

## **The Reasons of Eurozone Sovereign Debt Crisis and an Empirical Analysis over Permanency of the Crisis**

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**ABSTRACT:** This study aims to review how the Eurozone has been formed and to analyze how it has been formed on weak roots, both in public finance and politics. Contrary to economical ideas, political grounds tested the endeavor of creating a powerful the monetary union. Hence, it was very clean to predict upcoming the debt crisis. According to those assumptions known, pre-crisis problems of the countries has been reviewed. Latter, the crisis' permanency has been tested via PANKPSS if it's permanent or not? Mainstream acknowledgement on the literature agrees on the crisis is permanent and might lead to dire consequences. Nevertheless, nexus between those countries which has been forged by political bounds cannot be broken by that crisis; thus, the Eurozone might not be break down.

**Keywords:** Eurozone; Sovereign Debt Crisis; Second Generation Unit Root Tests; PANKPSS

**JEL Classifications:** B23; E60; F34; G01; G38; H6.

### **1. Introduction**

The situation having arisen with the mortgage crisis in USA in 2007 effected the amount of liquidity in financial markets and turned into a financial shock driving many banks and firms into bankruptcy. This break down in financial markets effected the European markets by leading to a global credit contraction. Some of the European economies increased their fiscal position deficits that they already had while trying to sustain the state based financing or extravagant public expenditure as a result of past habits. Thus, the risk perception changed for these countries whose rate of fiscal pressure escalated. The economic situation of the countries with weak economies which were lent with the same interest rates of the countries with strong economies deteriorated and considerable increases in risk prime interest rates occurred. Thus, as a consequence of the increase experienced in the cost of debts, the fear that these countries with already high debts will not be able to achieve their debt cycles and that they will go bankrupt by not being able to pay, increased. The gross debt/GDP rates had sudden increases due to occurring increases both in direct government debts and government guaranteed debts<sup>1</sup>; and also budget deficit/GDP rates reached high levels. Eventually, Eurozone rolled into a crisis that could easily have been foreseen. In February 2010, it was agreed that Greece was in a state of crisis and measures for saving Greece were initiated to be sought for.

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<sup>1</sup> The reason why the crisis in Europe named as "Sovereign Debt Crises" is that the crisis is caused by the rise of both direct public debt and the debt under the guarantee of the state (Reinhart and Rogoff 2011; 1702; Jovanović, 2012). Therefore, the parameter named as gross debt rate or debt rate is government consolidated gross dept / GDP.

This paper studies the reasons for Eurozone crisis by taking the economic structures of the countries into consideration. For this purpose, in the section following the introduction, the economic structures of the countries called PIIGS countries (Portugal, Ireland, Italy, Greece and Spain) and the entry periods of these countries into the crisis are mentioned. In the next section, the permanency of the crisis is tested via empiric methods and the findings acquired in the study are evaluated.

## **2. Formation of the Eurozone and Road to Crisis**

In January 1999, 11 countries of European Union formed the economic and monetary union officially known as Eurozone. These countries gave up using their own currency and independence of monetary policy by adapting to the common currency Euro (Canarella et al., 2011). These countries are Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxemburg, Holland, Portuguese and Spain. In 2001, Greece also joined the union. In year 2011, the number of these countries reached 17. Of these 17 countries, 5 of them with high public debts and budget deficits were held responsible for the crisis and these five started to be called as PIIGS. These countries are Portugal, Ireland, Italy, Greece and Spain. While analysing these PIIGS countries one by one, it can be seen that one has public debt, another has structural weaknesses and yet another is in an effort to keep the banking sector. Indeed, each of these reasons point out to the public policies applied in a wrong way and time. For this reason, it is possible to call this crisis “poor fiscal management crisis”<sup>2</sup>

At the beginning, any difference among the member countries was not taken into consideration; thus, Greece could find credit under almost the same conditions with Germany. These countries executing high indebtedness due to poor fiscal management could make use of a decrease in the costs of debt thanks to the fall in the risk prime interest rates upon becoming a member. As a result, low interest rates and easy credit conditions encouraged the credits related with consumption and assets (Lane, 2012:52, 56). The very countries, however, faced a loss by losing their competitiveness because of the increase in the prices of goods as they started to use Euro. Especially, the entry of Portuguese to the Eurozone contributed to the breakdown of external balance via the increase in the domestic demand because of the excessive appreciation of real effective exchange rate and also led to an increase in structural problems such as unemployment (Prokopijević, 2010: 379; Lucarelli, 2012: 28-29).

