

## CDS, bond spread and sovereign debt crisis in peripheral EU

Serpil Kahraman Akdoğu

*In the last decade, many economies were marked by the severe financial crises since the Great Depression. The euro area faced considerable economic difficulties and the CDS has become the focal point of the current crisis. The euro sovereign debt crises started in Greece and later on, spread to the other peripheral European countries Spain, Portugal, Ireland, Italy and still continues. This experience address the increasing importance of „fiscal discipline” and the role of European Central Bank (ECB), if ECB with national central banks take on all responsibility in government bond markets, Euro area could be stabilized. Policy makers argue both financial and monetary policies in European Union (EU), and convergence criteria to adopting Euro. This paper aims to determine the relationship between credit default swap (CDS), bond spread and the debt ratio of the countries. In this framework, the interaction between CDS and sovereign bond spreads are examined as a measure of perceived country risk. The focus of the study is to show the role of these two variables on peripheral European countries, during the recent euro sovereign debt crisis.*

**Keywords:** CDS, bond spread, sovereign debt crisis

### 1. Introduction

From the beginning of the euro introduction in January 1999 until the 2007 global financial crises, stability and convergence of bond spreads in Eurozone were considered successful. Nevertheless, following the collapse of Lehman Brothers on September 2008, the risk premium on European Monetary Union (EMU) government bonds dramatically increased and severe tensions emerged in Eurozone.

The ongoing sovereign debt crisis might have been analyzed into 3 phases. The first phase was a “financial fragility” period, began in September 2008, when the default of Lehman Brothers. This had serious impact on the financial markets in European Union (EU) countries. The second phase was marked by the “fiscal stabilization”, began in April 2009. The announcement of rescue pack ages was effective to decrease the volatility in both money and financial markets. Finally, third phase is characterized by the “sovereign default risk” which has become a significant factor.

In fall 2008 sovereign spreads in Europe. The sovereign issuers began to flight to relatively liquid and safe different sovereign bond markets. The investors focus on the solvency concerns with a linkage between government debt risk and fragility in banking sector (Bolton and Olivier, 2011:7). After that time, financial analysts and international investors started to use cds screening values instead of eurobond to asses country risk and default probabilities. Central bankers also use these values for monitoring money and financial markets. CDS reflects that the expectations and forecasts of both who sells and who own’s the risk. In crises periods, CDS values may arise much more than the default probability.

In this experience of sovereign debt, the financial health of one country is heavily dependent on the financial health of other countries. Additionally, contagion risk level depends on how each EU government manage risk or how they diversify risk level with respect to default probability. The main problematic in EU sovereign debt spread is that the linkage between national central banks in

Eurozone and the European Central Bank (ECB). In European Monetary System (EMS), if solvency problems in Greece lead bondholders to fear the spread to other bond markets, then liquidity crisis risk may occur. Some economists suggest that the only way to stop this contagion effect is the role of ECB's lender of last resort in the government bond markets. As known the lender of last resort is an insurance mechanism that stabilizes the euro system. However in such an insurance mechanism, ECB guarantees liquidity to sovereign bond holders but which may arise the moral hazard problem (Grauwe, 2011). Risk is also transferred to sovereign bond holders. As can be seen in Ireland, when the state extended the guarantee to Irish bank, sovereign spread began to increase. We should also mention that according to euro convergence criteria, the limit for debt to GDP ratio is 60%. But no forecast that the debt to GDP ratio have risen in this record levels. In the long run, all the policy makers agree that financial stability and fiscal discipline in the euro area is the highest priority against spillover effect of the crisis.

This study will focus on the determinants sovereign debt crises. In this framework the role of CDS, bond spread and the default probability will be analyzed. I'll focus on peripheral EU countries, Greece, Ireland, Portugal, Spain and Italy. This paper is organized as follows, the next section gives the brief history of European sovereign debt crisis and the second section provides theoretical and empirical literature review. The third section includes data and data description. The applied data is primarily from Finance Invest and Bloomberg. The fourth and final section of this paper includes conclusion and policy suggestions.

## **2. Survey of the Theoretical and Empirical Literature**

Most of the empirical work has focused on correlation between CDS and sovereign debt though US bond market, only a few studies are available for the Euro bond market. The recent literature on euro sovereign debt crisis has highlighted credit default swap and the stability of the domestic financial system.

