the Eurozone to the Germany economy and thus priced bonds equally (Arghyrou & Kontonikas, 2012), the spreads between German bonds and Greece, Ireland, Portugal, Spain, and Italy were close to 0 (Lane, 2012) as it can be seen in Figure I.

Figure I – 10-year government bond yield spreads versus Germany



Source: Eurostat and own calculations

Between 2008-2012 rising bond yields of several EU government bonds, displayed the financial markets concern about their ability to keep up with their future debt obligations, (Falagiarda & Reitz, 2015); the spread versus the German bond would rise above 300 bps for Italy and Spain (Lane, 2012). The countries with the most fragile economies and lingering public finance sustainability issues were exposed, like Greece, Ireland, Portugal, Spain and Italy. Access to the capital markets would eventually be cut off for the first three countries due to spiking yields on their sovereign bonds. These yields reflected the risk, the apprehension and the risk aversion of the debt markets at the time. To keep up with their financial obligations and avoid a default, these countries would be assisted by the International Monetary Fund (IMF) and EU through an EFAP.

With the advent of the financial crisis the ECB began a gradual reduction of the interest rates, until it reached an historical low of 0 on 2016. Due to the massive shock of the financial crisis and later the sovereign debt crisis, the ECB resorted to unconventional monetary policy to keep its objectives.

3.3-Unconventional Monetary Policy

The European Central Bank (ECB) main role is to ensure price stability but without prejudice contribute to the achievement of the economic objectives of the EU (Consolidated Version of the Treaty on the Functioning of the European Union, 2016), which are full employment and balanced economic growth (Consolidated version of the Treaty on European Union, 2016). To comply with his mandate, the ECB possesses the following instruments (Jäger & Grigoriadis, 2017; Pereira, 2016):

- Reserves – Banks must hold 1% of their liabilities as funds at their national central bank, this allows banks to react to short term changes in the money market;
- Open Market Operations – Through these the ECB guides the interest rates and manages the liquidity in the market, the most important one is the main refinancing operation (MRO);
- Standing facilities – the deposit and marginal lending facility, their purpose is to manage the overnight liquidity; by allowing overnight deposits at the ECB with a lower rate than the MRO and to grant overnight liquidity to banks from the ECB at a rate above the MRO respectively.

When the standard mechanisms are not enough, the ECB can resort to unconventional monetary policy, as it did to address the financial and later the sovereign debt crisis. These measures were implemented to safeguard the stability of the financial system and to ensure the functioning of the monetary policy transmission mechanism (Afonso & Sousa-Leite, 2019; Jäger & Grigoriadis, 2017; Pereira, 2016):

- Forward guidance, by guiding the expectations of the interest rates via announcements;
- Qualitative/credit easing, done by changing the ECB balance sheet composition;
- Quantitative easing, which consists of increasing the ECB balance sheet size by buying securities in the secondary market (sovereign and corporate

bonds, asset backed securities) and refinancing operations at low interest rates, namely the Targeted Longer-Term Refinancing Operations

- Decrease to record lows the interest rates of MRO, standing and marginal lending facilities.

3.4-Portugal

From 1995 to 2001 Portugal experienced a boom, in anticipation for the participation in the Eurozone project; this currency union would decrease not only country and exchange rate risks but also inflation (Blanchard, 2007; Blanchard & Portugal, 2017). In result the nominal and real interest rates decreased substantially. At the time it was also believed it would trigger a faster convergence and higher growth. This resulted in increased investment and spending from the households and firms (Blanchard & Portugal, 2017; Lourtie, 2011).In this period the economy grew on average 3.5% and the unemployment rate declined; while the deficit increased, and the current account balance worsened to a staggering -10%; the debt to GDP was barely affected, it was reduced from 58% to 53%. The budget deficit improved from -4.2% to -3.3%, while the cyclically adjusted primary deficit, which discounts the lower interest rates and the output growth (Blanchard, 2007), deteriorated from 1.5% to -2.6% (Blanchard & Portugal, 2017).

The period from 2002 until 2007 was a slump, GDP growth stalled to an average measly 1.1%. Accompanying this was an increase in unemployment from 5.5% to 8.7%. Private consumption growth decreased, and public spending bumped, partially to offset the former; still both were higher than the growth of

production (Correia, 2016), the cyclically adjusted deficit would increase to 3% (Blanchard & Portugal, 2017). The debt to GDP would climb up to 68.4% in 2007 and the current account balance hovered around -10%. Blanchard & Portugal (2017) point a couple factors for this dismay economic status such as lower levels of remittances, the competition from the Central and Eastern European countries that joined the European Union and a decrease in competitiveness due to the increase of 4.3% of labour costs over the euro average.

By 2008-2009 Portugal, as most of the developed world, was facing the consequences of the financial crisis, and stumbled into a recession; even though the effects were not as pronounced, the Portuguese economy shrank less than the euro zone in these years (Reis, 2013). Portuguese exports decreased by 10.2%, mainly due to a reduction of the output of the trading partners (Blanchard & Portugal, 2017); while imports decreased by 9.9% in 2009 (Correira, 2016). Banks' ability to obtain funding through the capital markets was reduced (Caldas, 2013) and the credit supply crunched due to an increase in the cost of funds, even with the ECB and Bank of Portugal liquidity provisions (Blanchard & Portugal, 2017; Caldas, 2013). In this period two banks crumpled, BPN and BPP; the first was nationalized in November 2008 and the second went bankrupt in 2010.

In 2008 the Portuguese government implemented the Initiative on Strengthening Financial Stability (IREF) with the measures outlined in the Appendix Table AI, to better equip and prepare the financial system to deal with the crisis and to strengthen it. The objective was to ensure funding to the economy and safeguard the deposits (República Portuguesa, 2009). In the same period the government applied the measures in Appendix Table AII to protect the families and the enterprises; these would be followed by an expansionary fiscal policy in

2009 described in Appendix Table AIII named Investment and Employment Initiative acting in accordance with the EERP. These plans aimed at mitigating the pernicious effects of the financial crisis.

These measures, as expected by the European Commission (Commission of the European Communities, 2008), swelled the deficit; by 2010 it reached a record of 11.2%.