The accumulating private debts and declining government revenues following Global Credit Crunch obliged Eurozone governments to intervene. This great increase required a great part of the private sector to be protected. It is not the governments without responsibility that cannot be disciplined by financial markets; in contrast, it is the undisciplined financial markets which governments showed responsibility by saving (De Grauwe, 2010: 344; Jovanović, 2012: 65). As a result of all these, a change in the risk perception in Eurozone occurred. In fact, this change in the perception of risk occurred together with the realization of the fact that some of the countries which are members to the zone are merely developing countries and/or countries which could not manage to improve their institutional basis in parallel with the developments throughout the world. These countries, without the necessary motivation to get rid of their own structural weaknesses coming with them from past and covered because of political reasons, preferred to live the advantages of a strong currency and a strong union instead of solving their present problems. These countries showed no necessary effort needed for the regulations needed during the preparation period and first years of Economic and Monetary Union (EMU).

While EMU was being formed, member countries were expected to adjust to the conditions stipulated by the Maastricht Agreement. In fact, the fulfilment of these conditions is used as the indicators that show these economies converge each other. Whereas it is obligatory that the member countries of the union put a common currency into practice, fiscal policies were left to each country's own control (Costa, 2010: 105). For this reason, the criteria of the agreement about public finance

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<sup>2</sup> “Poor or misdirected fiscal management crisis” does not mean the states' wrong policies towards their fiscal requirements, but points out the states' protectionist policies towards their markets which are caused either domestic business cycle or global economy.

have an exclusive importance.<sup>3</sup> Yet, the criteria set for the budget deficits and government debts could not be put into practice even from the beginning by a few countries. As seen in the chart given below, while the %3 percent limitation about the budget deficits could barely be provided by Belgium, it couldn't mostly be provided by Italy and Greece. The debt rates of Greece and Italy were way above %60 from 90ies on.

Many steps were taken to provide and maintain the limitations set by Maastricht Agreement. First of these is the Stability and Growth Pact (SGP) aiming to hold the Eurozone on route by means of sustainable fiscal policy. SGP brings forth limitations to the member countries' deficits; it threatens the countries exceeding the annual %3 limit with huge fines. However, the countries with a deep recession can be exempt from the fine on condition that they do have more than %2 contraction (Schuknecht et al., 2011: 9; Jovanović, 2012: 37; Cohen, 2012: 697). The steps taken in name of fines and control were revised for SGP by meeting two times in the years 2003-2005 and 2010-2011 (De Tramezaigues, 2010: 140; Schuknecht, 2011: 7). Because rather than the rules put into effect by making them more strict every time, execution of these rules and enforcements on condition that these rules are not obeyed have caused real problems. In the year 2003, Germany, which had obeyed the rules very carefully, was warned by European Commission because of its debt rates (Jovanović, 2012: 38).

Every new step taken under the name of bailout (European Financial Stability Facility-EFSF and European Stability Mechanism-ESM), brought forth more strict debt regulations and sharper measures. The costs which countries should tolerate to be able to get a bailout increased more and more in time. These regulations, however, were admired and gained support as they were done so as to resolve the cracks in the system. Each measure was the repetition of the previous one, though. Eventually, these bailouts can be enough to rescue a relatively small country such as Greece, but with a great possibility, these bailouts won't be enough to rescue the large economies of Eurozone such as Italy and Spain (Lane, 2012: 60).