The first example to examine the CDS was the study performed by Duffee (1999). Duffee (1999) applied recovery rates to corporate bonds. Another study of Duffee (1996) evaluates the relationship between Treasury yields and bond yield spread. The author used two different credit rating indexes to determine this relationship. One holds credit rating is constant over time, and the other is refreshed calculation method of credit rating over time. Author also emphasizes that there is a strong relationship between bond yields and yield spread, based on Moody's yield indexes. So that decline in bond yield spreads is small for Aaa Credit rated bonds but large for Baa credit rated bonds.

Landscoot (2004) examines that the term structure of credit default swaps on Euro bond investment between years 1998-2002 and also compare the empirical results with other studies on USD bonds. Depending on bond characteristics, they investigate the role of credit spreads volatility on both financial and macroeconomic variables. The authors found that the results are statistically significant. Credit default and volatility are positively related, credit default has significant role on volatility.

Barrios et al. (2009) focuses on government bond yield spreads in the euro area during the crises found that the relationship among foreign debt, current account deficit and sovereign risk premium. Risk perception plays a crucial role in crisis period which will lead to higher level government bond yield spreads. Thus, their results have shown that sovereign bond interest rates are affected by global financial markets. Determinants of yield spreads credit risk, change in risk aversion, and liquidity consideration.

Delatte et al. (2010) examined the nonlinear approach to determine the interaction between European sovereign credit default swaps and bonds. They applied panel smooth transition error correction model by using daily panel data covers for the crisis period from 2008 to 2010. The countries in the study were 11 European countries into two groups, “core Euro area” group includes Austria, Belgium, Finland, Denmark, Netherlands, France and the “high yield” European countries includes Greece, Italy, Ireland, Spain and Portugal. They found that threshold tension behaves differently across groups, higher threshold tension over the “high yield” group. Their results show that high volatility in CDS prices lead to panic in Eurozone so that CDS spread is the leading indicator for default risk.

Bolton and Olivier (2011) analyzed contagion effect of sovereign debt crises by using the data of 2010 European stress test. They address that the lack of fiscal integration monetary integration is the main problem of government debt. They found that banks have played a crucial role in euro sovereign debt crises spread as well as the policy response of monetary authorities.

Gomez-Puig and Sosvilla-Rivero (2011) used daily data of 10 year bond yields cover from 1990 to 2010 for peripheral EMU countries; Greece, Ireland, Portugal, Italy and Spain. They applied the Granger causality test and found strong causality relation among peripheral EMU bond yields. They also tested for cointegration by using Johansen’s (1991 and 1995) approaches. Their findings suggest that contagion of the crisis through macroeconomic imbalances and banking system may be an important issue.

Santis (2012) analyzed the euro area long term government bond yields for the daily period between 1.September.2008 and 4.August.2011. He determined that three factors have played a key role in developments of sovereign spread. These factors are country specific credit risk, aggregate regional risk, and the spill over from Greece. He also implies the importance of the credit rating information.

A more recent study to determine the granger causality relationship between credit default swap and bond yield spread was performed by O’Kane (2012). He use daily data for the period 1 January 2008 to 1 September 2011 and found that CDS granger cause bond spread for Greece and Spain, but converse relationship for Italy and France and bidirectional relationship for Portugal and Ireland.

### **3. Developments on Euro Sovereign Debt Crisis**

In the first phase of euro area sovereign debt crises, the rescue of the largest Irish banks might have played a key role in the development. However the main reasons of the euro area sovereign debt crises vary to countries. Ireland crisis differs than Greece, originated in the banking sector, then spread to the sovereign debt. In Ireland, the main reason of crisis is the increasing probability of default risk related to the domestic housing boom which was financed by foreign borrowers. During the crisis, cut and run behavior” of foreign capital may arise. In contrast, Greece, Portugal and also Italy, the main reason behind the crisis is the high fiscal deficit and public debt (Gomez-Puig and Sosvilla-Rivero, 2011, pp. 4-5).