In 2010, the Portuguese government announced a program of fiscal consolidation (PEC 2010-2013) in line with the new winds from the EU that pushed for a tightening of the fiscal policy; while Greek bond yields spiked up until it needed international financial assistance, the rest of the periphery of the Eurozone suffered with a contagion effect; on May 7 the bailout programme for Greece was signed and the peripheric bonds yields rose, the Portuguese were at 6.285% on the market close (Lourtie, 2011)

A few days after the Greek bail out was signed, in May 13, to send a calming sign to the markets, the Portuguese government announced a lower deficit targets for 2010 and 2011; these would be attained by expanding the plan approved two months earlier (Lourtie, 2011).

As markets, European voices and media pressure piled up, a third expanded revision of the consolidation plan was announced on September 29.

A fourth version was prepared but eventually was not approved by the Portuguese National Parliament which triggered the announcement of early elections; a political crisis was set. The political instability coupled with the gloomy Portuguese macroeconomic perspective and the revised deficit and debt values (due to methodology change in the Eurostat the figures for 2009 and 2010 were significantly worse) plunged the debt ratings into non-investment grade

(Standard and Poor´s and Fitch); the yields spiked to 8.767% in April 5 (Lourtie , 2011).

Portugal eventually succumbed and requested financial assistance in April 7, 2011. This financial assistance programme consisted of €52 bn of funding split between the European Financial Stability Facility (EFSF) and the European Financial Stabilisation Mechanism (EFSM) and €26bn from the IMF conditional with the introduction of several economic and fiscal policies reforms agreed in the Memorandum of Understanding on Specific Economic Conditionality (MoU), accompanying the Memorandum of Economic and Financial Policies (MEFP); which goals were regain access to capital markets and solve the structural inefficiencies and deficiencies so Portugal could be en route to a sustainable growth path (European Commission, 2016). Some noteworthy reforms targets were:

- Fiscal policy – reduce the deficit/GDP to 3% by 2013 and hence stabilize the debt/GDP through the expense and revenue side;
- Labour market – increase flexibility costs by loosening employment protection legislation, decreasing unemployment benefits duration and increasing its coverage, wage-setting mechanisms, active labour market policies, vocational training and tertiary education;
- Goods and services markets – increase competition in the transportation, energy, telecommunication and postal sectors; dynamize the services sector and regulated professions such as real estate, construction, accountants, lawyers and pharmacists by removing barriers to the entry.

Portugal ended the programme on May 2014 without needing to receive the final tranche of €2.5 bn having regained access to the capital markets by 2013 with a deficit/GDP at 4.5% and long-term bond yield around 3% (European Commission, 2016).

3.5-Spain

Until the prelude of the Financial Crisis in 2007, Spain was in a comfortable position, it had been growing for 14 consecutive years, at an average annual rate of 3.8% between 2000-2007, the public accounts were in line with the Stability and Growth pact, achieving a budget surplus in the years between 2004 and 2007, while the public debt/GDP was in a downward trajectory, decreasing from 58% to 35.6% between 2000 and 2007 (Eurostat). As Spain joined the euro area it benefited from low interest rates and the expansionary monetary policy which in part explain the long growth period (Marti & Pérez, 2016) and the seeding of macroeconomic and financial imbalances, such as the rise of debt of households and non-financial corporations from 94% to 191% of GDP (2000-2007) and the creation of a real estate bubble ; these would ultimately become the main transmission mechanism of the crisis (Banco de Espanã, 2017). A decreasing competitiveness, caused by high wage growth rates and low labour productivity growth, coupled with an increasing demand, worsened the current account balance from -4.40 % to 9.63% (Banco de Espanã, 2017).

In the wake of the financial crisis Spain fell into a recession by the third quarter of 2008 due to decreased liquidity in the global financial system, falling

prices of real estate, increased uncertainty and the decrease in exports caused by the reduction in global trade (Banco de Espanã, 2017; Gruppe & Lange, 2014). The magnitude of the exposure of the Spanish credit institutions to the real estate sector (sum of mortgage, housing renovations and construction loans) between 1992 and 2007 increased substantially, from 32.7% to 62%, this made these institutions vulnerable to the falling estate prices in the following years (Jimeno and Santos, 2014).

Between 2008-2011 the Spanish Government and Central Bank enacted several reforms and measures in order to face the crisis in Spain and to adapt international reforms to the country´s financial system (Banco de Espanã, 2017):

- Creation of the Fund for the Acquisition of Financial Assets (FAFA) to provide liquidity to credit institutions and promote lending to the private sector;
- Set up of a system to grant State guarantees to new issues of Spanish credit institutions;
- Increased deposits protection from €20,000 to €100,000, with the objective of improving depositors and investors' confidence;
- Formation of the Fund for the Orderly Restructuring of the Banking Sector (FROB I) do deal with restructuring processes of credit institutions which failed in dealing with their difficulties and to reinforce the funds of credit institutions undergoing mergers;
- Circular 3/2010 of Banco de Espana which tightened the provisioning requirements for past -due loans;

- Reform of the savings bank sector aiming at promoting access to capital markets, granting savings banks alternative ways to engage in financial activity;
- Legislation and measures to boost the professionalism of savings banks governing bodies;
- Changes to the Capital requirements in line with the Basel III accord.

Acting accordingly with the EERP, the government of Spain implemented a set of temporary fiscal measures that amounted to a fiscal stimulus of 11.2 billion euro in 2009, i.e. 1% GDP, which together with permanent measures namely in the tax system, totaled a fiscal stimulus amount of 2.3% of GDP in 2009; the aim of these measures was to alleviate the effects of the crisis and its social consequences while boosting the economy (Kingdom of Spain, 2009). The short-term measures consisted fundamentally of the allocation of public funds, in order to create jobs and promote public investment through the Central Government Fund for Local Public Investment and Special Central Government Fund, which were endowed with 8 and 3 billion euros respectively (Kingdom of Spain, 2009). Together with the economic downturn, the delayed impact of the tax cut reform (approved before the crisis) and the unwinding of temporary revenues, the Spanish fiscal position went from 2% surplus in 2007 to a 11% GDP deficit in 2009 (Marti & Pérez, 2016).

In 2010 the fiscal policy changed abruptly, it went from expansionary to contractionary, following the EU guidelines. The focus was diminishing the deficit by reducing public spending and tax increases, noteworthy are the VAT hike, cut in the public sector compensations, decreased public investment and

freezes in the public sector wages and pensions (Banco de Espanã, 2017; Marti & Pérez, 2016).