**Table 1.** General Budget Balance and Public Debt in Euro Area Countries

Country	Budget Balance					Gross Debt				
	1991	1998	2007	2010	2013	1991	1998	2007	2010	2013
Finland	-1	1.7	5.3	-2.5	-2.4	22.3	48.4	35.2	48.6	56
Luxemburg	0.7	3.4	3.7	-0.8	0.6	4.1	7.1	6.7	19.2	23.6
Germany	-2.9	-2.3	0.2	-4.1	0.1	39.5	60.5	65.2	82.5	76.9
France	-2.9	-2.6	-2.7	-7.1	-4.1	36	59.4	64.2	82.3	92.2
Austria	-2.9	-2.4	-0.9	-4.5	-1.5	56.3	64.4	60.2	72	81.2
Netherlands	-2.7	-0.9	0.2	-5.1	-2.3	76.6	65.7	45.3	63.1	68.6
Belgium	-7.4	-0.9	-0.1	-3.8	-2.9	127.1	117.2	84	95.5	104.5
Portugal	-7	-3.9	-3.1	-9.8	-4.9	55.7	51.8	68.4	93.5	128
Ireland	-2.8	2.2	0.1	-30.9	-5.7	94.5	53	25.1	92.2	123.3
Greece	-9.9	..	-6.5	-10.7	-12.2	73.4	94.5	107.4	148.3	174.9
Spain	-4.2	-3	1.9	-9.7	-6.8	43.4	64.1	36.3	61.5	92.1
Italy	-11.4	-2.7	-1.6	-4.5	-2.8	98	114.2	103.3	119.2	127.9

Source: Eurostatstatistic (1998-2013) and ECB Occasional Paper Series No: 129;8.

The twelve countries given in the Table 1 are the ones which were the first members of the Union and which we examined in this paper. Because examining the countries which became a member after 2007 will not be appropriate to be able to see the effects of the crisis. Five of these 12

<sup>3</sup> The Maastricht Treaty's criteria are important in the context of fiscal convergency. The monetary union achieved by a group of heterogeneous countries cannot work without a proper fiscal convergency (Krugman and Obstfeld, 2009: 565).

countries still have the crisis and due to the terms of Maastricht Agreement, some countries except for these are seen as various candidates. One of these is Belgium. The debt rates of Belgium were almost always high above the %90 of GDP between the years 1995-2011. In year 2011 it was calculated as %98. It is true that the debt rates in Belgium are high; yet, the country is following a really consistent path about this topic both before and after the crisis. In other words, Belgium is more different than the rest mentioned as countries of crisis in this respect. However, it is normal that Belgium is seen as a country in risk during this period. Because even France, which is one of the strongest economies of Eurozone, is counted among the countries on the path to crisis although She gained strength with Holland's being chosen as the chief (Cohen, 2012: 694-695).

The problems in Eurozone began with Greece in 2009. Degradation in fiscal deficits was seen after the elections done in 2009. Yet, it was not agreed either by Athens or by her partners in EMU that Greece was in a crisis. Months later, due to the increasing market pressure, Athens promised to take some measures asked for by the authorities to improve the fiscal instabilities and announced a recovery package in March, 2010 (Cohen, 2012:694). It seems like that the root of the problem in Greece is caused by the method of management. The taxation system in the country has various problems, as well. Public spending, employment and loans are used to serve the voting mechanism. Due to all these problems, the entrance of the country with a big public sector to Eurozone led to an increase in the amount of usable credit and eventually perpetual increases in the debts of country began. Upon noticing the condition of Greece, the offered interest rates had a sudden increase and debt circulation became to be unrealizable. As a consequence of this, investment, employment and production levels had a fall and capital desertion began. (Jovanović, 2012:50-51). In spite of the temporary aid program, Greece had an alert again and negotiations for a second recovery package began. Economy had a contraction four times successively, the debt rate reached %150 in 2011 (Cohen, 2012: 694). That the banking crisis going beyond Atlantic Ocean increased the debt rate of Greece and many more countries, the lack of discipline in Greece fiscal policies and the Ireland crisis soon following the one in Greece reflect the ineffectiveness of the cautious observation (Welfens, 2011: 16). It is possible to mention three more players causing the tragedy experienced in Greece. First of all, as a reason of the debt rates of Greece mainly over its %100 GDP and all the time poorly managed domestic economy, Greece governments and poor politic system are the main factors. Secondly, especially the credit rating institutions and financial markets were too myopic towards the USA mortgage crisis I 2007 and caused too much reaction to be given against this crisis. Finally, together with the Eurozone Governments the late coming reaction of European Central Bank (ECB) affected this period (Kouretas and Vlamis, 2010: 393).