The first signal of the crisis had been seen in summer 2009. 22 February 2009. Irish government announced that the new tight fiscal stabilization program. Later on 16 October 2009 Greek government announced that %12.7 debt to GDP ratio which was doubled than forecasts. These developments lead to sovereign debt spread dramatically risen (Santis, 2012:2). In this phase, CDS spread of peripheral European countries; Greece, Spain, Portugal, Ireland and Italy have reached record levels with the probability of default, then panic spread to euro area. Default probability ratio

was calculated 74% for Greece, 47% Portugal, 46% Ireland, 21% Spain and finally 14% for Italy (Bloomberg).

Table 1 represents GDP and debt in selected EU countries, USA and Japan for the year 2011. The correlation between foreign debt and public debt is obvious. As can be seen in the table with %166 the highest public debt to GDP ratio country is Greece and with %1093 the highest foreign debt to GDP ratio is in Ireland is 5 times more than Eurozone average. Furthermore, public debt of Greece began to increase significantly in 2006, and worsened since 2009. Looking at Greece and Italy's huge fiscal deficit, seem clear that the result of macroeconomic imbalances. However Portugal, Ireland, and Greece's GDP is only 1.4% of the total EU's GDP. But the main problem is as known, main actors in world economy hold large amount of government bonds from the financially distressed countries. Additionally, the data confirms the role of the international risk factor, US is an important driver for EU. Due to the increasing size of the bank rescue packages in UK, debt to GDP ratio has begun to sharp increase in year 2007. In Eurozone, France and Germany were considered as safe with highest credit ratings and positive economic outlook. The fiscal stability has come into focus on the default risk of high government debt.

**Table 1: GDP and Debt in Selected EU and Non-EU Countries (2011)**

	GDP (trillion €)	Foreign Debt (trillion €)	Foreign Debt/GDP	Foreign Debt per person (€)	Public Debt (trillion €)	Public Debt/GDP
France	1,8	4,2	235%	66.508	1,6	87%
Spain	0,7	1,9	284%	41.366	0,5	67%
Portugal	0,2	0,4	251%	38.081	0,2	106%
Italy	1,2	2,0	163%	32.875	1,5	121%
Ireland	0,2	1,7	1093%	390.969	0,2	109%
Greece	0,2	0,4	252%	38.073	0,3	166%
Germany	2,4	4,2	176%	50.659	2,0	83%
<b>Eurozone</b>	6,7	14,8	221%	53.202	6,2	93%
England	1,7	7,3	436%	117.580	1,4	81%
USA	10,8	10,9	101%	100%	35.156	10,8
Japan	4,1	2,0	50%	233%	15.934	9,6

Source: Finance Invest.

If we look at the debt levels in more detailed, below mentioned matrix shows the debt and/or how much money is owed by each country to other countries in the Eurozone as well as the other big world economies, Japan and USA. As we focus on the peripheral EU countries; Greece, Portugal and Ireland which are in three Eurozone countries which in deep recession, and need bail out. Greece's foreign debt is 0.2 tn euro and owes large amounts to France is heavily indebted to Eurozone. So Greek default risk could directly contagion to its creditor countries. Portugal is implementing privatization plan to reduce to debt. Foreign debt of Portugal is 0.4 tn euro and highly indebted to Spain with 65.7 bn euro. That's the reason Spain is in trouble to default probability of Portugal. Foreign debt of Spain is 1.9 tn euro and large amount of its debt is to Germany and France. The most heavily effected European country by housing boom in 2008, is Ireland. Foreign debt in Ireland is 1.7 tn euro and has very high gross domestic debt to GDP ratio %1,093 in such a small country. Additionally it has a big financial sector in overseas. Finally, Italy is the fifth peripheral country in Europe with 2 tn euro foreign debt and %163 foreign debt to GDP ratio. Italy has highly indebted to France, 309 bn euro.

Political instability is the main reason that the sovereign debt crisis very easily spread to Italy. However Italy is the relatively developed and wealthy country within other peripheral EU countries.