The declining confidence in Greek debt by the markets spread to several other European countries, especially the ones considered to be more vulnerable such as Spain due to the worsening of their fiscal position and growth perspectives; in accordance the Spanish ten-year sovereign debt spreads over Germany increased to 485bp by November 2011 (Banco de Espanã , 2017).

In June 2012, the Spanish government requested financial assistance from the EU to recapitalize part of its banking system; which was unable to do so in the capital markets due to worries of the impact of the gloomy economic activity on the banks' balance sheet and the interactions between the sovereign risk and bank risk (Banco de Espanã, 2017; Marti & Pérez, 2016). This assistance programme was approved by the EU in July 2012 and started in December 2012, with the European Stability Mechanism (ESM) granting 41.5bn euro (around 4% of Spanish GDP) and ended on January 2014 (Marti & Pérez, 2016).

3.6-Whatever it takes

The ECB resorted to unconventional monetary policy to tackle the crisis as far back as 2009 with the purchase of euro-denominated covered bonds issued in the euro area (CBPP) and other programs such as the Securities markets programme (SMP) and the Longer-term refinancing operations (LTROs).

Even with these measures, the sovereign debt crisis spread, in November 2011 the spreads over Germany peaked at 189 bp in France, 560 bp in Italy, 485 bp in Spain and 360 bp in Belgium (Banco de Espanã, 2017).

Between June and July 2012, the Euro area countries adopted several measures to address the ongoing sovereign debt crisis. In June the move towards a more comprehensive economic and monetary union was taken, the first step was the beginning of the establishment of a banking union, starting with the creation of a centralized supervisory system, the Single Supervisory Mechanism. In July, in the same conference, the ECB through Mario Draghi announced another programme named Outright Monetary Transactions (OMT), consisting of buying unlimited amount of sovereign bonds on the secondary markets of member states in financial difficulty and stated "Within our mandate, the ECB is ready to do whatever it takes to preserve the euro."

In September 2014 a third round of CPPP and an asset-backed securities purchase programme (ABSPP) were announced, these together with the public sector purchase programme (PSPP) would become the Expanded asset purchase programme (APP), launched in January 2015 in order to offset the low inflation and set it out on the correct path towards 2%.

The unconventional monetary policy adopted by the ECB had a decisive impact in managing the sovereign debt crisis, effectively reducing the sovereign bond yields (Afonso & Kazemi, 2018; Afonso & Jalles, 2019; Falagiarda & Reitz, 2015; Jäger & Grigoriadis, 2017; Pereira, 2016).

4-Methodology

In order to model sovereign yield spreads these should be considered as a measure of perceived sovereign risk by the markets, which is formed by credit risk, liquidity risk and risk appetite (Bernoth & Erdogan, 2010; Beirne & Fratzscher, 2013 ; Hauner *et al.,* 2010); together with the intertemporal

government budget constraint and the fundamentals behind it, the determinants of the government bond yields can be scrutinized.

A standard OLS fixed effects panel data model will be used as is common in the literature (Beirne & Fratzscher, 2013; Bernoth & Erdogan, 2010 ; Edwards, 1984; Hauner *et al.,* 2010) on a pool of European countries (Austria, Belgium, Finland, France, Greece, Ireland, Italy, Netherlands, Portugal, Spain) to make general inferences about the dynamics between government debt yields and the fundamentals. Due to Greece distinctive features, this will be performed excluding and including this country. In order to account for potential endogeneity a 2SLS regression will also be performed, the instrumental variables will be the sixth, twelfth, eighteenth and twenty-fourth month lagged independent variables.

A SUR (seemingly unrelated regressions) model will be applied to Portugal and Spain to determine specific country relations between the explanatory variables and sovereign yields similar to Afonso & Nunes (2015).

We will model the sovereign bond yields by comparing it to German ones, so the dependent variable ($s_{i,t}$) will be:

1) $s_{i,t=} = y_{i,t} - y_{G,t}$

where $s_{i,t}$ is the yield spread versus Germany of country *i* at time *t.*

The regression will then take the form:

2) $s_{i,t=} = \alpha_0 + \alpha_i + \beta_1 X_{i,t} + (\delta_0 + \delta_i + \beta_2 X_{i,t}) D_t^C + (\Omega_0 + \Omega_i + \beta_3 X_{i,t}) D_t^U + \varepsilon_{i,t}$

where α_0,δ_0 and Ω_0 are constants; α_i,δ_i and Ω_i are the country-specific fixed effects, respectively before crisis, after crisis and after the WIT, $X_{i,t}$ is the matrix of explanatory variables and β_1, β_2 and β_3 are the coefficients. A change in

the parameters over time will be possible via the introduction of a dummy variable (D_t^C) in the regression as was done in Beirne & Fratzscher (2013), this dummy will take the value of one for the period after the fall of Lehman Brothers, September 2008. This model is expanded by adding another dummy variable (D_t^U) which will take the value of one after July 2012, this was the month of the WIT speech of Mario Draghi. These two dummy variables will allow us to check if and how the markets perception and risk pricing of the sovereign bonds changed after these two events. Evidences of a bond pricing regime change after the WIT and the OMT announcement were already found by Afonso *et al.* (2018) with a time-varying parameter panel; this regime is characterized by a weaker link between the fundamentals and the spreads but with higher spreads compared to the pre-crisis period.

The below preliminary analysis was done to verify the time series properties of our data, the test statistics for Hausman, Modified Wald and Wooldridge tests are reported in the Table I and Table II and Im-Pesaran-Shin unit root in the Appendix Table AVI

1. Im-Pesaran-Shin unit root test displayed the non-stationarity in levels of REER,

   3-month Euribor and Debt/GDP, which lead us to first differentiate these variables in order to obtain stationarity
2. Hausman test, which confirms the fixed effects model is better suited
3. Modified Wald test for groupwise heteroskedasticity, corroborates our suspicion of the presence of heteroskedasticity
4. Wooldridge test shows there is autocorrelation

To account for the heteroskedasticity and autocorrelation we used Newey West standard errors.

5-Empirical Analysis

5.1-Data

The timeframe will be 1999:11-2019:6, this will allow to capture the last years of the great moderation period, the financial and economic crisis, the sovereign debt crisis and unconventional monetary policy. The starting date 1999 was chosen because it is the year of the introduction of the €.