The second country giving alarm after Greece was Ireland. The Celt Tiger arouse no interest due to the inflation in property markets and her ambitious banking market. Yet, banks in Ireland started to get cheap loans in abundance from abroad in order to invest in domestic real properties. The increase in credit funds and together with this the activity of giving over-debt increased the prices in property market. In year 2008, rents from land and property ownership began not to bring in income. As Ireland is called a country of investment miracle, the decision to lower the rents in certain sectors was made. This step, however, caused the investors and banks in its own economy to face with losses in their investments related with properties. Ireland Government guaranteed to protect the owners of bailors and bonds in order to prevent the unrest caused by the investments related with properties (Jovanović, 2012: 57-58). As seen in the table above, together with this guarantee the debt rates which were %25 in 2007 reached %92 in 2010 and the budget deficits which were %0.1 in same year reached %30 in 2010, as well.

Four months later than Ireland, the Portuguese government was overthrown and parliament started to take urgent domestic measures (Cohen, 2012: 695). The monetary union membership had the most unique effect among the crisis countries for Portuguese. The growth rate of the country decreased remarkably when compared with the previous years (Fernandes and Mota, 2011: 640). The problems in Portuguese, Spain and Italy are due to not only the government financing's being costly but merely a negative network effect occurring because of the relations among these three countries (Welfens, 2011: 27).

Spain has a great property balloon caused by the increase in debts in private sector. Local banks had a great contribution to the inflation of this balloon. The problem of Spain with a great budget deficit is not the careless spending as in Greece but the tax revenues having decreased because of the

property market. The local banks in Spain had to face with a great amount of credit with no return after the booming of property balloon. In this period, increasing production costs undermined the competitiveness (Jovanović, 2012: 60). In the years in which Italy had to provide the adequacy to join the Monetary Union, the public finance of Italy entered in a period of rapid deterioration and the effect of this deterioration could be easily observed in public debts simultaneously. The deterioration in the excess during first years could be balanced in a great amount via the decrease in interest rates. European Commission asked Italy to improve the budget deficits at least until 2007 by pointing out to the excessive deficits of Italy in 2005 (Marino et al., 2008; 452). The common problem of both economies is that they couldn't come to possess proper modern economies acceptable for the requirements of the era as they couldn't complete their structural reformations (Jovanović, 2012: 60-62).

### 3. Methodology and Findings

In this study, for 22 years between 1990 and 2011, GDP per capita of 12 Eurozone countries<sup>4</sup> (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain) were used to form a panel data set. The World Bank Development Database was utilized to obtain these data.

In order to carry out unit root tests in panel data sets, firstly, the cross section dependence of the series has to be examined. If it is found that there is no cross section dependence, first generation unit root tests can be used. In case cross section dependence exists, it will be better to employ second generation unit root tests for more efficient and consistent estimations. To test the cross section dependence in panel data sets, Breusch and Pagan (1980) and Pesaran (2004) LM test statistics can be used.