**Table 2: 2011 Eurozone Debt Matrix (bn euro)**

	Germany	UK	US	France	Spain	Portugal	Italy	Ireland	Greece	Japan
Germany		141.1	174.4	205.8	0	0	202.7	0	0	108.3
UK	379.3		578.6	209.9	316.6	0	0	113.5	0	122.7
US	414.5	834.5		440.2	170.5	0	0	0	0	835.2
France	123.5	227	202.1		0	0	37.6	0	0	79.8
Spain	131.7	74.9	49.6	112		19.7	22.3	0	0	20
Portugal	26.6	19.9	3.9	19.1	65.7		2.9	0	0	0
Italy	120	54.7	34.8	309	29.5	0		0	0	32.8
Ireland	82	104.5	39.8	23.8	0	0	0		0	15.4
Greece	15.9	9.4	6.2	41.4	0	7.5	2.8	0		0
Japan	42.5	101.8	244.8	107.7	0	0	0	0	0	
Risk	<i>Low</i>	<i>Low</i>	<i>Low</i>	<i>Medium</i>	<i>Medium</i>	<i>High</i>	<i>High</i>	<i>High</i>	<i>High</i>	<i>Low</i>

Source: <http://www.bbc.co.uk/news/business-15748696>

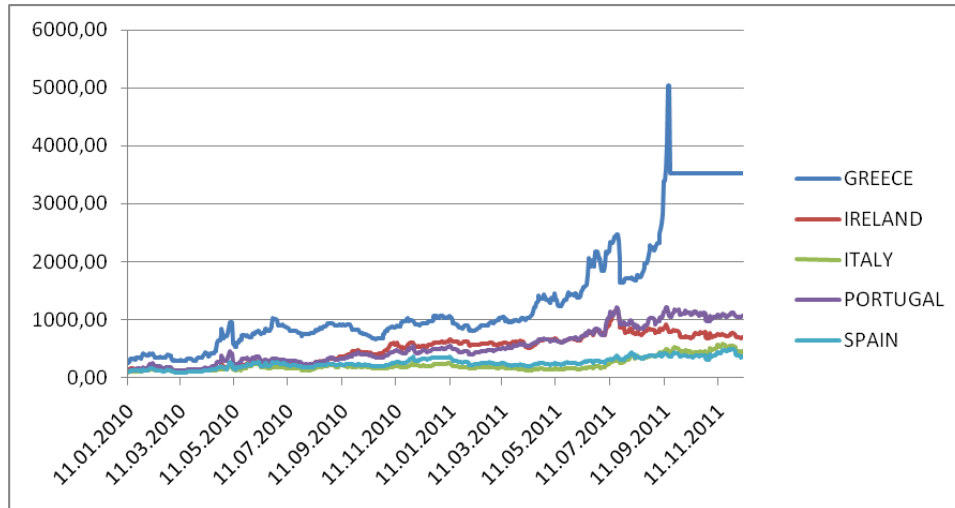
In early 2010, until March, reflecting an optimistic expectation of Greek default risk, there was relatively little contagion effect. But in March, as the European recovery was weak, the crisis began to spread to other European countries. Later than EU member governments and IMF were setting up a lending mechanism for Greece and other peripheral countries. By the end of the April, the crisis reached its most acute phase, and the Greek government requested rescue package be quickly activated on 23 April 2010. May 2010, European Central Bank declared that 110 bn euro worth loan agreement. Irish government also requested an 85 bn. Euro rescue package (Bolton and Olivier, 2011, pp. 9-11). European Financial Stability Facility (EFSF), created to conditional crisis loan as a new entity to Eurozone.

#### 4. CDS, Bond Spread and Financial Distress

The ongoing euro area debt crises show that Credit default swap (CDS) and bond spreads are the main factors to determine the default risk. CDSs were introduced in mid 1990s and became a popular after 2007. Briefly, a sovereign CDS spread is a financial instrument which entails transfer the default risk between two parties. On the other hand, Credit default swaps are a bilateral insurance contract covering a sovereign's bond or loan. Typically, CDS provides insurance for five years. CDS are not standardized financial instrument. So that, they are opaque, not regulated and not traded instrument. Suppose that a country at high default risk and probably won't be able to pay back its bond holders. In this case you may speculate to buy this bonds and pay for CDS premium cause you know that if the country would not default, you will get the total face value of bonds. Conversely, suppose that a country is in good financial markets now you may have chance to offer insurance whose opinion is opposite yours. In this case you may speculate that the country would default to sell the insurance but not pay back. Thus we may say that "*speculation*" is the key word on CDS. The main problematic in CDS screening values is intertemporal changes in default probability cause the credit rating indexes are held constant the measure.