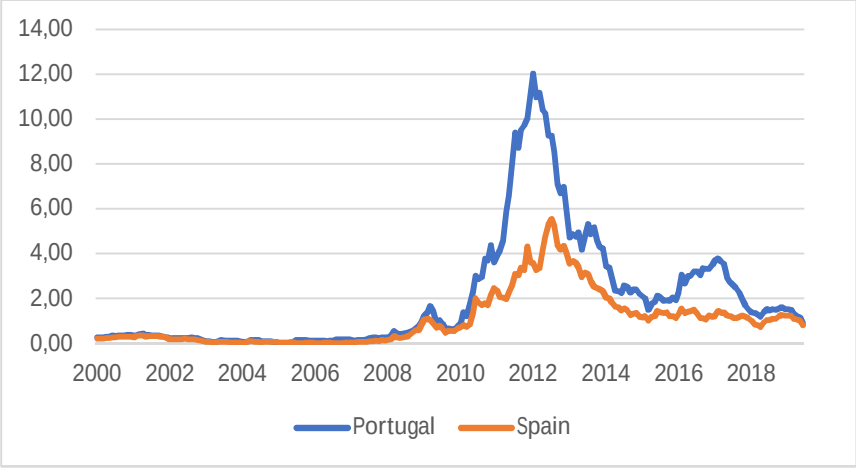
In line with previous literature the variables will be public debt/GDP, fiscal balance/GDP (Fiscal), real effective exchange rate (REER), the Chicago Board of Exchange Volatility Index (VIX), bond yield bid ask spread (BAS) and the 3-month Euribor rate. The debt and fiscal balance, which are a measure of the credit risk, were taken from the European Commission forecasts, this allows to integrate the forward-looking expectations of investors which rely on these reports as a source of information (Attinasi *et al*, 2009; Arghyrou & Kontonikas, 2012; Gerlach *et al*., 2010). Since the forecasts are (generally) published at a semiannual frequency and we are using monthly data, for the months between each forecast we used the last forecast available. These two variables are used in the regression as the respective spread against Germany. We expect the debt ratio to have a positive sign, as the stock of government debt increases compared to its GDP, so does the risk and accordingly, the yields spreads. Higher values of the fiscal balance ratio imply a healthy budget balance and so the coefficient for this determinant is expected to be negative. As in Afonso & Kazemi (2018) and Arghyrou & Kontonikas (2012) we expect the REER to be positive, so a currency

appreciation increases the spreads. The VIX will be used as a measure of risk appetite; the daily data was transformed to monthly by averaging it; as markets tensions and volatility increase so should the yield spreads. To introduce a measure of liquidity risk we used the BAS, this parameter should display a positive sign; higher values of BAS means the bond is less liquid and hence higher spreads.

The 3-month Euribor is introduced to proxy the monetary policy of the ECB and we anticipate it to be positive as in Afonso & Silva (2017), as the ECB monetary policy becomes more accommodative, yield spreads should decrease. The sources and descriptive statistics are displayed in the Appendix Table AIV and Table AV.

As it can be observed in Figure 2, the Spanish and Portuguese bond yields spread began raising after the 2007-2008 financial crisis; from 2010 onward, the onset of the European Sovereign Debt Crisis, both countries yield spread raised even more sharply, especially the Portuguese one. This trend would only be reversed by 2012.

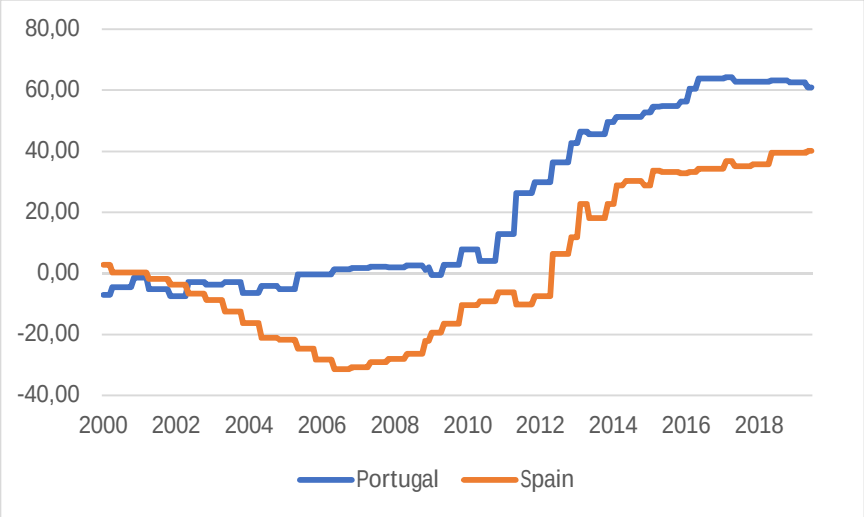
Figure 2 – 10-year government bond yield spreads versus Germany



Source: Eurostat and own calculations

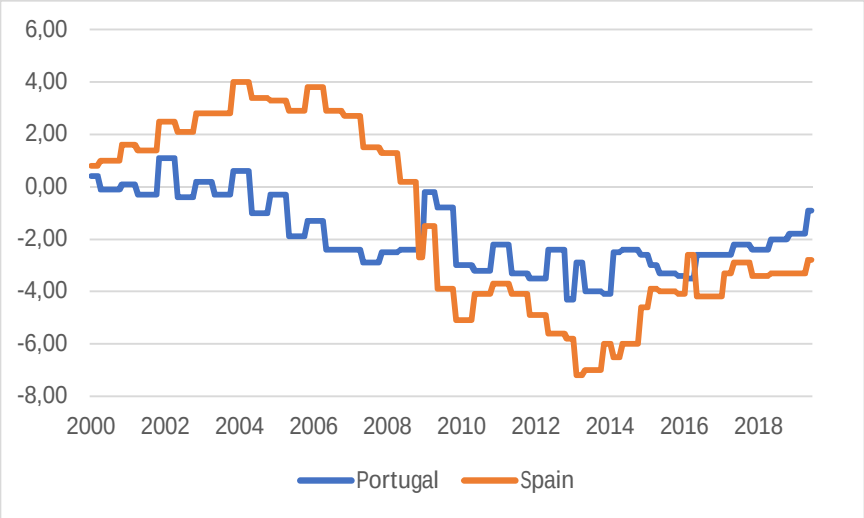
Figures 3 and 4, show the debt ratio and the fiscal balance spreads were stable in the Portuguese case and improving in Spain, the latter debt ratio was in downward trajectory and the budget balance was positive. This trend would change after 2008, with both countries running higher deficits and increasing their debt ratios.