The Breusch and Pagan LM test depends on the sum of squares of correlation coefficients among sectional residuals that are obtained by employing OLS (Guloglu and Ivrendi, 2008: 383). The test stated as  $CD_{lm1}$  is calculated as below:

$$CD_{lm1} = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{p}_{ij}^2 \quad (1)$$

The test has a chi-square distribution with  $N(N-1)/2$  degrees of freedom asymptotically. Here,  $p_{ij}$  represents the sample estimation of sectional correlation among residuals. The  $CD_{lm1}$  test hypothesis can be formed as below:

$$H_0 = \hat{p}_{ij} = Cov(\varepsilon_i \varepsilon_j) = 0$$

$$H_1 = \hat{p}_{ij} = Cov(\varepsilon_i \varepsilon_j) \neq 0$$

Under the null hypothesis is that there is no relationship among cross sections,  $N$  is constant while  $T \rightarrow \infty$ . However, for the  $CD_{lm1}$  test, if time dimension ( $T$ ) is greater than the cross section dimension ( $N$ ), the Breusch-Pagan test can be run.

Pesaran (2004)  $CD_{lm2}$  test can be employed under the null hypothesis that there is no relationship among cross sections while  $T \rightarrow \infty$  and  $N \rightarrow \infty$  and  $T$  is greater than  $N$ .  $CD_{lm2}$  statistic is normally distributed and are calculated as below:

$$CD_{lm2} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T \hat{p}_{ij}^2 - 1) \sim N(0,1) \quad (2)$$

The Pesaran (2004) CD cross section dependence test presents the distribution of  $N(0,1)$ . Besides, the Pesaran (2004) test can be employed for unbalanced panels (panels that have missing data) (Nargeleçekenler, 2011: 171). The Pesaran (2004) test is utilized if  $N$  is great and  $T$  is small and is calculated as below:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left( \sum_{i=1}^{N-1} \sum_{j=i+1}^N p_{ij} \right) \sim N(0,1) \quad (3)$$

<sup>4</sup> Other eurozone countries and the years they were incorporated into the zone are as below: Slovenia-2007, Malta-2008, South Cyprus-2008, Slovakia-2009, and Esthonia-2011. These countries are not included in the model as we think that net effects of the crisis can not be observed in them.

Under the null hypothesis that denotes there is not a relationship among cross sections, CD statistic is normally distributed (Guloglu and Ivrendi, 2008: 384).

In the study, because data from 12 countries for 22 years have been used, the time dimension is greater than the cross section dimension. For  $CD_{lm1}$  and  $CD_{lm2}$  tests, on the assumption that each country is affected discretely by the individual time effect (Çınar, 2010: 594). The cross section dependence test results of the model are reported in Table 2.

**Table 2.** Cross section dependence test results <sup>5</sup>

Test statistic	Value	Prob
$CD_{lm1}$	373.85	0.0000
$CD_{lm2}$	12.625	0.0000
$CD$	0.184	0.427

The  $CD_{lm1}$  and  $CD_{lm2}$  test results that have been found by taking the lag length as 3 rejects the  $H_0$  hypothesis. Thus, it has been found that there is cross section dependence among GDP per capita of 12 countries.

Because the null hypothesis has been rejected, second generation unit root tests must be employed to detect whether the series have unit roots. While Pesaran (2006) CADF test (Cross Sectional Augmented Dickey Fuller Test) can test the stationarity of series one by one, CIPS test (Cross Section in Pesaran Shin) tests stationarity by taking the average of all countries.

CADF test was developed by means of cross section averages of lag lengths of ADF (Augmented Dickey Fuller) regressions and first differences of individual time series. In other words, common factors can be changed to cross section average and lagged values of  $y_{it}$  and can be substituted for them. CADF test is as below (Furuoka, 2011: 1393):

$$\Delta y_{it} = a_i + b_i y_{i,t-1} + c_i \bar{y}_{t-1} + d_i \Delta \bar{y}_i + \varepsilon_{i,t} \quad (4)$$

In the equation,  $a_i$ ,  $b_i$ ,  $c_i$ , and  $d_i$  show the slope coefficients that are obtained by estimating ADF test of every country,  $\bar{y}_{t-1}$  indicates the average value of lag lengths,  $\Delta \bar{y}_t$  shows the average value of first differences, and  $\varepsilon_{i,t}$  represents error terms.