In this non-technical analysis daily close prices for both CDS and bond spreads data is used for the period 11 January 2010 to 08 December 2011. All the data are collected from Finance Invest. There are no missing data for CDS but several missing exist in bond spread data for Italy and Spain. The below mentioned figure 1 shows the credit default swap and the following figure.2 represents sovereign bond yield spreads for peripheral countries Greece, Ireland, Italy, Portugal and Spain. The dates in figures mark some of the key developments in European sovereign debt crisis. These are, on 8.December.2009 with negative economic outlook by Fitch, Greek credit rating downgrade to BBB+, on 28.November.2010 Irish rescue package, and 6.April.2011 Portugal call for bailout EU (Metiu, 2011, pp. 24).

**Figure 1: Credit Default Swap (CDS) in Peripheral EU**

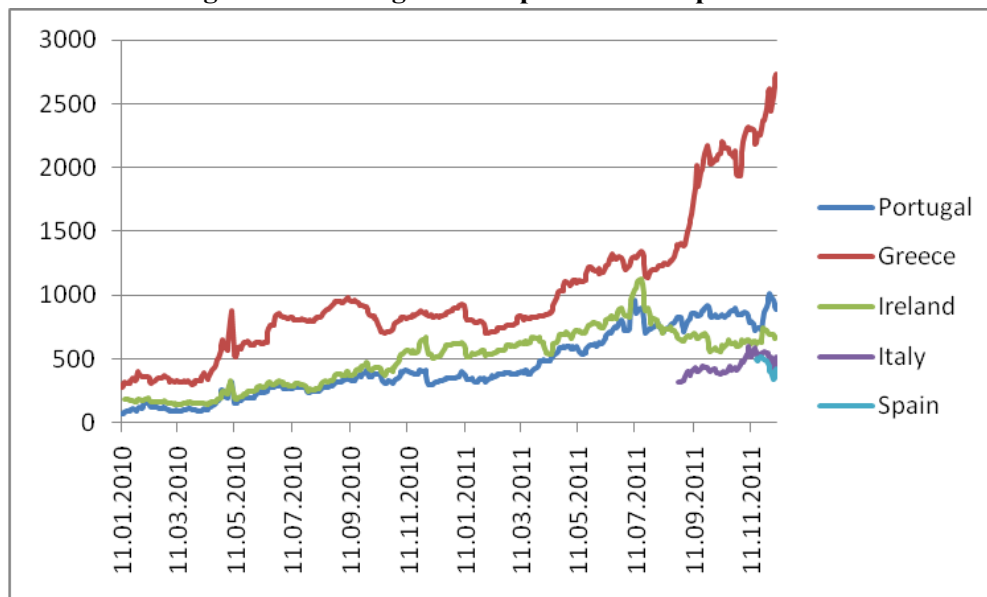


Source: Finance Invest.

Bond spread is another important indicator of economic volatility of a country that reflects to measure of perceived risk and have risen since mid-2007. Bond spread is the difference between the two bond yields with differing credit ratings. In crisis periods, investors beware risk, bond spread rising. During the crises period, changes in the creditworthiness is reflected in the bond spread of the country which can be seen in below mentioned figure 2. The sovereign debt crises makes the spreads increase, due to the uncertainty about Bear Stearns spreads have clearly risen. and the above mentioned level of bond spreads were seen only in emerging markets before. As seen in the figure, developments in July 2011 were remarkable with the Greek, Irish and Portugal spreads. They have all received bailout loans, but it worsened the condition.

I should also mention that many of the economists do not address uncontrolled higher demand for German Sovereign bonds, cause in the crisis period German bond seems to have benefited and safe. By the way German government guarantee to German sovereign bonds, carrying the default probability.

The economic agents have argued that solvency risk for those countries deteriorated and lead credit ratings downgrades. Three credit rating agencies; Standart and Poor (S&P), Moody's Investors Service (Moody's) and Fitch might have important that reported credit rating reviews and deteriorated sovereign solvency risk. Table indicates that Greek sovereign bonds lead to strong impact of default probability since the default of Lehman Brothers, but less noticeable in Italy and Spain. The spreads of Italy and Spain reaching the highest level since adopting the euro area and still increasing, but Ireland and Portugal seems getting better. However, this is not enough to calm the markets and reduce to spillover effect to outside of Europe.