Figure 3 – Debt/GDP spread versus Germany forecast



Source: European Commission and own calculations

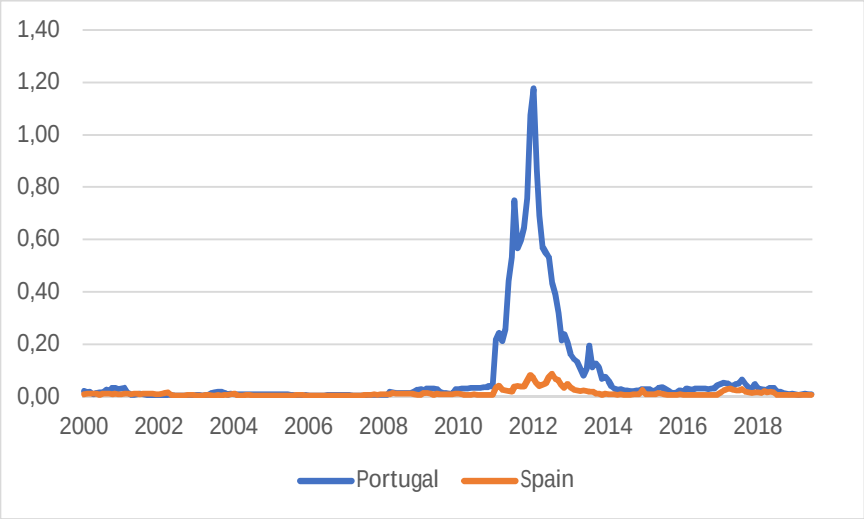
Figure 4 – Fiscal balance/GDP spread versus Germany forecast



Source: European Commission and own calculations

The liquidity of the government bonds of both countries decreased after the Eurozone crisis, but was much more pronounced in Portugal as seen in Figure 5.

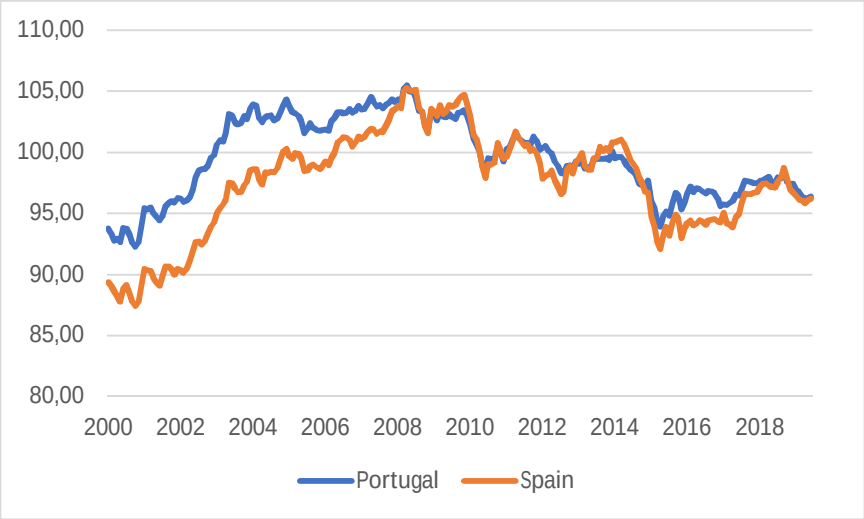
Figure 5 –Yield bid ask spread of 10-year government bond



Source: Bloomberg and own calculations

Two trends are visible regarding the REER in Figure 6, until 2008 an increase trajectory, followed by a decrease not as steep as the previous trend.

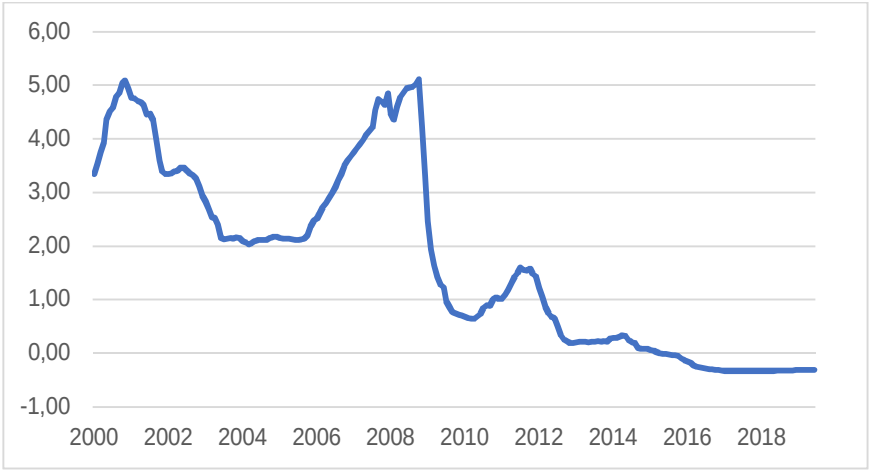
Figure 6 – Real effective exchange rate



Source: International Financial Statistics

The decreasing trajectory of the Euribor rates after 2008, as seen in Figure 7, illustrates the accommodative monetary policy adopted by the ECB.

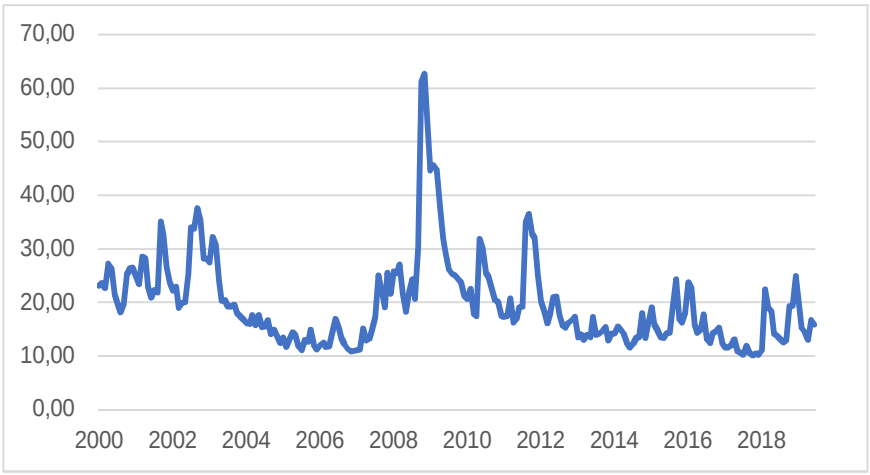
Figure 7– Euribor rates



Source: Eurostat

The spike in the VIX in 2008, following the fall of Lehman Brothers, and higher volatility after the crisis, when compared to the period 2003 – 2007 can be seen in Figure 8.