CIPS test statistics are average values that are obtained by dividing N into data regarding all countries'  $t_i$  data. Pesaran (2006) developed this test by organizing IPS statistics that are based on individual CADF.

$$CIPS = \frac{1}{N} \sum_{i=1}^N CADF \quad (5)$$

The result obtained from this equation is compared with Pesaran's (2006) values. The hypothesis regarding this test can be formed as below:

$$H_0: \beta_i = \beta = 0 \quad (\text{for all } i)$$

$$H_1: \beta_1 = \beta < 0 \quad (\text{for at least one } i)$$

Another stationarity test is SURADF (Seemingly Unrelated Regression Augmented Dickey Fuller Test) test developed by Breuer et al., (2001). Breuer et al. (2001) showed that reciprocal and identical lag structures are biased test statistics. They selected lag structures for all equations in regard to Phillips Perron's (1989) approach. The main difference of SURADF test from other unit root tests that are produced from formulations of null hypothesis is that, while in all other tests unit root test is combined for all for all units of the panel, SURADF tests the null hypothesis one by one for every individual unit of the panel.

$$\Delta Y_{it} = \delta_i + \alpha_i Y_{it-1} + \sum_{j=1}^{pi} \beta_{ij} \Delta Y_{it-j} + \varepsilon_{it} \quad (6)$$

Critical values for SURADF test that let equation coefficients become different (heterogeneity) for each country are obtained by using Monte Carlo simulation. The null hypothesis of the existence of

<sup>5</sup>Cross section dependence has been tested by using Gauss 8.0

a unit root is accepted if SURADF test statistics are greater than critical values obtained via Monte Carlo simulation. The lag lengths obtained from CADF test results are utilized for SURADF test.

The null hypothesis is accepted if CADF value is greater than Pesaran critical value, and it is accepted that the series regarding the country is not stationarity. CADF test results are reported in Table 3. While the series concerning Finland is stationary, the others are not stationary in the trendless model. However, CIPS statistic that regards data of all countries reports that the series are not typically stationary.

**Table 3.** CADF Test Results

Country	CADF	p
Austria	-0.597***	4
Belgium	-1.4699***	4
Finland	-7.5493	1
France	-0.1466***	4
Germany	-1.1406***	4
Greece	-3.1664**	4
Ireland	0.2465***	4
Italy	-3.2258**	4
Luxembourg	-3.0153**	4
Netherlands	-3.144**	4
Portugal	-2.4572***	1
Spain	-3.9243*	4
<b>CIPS</b>	<b>-2.6325***</b>	

Notes: \*\*\*, \*\* and \* stand for significance at 1, 5 and 10 levels, respectively. The lag lengths (p) are selected according to Schwartz information criterion. The critical values for the CADF test were obtained from Pesaran (2006).

For SURADF test that examines whether there is a unit root for all countries one by one, critical values must be calculated primarily. In practice, critical values that are estimated via 10.000 iterations of Monte Carlo simulation are utilized. If SURADF test statistic is greater than critical values, it is found that the series regarding the country is not stationary. The Table 4 reports SURADF test results.

**Table 4.** SURADF Test Results

Country	SURADF	Critical Values		
		1%	5%	10%
Austria	-3.062***	-8.548	-6.789	-5.927
Belgium	-3.667***	-9.343	-7.378	-6.339
Finland	-3.601***	-9.669	-7.557	-6.618
France	-3.612***	-8.664	-6.738	-5.928
Germany	-3.218***	-10.81	-8.464	-7.391
Greece	-4.654***	-9.038	-6.932	-6.002
Ireland	-4.776***	-9.069	-6.942	-5.927
Italy	-2.695***	-9.159	-7.308	-6.276
Luxembourg	-2.529***	-10.08	-8.076	-7.124
Netherlands	-3.868***	-11.39	-8.528	-7.379
Portugal	-3.762***	-11.08	-8.263	-7.21
Spain	-3.539***	-11.67	-8.795	-7.554

Notes: \*\*\*, \*\* and \* stand for significance at 1, 5 and 10 levels, respectively. The critical values for the SURADF test were generated using Monte Carlo simulations with 10.000 replications.