**Figure 2: Sovereign Bond Spreads in Peripheral EU**

Source: Finance Invest.

## 5. Conclusion and Policy Suggestions

Doubtless the euro sovereign debt crisis is the biggest test for euro has ever faced. Credit default swap (CDS) and sovereign bond spreads have played a key role in the developments of the crisis. The ongoing crises show that investors had more interest to negotiate CDS on high yield EU countries. Empirical studies show that during the financial and economic turbulences, there is high correlation between these two derivatives. In Eurozone peripheral countries Italy, Portugal, Spain, Greece and Ireland are probably the best examples for this transmission mechanism. The recent econometric debate on this issue is mainly focus on the causal relationship between CDS and bond which is important for policy makers. Most of the studies agree that bond spreads are mainly driven by the credit default swaps.

On the other hand, European Council (EC) have failed to isolate the contagion of the Greek sovereign debt crisis to the Eurozone. The European Central Bank officials are considering that there are several informal plan to support Greece's rescue plan. One plan suggest that ECB could sell its Greek bonds to European Financial Stability Facility (EFSF) but EFSF is disagree and against this suggestion. Under another informal plan is euro area central banks could get losses on Greek bonds to buying in its asset purchase program until Greek bond payment due to March 2012. EU commission agreed on the European Stability Mechanism (ESM) fund in March.2011 but it may come into effect in 2013.

At the end, Euro sovereign debt crises has highlighted fiscal discipline and macroeconomic instability that lead to rising sovereign spreads to other countries through integrated financial and banking system can be a major issue. There is one clear lesson from the euro sovereign debt crisis, a consequence of monetary integration; governments cannot be indifferent default probability of a euro area government debt.

## Acknowledgement

I would like to thank Oğuz Büktel, Research Department at Finans Invest Co. for data and helpful comments.

## References

1. Barrios, S. – Iversen, P. – Lewandowska, M. – Setzer, R. (2009): Determinants of Intra-euro Area Government Bond Spreads During the Financial Crisis, *Economic Paper 388*, European Commission.
2. Bolton, P. – Olivier, J. (2011): Sovereign Default Risk and Bank Fragility in Financially Integrated Economies, *NBER Working Paper 16899*.
3. Delatte, A. – Gex, M. – Villavicencio, A.L. (2010): Has the CDS market amplified the European Sovereign Crises: A nonlinear Approach, *Research Paper*, Southwestern Finance Association 50<sup>th</sup> Annual Meeting, 9-12 March 2011, Houston..
4. Duffee, G. R. (1996): Treasury Yields and Corporate Bond Yield Spreads: An Empirical Analysis. *Finance and Economics Discussion Series*, 20.
5. Duffee, G.R. (1999): Estimating the Price of Default Risk, *The Review of Financial Studies*, 1, pp. 197-226.
6. Gomez-Puig M. – Sosvilla-Rivero S. (2011): Causality and Contagion in Peripheral Emu Public Debt Markets a Dynamic Approach, *Research Institute of Applied Economics Working Paper 201*.
7. Grauwe, P. (2011): Only a More Active ECB Can Solve the Euro Crisis, *CEPS Policy Brief*, No. 250.
8. Landscoot, A.V. (2004): Determinants of Euro Term Structure of Credit Spreads, *European Central Bank Working paper Series*, No. 397.
9. Metiu, N. (2011): The EMU in Debt Distress: Contagion in Sovereign Bond Market. *Research Paper*, European Economic Association & Econometric Society 2011 Parallel Meetings, 25-29 August 2011, Oslo.
10. O’Kane, D. (2012): The Link Between Eurozone Sovereign Debt and CDS Prices, *EDHEC Risk Institute*.
11. Santis, R.A. (2012): The Euro Area Sovereign Debt Crisis, Safe Haven, Credit Rating Agencies and the Spread of the Fever From Greece, Ireland and Portugal, *European Central Bank Working Paper Series*, No. 1419.