Figure 8– VIX index



Source: Federal Reserve Economic Data and own calculations

5.2-Baseline

First, we will analyze the results of the OLS/2SLS fixed effects (FE) model on a pool of European Countries, with Greece and excluding it, presented in Table I and Table II respectively. The SUR regression results are discussed afterwards.

In both regressions without the dummies (1 and 3), only the fiscal balance and BAS are statistically significant, and both are associated with their anticipated sign, negative and positive accordingly but the coefficients are substantially greater in the 2SLS regression. It should be noted that besides the VIX, all the other variables, while statistically insignificant have an unanticipated sign.

Regarding the regressions 2 and 4, before the crisis their determinants differ; while in the OLS regression the debt ratio, the fiscal balance and the BAS are significant, in the 2SlS solely the fiscal balance is significant. Only the debt ratio has the expected sign (positive), hence markets were mispricing the other two and not pricing the other variables.

After the crisis and until WIT the fiscal balance and the VIX change are statistically significant, both display the “correct” sign, negative and positive respectively. These regressions display different results for the other determinants, BAS is significant in OLS while REER and Euribor are significant in the 2SLS, all with the expected signals. The debt ratio is not significant and exhibits an unexpected negative sign.

Table I
Determinants of bond yield spreads with Greece

	(1) OLS	(2) OLS	(3) 2SLS	(4) 2SLS
Pre crisis				
Δ Debt/GDP	-0.022	0.014*	-0.029	0.029
	(0.041)	(0.008)	(0.066)	(0.029)
Fiscal balance/GDP	-0.255***	0.100***	-0.105***	0.161***
	(0.052)	(0.035)	0.027	0.032
VIX	0.0003	-0.009	-0.006	-0.013
	(0.008)	(0.007)	0.016	(0.007)
BAS	5.766***	-19.383*	13.886***	-3.635
	(1.409)	(10.430)	(0.569)	(12.653)
ΔREER	-0.045	-0.015	-0.3339	0.009
	(0.037)	(0.024)	(0.281)	(0.129)
Δ 3-Month Euribor	-0.498	0.077	2.199	0.097
	(0.360)	(0.246)	(1.490)	(0.433)
After crisis				
Δ Debt/GDP		-0.084		-0.006
		(0.087)		(0.152)
Fiscal balance/GDP		-0.529***		-0.377***
		(0.123)		(0.096)
VIX		0.025***		0.049***
		(0.008)		(0.009)
BAS		24.244**		11.415
		(10.369)		(12.637)
ΔREER		0.139		0.328*
		(0.085)		(0.188)
Δ3-Month Euribor		0.751		2.015**
		(0.506)		(0.942)
After WIT				
Δ Debt/GDP		0.093		-0.009
		(0.095)		(0.156)
Fiscal balance/GDP		0.307**		0.079
		(0.121)		(0.084)
VIX		-0.007		-0.027**
		(0.016)		(0.013)
BAS		15.991***		19.299***
		(2.422)		(1.952)
ΔREER		-0.176*		-0.588**
		(0.097)		(0.266)
Δ 3-Month Euribor		-1.361		-0.711
		(2.443)		(4.465)
R^2	0.666	0.812	0.4984	0.723
No. of Observations	2350	2350	2290	2290
Hausman	1435.8***			
Modified Wald	24346.23***			
Wooldridge	180.645***			

Significance levels: *p<0.1, **p<0.05, ***p<0.01.
The standard errors are reported between parentheses.

From the WIT onward, in the OLS regression the fiscal balance pricing is changed again, since it is statistically significant but becomes less negative. In 2SLS the change in the VIX is significant and is negative. The REER is significant and has a negative sign in OLS and 2SLS. The BAS coefficient is also modified and becomes greater in both cases.

5.3-Excluding Greece

The OLS and 2SLS specifications without the dummies are similar to the ones in the previous section except for the debt ratio; now reveals a positive sign and is significant in the latter version.

As for regressions 6 and 8, in the pre-crisis period the fiscal ratio is positive and significant as in the version including Greece (see Table II). In 2SLS the Euribor rate is also significant and positive.

For both regressions in the intermediate period, the change for all the determinants are statistically significant and have the expected sign except the Euribor in 2SLS, which also has the expected positive sign but is not significant.

In the last period, in the 2SLS specification the VIX is the sole statistically significant regressor, displaying a negative sign.

Table II
Determinants of bond yield spreads without Greece

	(5) OLS	(6) OLS	(7) 2SLS	(8) 2SLS
Pre crisis				
Δ Debt/GDP	0.025	0.008*	0.100**	0.005
	(0.016)	(0.004)	(0.043)	(0.014)
Fiscal balance/GDP	-0.141***	0.063**	-0.154***	0.144***
	(0.016)	(0.024)	(0.010)	(0.016)
VIX	0.004	-0.003	0.008	-0.006
	(0.004)	(0.006)	(0.005)	(-0.004)
BAS	12.435***	-7.914	13.514***	-5.904
	(0.957)	(8.040)	(0.863)	(6.864)
ΔREER	-0.030	-0.015	0.104	0.0561
	(0.0197)	(0.009)	(0.097)	(0.085)
Δ 3-Month Euribor	-0.307	0.038	0.140	0.494*
	(0.186)	(0.164)	(0.512)	(0.281)
After crisis				
Δ Debt/GDP		0.045*		0.119**
		(0.026)		(0.051)
Fiscal balance/GDP		-0.258***		-0.334***
		(0.042)		0.029)
VIX		0.018***		0.030***
		(0.005)		(0.007)
BAS		19.307**		17.956**
		(8.006)		(6.986)
ΔREER		0.0528*		0.206*
		(0.040)		(0.112)
Δ3-Month Euribor		0.457*		0.202
		(0.258)		(0.396)
After WIT				
Δ Debt/GDP		-.0169		-0.089
		(0.030)		(0.060)
Fiscal balance/GDP		0.0026		0.0204
		(0.064)		(0.031)
VIX		-0.010		-0.015***
		(0.009)		(0.005)
BAS		0.760		2.085
		(4.445)		(2.134)
ΔREER		-0.012		-0.0941
		(0.055)		0.130
Δ 3-Month Euribor		-3.543		-2.410
		(2.336)		(2.760)
R^2	0.771	0.821	0.69	0.75
No. of Observations	2115	2115	2059	2059
Hausman	2765.96***			
Modified Wald	4384.76***			
Wooldridge	629.204***			