According to the results of SURADF unit root test, the series of all countries have unit a root. Therefore, it can be argued that GDP per capita values of all countries are not stationary.

The results of CADF and SURADF second generation unit root tests show that GDP per capita is not stationary for our sample. Finally, Panel KPSS (PANKPSS -Panel Kwiatkowski, Phillips, Schmidt and Shin) unit root test which was developed by Carrion-i Silvestre, Del Barrio and Lopez-Bazo (2005) has been performed. This test regards multiple breaks and the breaks in averages and in trends of series that form the panel.

PANKPSS test lets different numbers of structural breaks for different times for each cross section unit. Because the test is based on Hadri test, the null hypothesis indicates stationarity. This test examines stationarity of series both individually and jointly (Güloğlu and İspir, 2011: 208).

The model can be written as:

$$Y_{it} = \alpha_{it} + \beta_{it} + u_{it} \quad i = 1,2,3,\dots,N \quad t = 1,2,3,\dots,T$$

In the equation  $\alpha_{it}$ :

$$\alpha_{it} = \sum_{k=1}^{m_i} \theta_{i,k} D(T_{b,k}^i)_t + \sum_{k=1}^{m_i} \lambda_{i,k} DU_{i,k,t} + \alpha_{i,t-1} + \varepsilon_{i,t} \quad (7)$$

can be defined. Here,  $D(T_{b,k}^i)_t$  and  $DU_{i,k,t}$  represent dummy variable trend break and dummy variable level break, respectively. The hypothesis of the model can be formed as:

$$H_0: \sigma_{\varepsilon,i}^2 = 0 \quad \text{stationary}$$

$$H_1: \sigma_{\varepsilon,i}^2 > 0 \quad \text{not stationary}$$

The null hypothesis of stationarity can be examined by using  $LM_{hom}$  statistic:

$$LM_{hom}(\lambda) = \sum_{i=1}^N (\widehat{w}^{-2} T^{-2} \sum_{t=1}^T S_{i,t}^2) \quad (8)$$

$S_{it} = \sum_{j=1}^t u_{ij}$  and  $\widehat{W}_i^2$  represent partial sum of error terms obtained from OLS and long-term variance of error terms, respectively.

In practice, there is a standart normal distribution if there is not cross section dependence among series. If there is cross section dependence, there is not a standart normal distribution. In such a case, bootstrap critical values are considered for each country.

$Z(\lambda) = \frac{\sqrt{N}(LM(\lambda) - \delta)}{\sigma} \sim N(0,1)$  LM statistics are standardized in this way.  $\delta$  and  $\sigma$  are arithmetic means of expected values and variances for each cross section, respectively.

PANKPSS test results for the model with intercept and trend are reported in Table 5. We have not reported the test results for the model with intercept as they are not significant. Results of individual panel KPSS considering structural break are shown in top side of the table. The findings indicate that the null hypothesis of individual stationary is rejected apart from Finland. However, stationarity is rejected at 0.10 level for PIIGS countries (Portugal, Italy, Ireland, Greece, and Spain) experiencing the crisis severely. In the second part of the Table 5, bootstrap critical values and asymptotic critical values are reported for joint stationarity results for the panel. Because cross section dependence is accepted in Table 1, results must be compared with bootstrap critical values. The null hypothesis of stationarity is rejected as PANKPSS test statistics are greater than bootstrap critical values for homoskedasticity at 0.01 level and heteroskedasticity at 0.05 level. In the light of such information, it can be argued that individual panel unit root test results are compatible with joint panel unit root test results.

According to the results of both CADF and PANKPSS tests, the crisis does not seem permanent in only one country in the zone. Finland is the luckiest country about the crisis. This is not surprising when macroeconomic variables of this country are monitored. The probability of suffering from a debt crisis for Finland is very low. Because, debt/GDP ratio of Finland has never exceeded 60%. It has reached its peak in 1995 and 1996, and there is a structural break in 1994 according to the unit root test with structural break. Finland is one of the countries that manage the global crisis, and Finland appears to take measures against the crisis. Because, this country has decreased its primary surplus since 1994, and thus it has enlarged its budget to restrain need to borrow and restriction in markets. Primary balance turned back to negative in 2009 and it decreased almost %122 by the former year. Its primary balance has turned back to positive and has decreased need to borrow since 2011.



**Table 5.** PANKPSS Test Results (Constant and Trend)

Country	KPSS	M	t1	t2	t3	Critical Values		
						90%	95%	99%
Austria	0.4122***	3	1994	2001	2008	0.092279	0.111316	0.204189
Belgium	0.5817***	3	1994	2000	2008	0.094646	0.122054	0.283985
Finland	0.7952	3	1994	2001	2008	3.617123	4.200408	5.72661
France	0.5377***	3	1994	2000	2008	0.11648	0.190026	0.354975
Germany	0.4229**	3	1994	2000	2008	0.125831	0.229694	0.543505
Greece	1.0495*	2	2002	2007		1.028663	1.574941	3.098256
Ireland	1.4196*	2	2002	2008		1.009703	1.522974	3.060858
Italy	1.3322*	2	1999	2008		1.000269	1.478797	2.859296
Luxembourg	0.4160**	3	1996	2001	2008	0.291599	0.38527	0.715664
Netherlands	0.32209***	3	1994	2001	2008	0.125233	0.179297	0.291062
Portugal	1.51285*	2	2002	2008		1.147834	1.559206	3.093086
Spain	4.6184***	2	2002	2008		1.0108	1.45754	2.83741
<b>PANKPSS Tests</b>								
Model			Test Statistic			Critical Values		
LM <sub>hom</sub>			84.9259			2.225		
LM <sub>het</sub>			280.04104			2.225		
<b>Bootstrap Critical Values</b>								
Model			90%		95%		99%	
LM <sub>hom</sub>			35.9715		41.045		53.509	
LM <sub>het</sub>			195.674		230.168		324.001	

Notes: The specification contains country-specific intercepts and linear trends.  $LM_{hom}$  and  $LM_{het}$  denote the panel stationary test with multiple breaks developed by Carrion-i-Silvestre et al. (2005) for the case of homogeneity and heterogeneity, respectively, in the estimation of the long-run variance. The number of break points has been estimate using the LWZ information criteria allowing for a maximum of  $m_i = 4$  structural breaks. Critical values were obtained by using bootstrap for 10.000 replications. Structural break points and break dates are represented by M and  $t_n$ , respectively.

Actually, the policies that have been implemented by Luxemburg are parallel to Finland's policies. In other words, policies eligible for managing the crisis were carried out in Luxemburg. However, the most important difference between these two countries is economic structures of these countries. While Finland's economy is based on reel sector, Luxemburg's economy is based on banking sector. This can be reason why the crisis in Luxemburg is permanent while the crisis in Finland is not. Also, Luxemburg's important trade partners have been suffering from the crisis, and this can be another reason.

#### 4. Conclusion

The Eurozone economies are examined in the theoretical part of the study, and later empirical tests are performed on the permanence of the crisis. Both the economic indicators of the countries and empirical results indicate the crisis in the zone is deep and permanent. Initially, the responsibility of the crisis was arrogated to PIIGS countries. However, the authorities of ECB and EU who did not show sensitivity on implementing Maastricht Criteria that become the conditions of convergence and establishment document of the Eurozone are in charge of the crisis. It is seen that there have been problems from the outset when specific features of countries are taken into account. The measures that were taken to remove the differences among countries in 1999 and 2007 did not work.

The explanation in the theoretical and the findings of the empirical part shows us that the crisis is permanent. The debt crisis that has been going on will continue to affect each country due to integration of the Eurozone economies. However, it is worth keeping in mind that Euro had been a

problematic currency since the moment it was created. It was born as the currency of both high and low inflation countries. Additionally, some of the countries which were to use the Euro had not disciplined their public finance properly. In spite of everything, the Euro is still the product of a political dream, namely a united Europe, thus it will continue to be protected.

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