Significance levels: *p<0.1, **p<0.05, ***p<0.01.
The standard errors are reported between parentheses.

5.4-SUR

The fiscal balance for Portugal and Spain before the crisis displays a statistically significant mispricing since it has a positive sign (see Table III). In Spain the VIX and the BAS are also significant and have a positive sign, while in Portugal only the latter is significant but has a negative sign which points to the Portuguese yield spread vis a vis Germany decreasing in times of increased volatility. This implies a market perception of the Portuguese debt as a safe heaven and at least as safe as the German one during this time period.

After the financial crisis, in both countries, the fiscal balance is again statistically significant, but the sign becomes negative, illustrating the markets new attention to this economic fundamental and the underlying credit risk linked to this variable. For Portugal the VIX and the BAS become statistically significant and positive, exhibiting the perspective change for the Portuguese debt, as volatility increases, so does the spread vis a vis Germany and the liquidity risk begins being priced as well, with a lower liquidity (higher BAS) meaning higher yields spreads.

The results after WIT are puzzling for Spain, the fiscal balance coefficient becomes more negative, implying an increased sensitivity to higher projected deficits compared to the previous period and the monetary policy proxy is significant for the first time, while displaying an unexpected negative sign, contradicting the theory, with lower Euribor rates the spreads should diminish. As for Portugal only the BAS is statistically significant with a positive sign; this shows the ever-increasing importance of the liquidity in the pricing of sovereign risk.

Table III
Determinants of bond yields spread using SUR

	Portugal	Spain
Pre crisis		
Δ Debt/GDP	-0.0098	0.0079
	(0.0565)	(0.0328)
Fiscal balance/GDP	0.0828*	0.0882**
	(0.0495)	(0.0314)
VIX	-0.0175**	0.0101*
	(0.0087)	(0.0060)
BAS	-5.4838	33.9778***
	(8.4252)	(12.8658)
ΔREER	0.0118	-0.0242
	(0.1224)	(0.07029)
Δ 3-Month Euribor	-0.1055	0.1121
	(0.5392)	(0.3051)
After crisis		
Δ Debt/GDP	0.0424	0.0081
	(0.0643)	(0.0392)
Fiscal balance/GDP	-0.4218***	-0.3045***
	(0.0944)	(0.0587)
VIX	0.2558***	0.0075
	(0.0093)	(0.0062)
BAS	16.1129*	15.9797
	(8.4305)	(13.1852)
ΔREER	0.1151	0.0318
	(0.1962)	(0.1024)
Δ3-Month Euribor	1.1048	0.6629
	(0.7406)	(0.4101)
After WIT		
Δ Debt/GDP	-0.0440	0.0310
	(0.0673)	(0.0303)
Fiscal balance/GDP	-0.0160	-0.0830**
	(0.1145)	(0.0381)
VIX	-0.0186	-0.0057
	(0.0161)	(0.0088)
BAS	5.7714***	-5.6343
	(1.1803)	(4.5295)
ΔREER	-0.1102	0.0531
	(0.2124)	(0.1004)
Δ 3-Month Euribor	-2.8577	-3.2804**
	(2.8851)	(1.6191)
R^2	0.9389	0.8987
No. of Observations	235	

Significance levels: *p<0.1, **p<0.05, ***p<0.01.
The standard errors are reported between parentheses.

6-Conclusion

The objective of this dissertation was to study how the pricing of Portuguese and Spanish sovereign risk by the markets was affected by the financial and subsequent sovereign debt crisis and with the advent of the unconventional monetary policy. This was done by investigating how the determinants of the sovereign bond yields behaved between 1999 and 2019.

In order to have a comparison point we first examined the problem at the Eurozone level and then proceeded to investigate the Portuguese and Spanish case.

As we suspected, after the financial crisis the markets began pricing correctly all the components of the sovereign risk, this is patent in the change to the expected signs of the fiscal position (credit risk), the BAS (liquidity risk) and the VIX (risk appetite). This is coherent with the hypothesis that the financial markets were not reflecting the true risk of Eurozone sovereign bonds after the introduction of the Euro until the crisis and became more sensitive after it.

After the WIT, the results are weaker than expected, but still display the dissipation of the tensions over the economic fundamentals of the Eurozone countries in the increase of the overall coefficient for the fiscal balance, while remaining negative, which is the theoretical correct sign.

The idiosyncrasies of Greece are unfolded when we compare the model with this sovereign state to the version without it. While the wake-up call after the crisis can be seen in all its strength in the version without Greece, only when

including this sovereign state, were we able to see a change in the yields spreads after the WIT.

The SUR regression shows the markets perception change for Portugal and Spain, regarding the credit risk, was focused on the fiscal balance. The fiscal balance coefficient change is smaller when compared to the results of the full Eurozone panel but when compared to the panel without Greece, the Portuguese one is greater, while the Spanish one is between the OLS and the 2SLS result. Portugal was one of the most affected countries by the sovereign debt crisis, so this result is not surprising. The only pricing changes for Spain in the SUR regression are the fiscal balance and an odd result for the Euribor after the WIT; this shows the markets pricing change of our selected variables might not be as suited for the Spanish as it was for Portugal and other Eurozone countries. The non-statistically significance of Spanish debt/GDP might be a result of the years prior to crisis, in which its levels were lower than Germany.

Our results show that the Eurozone sovereign bonds pricing was changed, with an increase in the price of sovereign risk across all its factors and a subsequent decrease after the WIT. As for Portugal, there is a more pronounced increase in the price of sovereign risk.

We did not find evidence of a dissipation of the tensions after WIT in neither Portugal nor Spain, in fact the liquidity (BAS) and credit risk (Fiscal balance/GDP) pricing increased in these countries respectively. This might be due to the model limitation, a more dynamic approach, such as a time varying coefficients model, allowing the coefficients to change across time instead of at

specific moments in time, could provide different findings for these countries and hence constitutes a pertinent follow up to this study.

Future research on this topic will benefit from the increased number of the observations after these events and will be able to explore the long-term implications of the pricing of sovereign risk after these events.

While our findings and model cannot explain in full detail and without a doubt the dynamics of the price of sovereign risk in the last years, they do present a picture and help understand what happened; in the words of Box (1979), “For such a model there is no need to ask the question "Is the model true?". If "truth" is to be the "whole truth" the answer must be "No". The only question of interest is "Is the model illuminating and useful?" “

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Appendix

Table AI

IREF Measures Description

Measure	Description
Strengthening the Information Disclosure and Transparency Obligations of Financial Institutions (FI)	I)FI must provide more information to supervisory authorities, namely the exposure level to different types of financial instruments, risk management, control practices, held shares of corporations registered outside of the European union; II) widening of the liability of legal persons; III) strengthen the competences of National Financial Supervisors Council
Revising the Punishments in the Financial Sector	Updating the framework of penal and administrative sanctions including increases in fines and introduction of accelerated summary processes in the banking and insurance sector
Strengthening the Deposits Guarantee	Raised from EUR 25 000 to EUR 100 000
Granting of guarantees by the State	Creation of a State guarantee mechanism to ensure the access of funding to credit institutions, registered in Portugal and complying with the solvency criteria, unable to finance/refinance their activities due to liquidity constrains in the financial markets
Strengthening the Financial Soundness of Credit Institutions	Introduction of a framework allowing direct public intervention in the financial restructuring and recovery of credit institutions with a core capital levels below the legal minimum
Other Isolated Interventions to Assure Financial Stability	To guarantee the stability of the Portuguese financial system the government: I) nationalized Banco Português de Negócios, S.A. (BPN) II) granted State guarantees to Banco Privado Português, S.A. (BPP)

Source : Adapted from República Portuguesa, 2009

Table AII

Measures to Support Households and Businesses in 2008

Objective	Description
Support owners and leasers of real estate	I)Reduction of Municipal Real Estate Tax (IMI) and extension of period of exemption II) Introduction of a regressive loading of the personal income tax deductions vis-à-vis housing costs III)Creation of a special scheme applicable for funds and corporations renting housing IV)Increased tax saving on the sale of the own and permanent dwelling
Fight poverty	Expand, strengthen and reinforce the Solidarity Supplement for the Elderly and the Social Integration Income
Household protection	I)Increase amount and beneficiaries of School Welfare II) Raise Family Allowance III)Implementation of a transport pass for young people
Business support	I)Introduction of a general tax bracket with a reduced corporate tax rate II)Reduction of advance payments by small and medium sized enterprises (SME) III)Creation of a mechanism enabling the advance payment of EU funds granted to businesses IV)Constitution of credit lines targeted to the SME with improved financing conditions to promote corporate investment V)Implementation of the Programme for the Extraordinary Settlement of the States' Debts

Source : Adapted from República Portuguesa, 2009

Table AIII

Investment and Employment Initiative

Measure	Description
Modernisation of schools	Reconstruction and modernization of over 100 public schools between 2009-2001
Fostering Renewable Energies, Energy Efficiency and Energy Transmission Infrastructure	I) Installation of solar panels and micro-generation units (mini-wind turbines) II) Investment in energy transmission infrastructure III) Improvement of energy efficiency of public buildings IV) Investment in energy metering networks
Modernisation of Technological Infrastructure – New Generation Broadband Networks	Support for carrying out investments in next generation broadband networks
Special support for economic activity, exports and SME	I)SME credit lines with partial subsidization of the interest rate and full subsidization of the guarantee fee II)Creation of a fund of EUR 175 million to co-finance domestic and international mergers and acquisitions operations III)Support national SME trade transactions in external markets by providing additional credit risk coverage IV)Support to activities promoting the country abroad V) Support to private investment projects in agriculture and agro-industry VI) Creation of a credit facility supporting agriculture and agro-industry exports and competitiveness VII) Tax credits for investment VIII)VAT Reverse-charge in the provision of goods and services to Public Administration IX) Reduction to the VAT reimbursement threshold X) Reduction to the advance tax payment

Protecting employment and strengthening social protection	I) Reduce the employer's contribution to Social Security by 3% for workers older than 45 years II) Support for enterprises and workers in case of a temporary reduction of activity III) creation of traineeships for young people IV) support the return to work of the unemployed, particularly the long-term unemployed and the unemployed aged over 55 years V) Expansion of social protection by temporarily extending unemployment benefits

Source: Adapted from República Portuguesa, 2009

Table AIV

Data set

Variable	Source
$s_{i,t}$	Eurostat and own calculations
Debt/GDP	European Commission and own calculations
Fiscal Balance	European Commission and own calculations
BAS	Bloomberg and own calculations
REER	International Financial Statistics
VIX	Federal Reserve Economic Data and own calculations
3-Month Euribor	Eurostat

Table AV

Descriptive Statistics

Variable	Observations	Mean	Standard Deviation
$s_{i,t}$	2360	1.167	2.456
Δ Debt/GDP	2350	0.121	2.287
Fiscal Balance	2360	-0.783	2.853
BAS	2360	0.042	0.230
Δ REER	2360	0.004	0.725
VIX	2360	19.638	8.190
Δ 3-Month Euribor	2350	-0.0160	0.144

Table AVI

Stationarity Test Results IM-Pesaran-Shin

Variable	Test statistic	p-value	Order
$s_{i,t}$	-2.0069	0.0224	I(0)
Debt/GDP	-19.3374	0.0000	I(1)
Fiscal Balance	-1.8985	0.0288	I(0)
BAS	-4.8455	0.0000	I(0)
REER	-19.4816	0.0000	I(1)
VIX	-6.3806	0.0000	I(0)
3-Month Euribor	-12.4551	0.0000	I(1)

I(O) and I(I) means in levels and in first differences respectively