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AN EMPIRICAL STUDY ON FISCAL SUSTAINABILITY IN EUROZONE

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Abstract

European crisis affected financial sustainability of Monetary Union countries negatively. Union countries are trying to alleviate the short term effects of the crisis on policy implementation. Whether union countries will ride out the crisis with short term policies can be examined by investigating their financial sustainability.

The aim of this study was to examine the European Monetary Union member countries' financial viability. For this aim we use a balanced panel covering EMU 12 countries (Austria, Belgium, Finland, France, Germany, Luxemburg, Ireland, Portugal, Netherland, Italy, Greece, Spain) over the period 1995-2011. We analyzed the relationship between debt/GDP and primary surplus for panel causality covering EMU 12 countries. The results of the panel co-integration tests revealed that the variables are co-integrated. In other words there is statistically significant long-run relationship among the variables.

Keywords:Unionization, sustainability, panel, empirical studies

1. INTRODUCTION

The sustainability of growth and stability are important issues as well as economic growth and stability. The realization of macroeconomic stability or growth alone is not enough. In this context, crisis effects that are suppressed by expansionary or contractionary policies in times of crisis continued in the post-crisis period.

The recent financial and economic crisis has put a heavy burden on public finances in

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euro area countries. This resulted from three main factors. First, in some countries, capital injections for financial institutions created large fiscal costs. Second, the economic down turn had an immediate impact on tax receipts and unemployment-related spending. Third, discretionary measures adopted to compensate for declining private demand in the economy had an adverse impact on fiscal positions (ECB, 2011). These costs have a negative impact on financial stability of member countries.

Deterioration of fiscal discipline caused an increase in public debt and deepening in budget deficits of countries. Union counties combating the crisis are trying to catch the sustainable growth by taking extraordinary measures as well as achieving a reliable structure of financial markets by eliminating vulnerabilities in the financial markets. The important point here is that sustainable growth can only be possible by ensuring financial sustainability. Financial sustainability, the balance of a borrower's income and expense in the future will not be realistic to expect a big correction without the condition of the fulfillment of their debt payments (IMF, 2007).

In the literature, financial sustainability is studied by investigating the stationarity condition of public sector borrowing requirement/GDP, primary surplus/GDP, and public debt/GDP series. A second method tries to examine the financial sustainability by causality analysis between series. In this study, primarily stationary of debt/GDP ratio series will be analyzed. Then the relationship between primary surplus and debt/output ratio will be investigated.

Primary surplus is calculated by subtracting interest payments from the budget balance. As long as the government does not apply extraordinary financing methods, primary surplus shows the part of the budget that controlled by government. Policy makers, who considered debt/output ratio has a certain limit, can render sustainability debt/output ratio through primary surplus. However, this depends on existence of long-run causality relationship between primary surplus and debt/output ratio.

Monetary union countries have undergone a variety of mechanism in order to ensure fiscal sustainability that is deteriorated after the crisis. These mechanisms are the European Stability Mechanism (ESM) and the European Financial Stability Fund (EFSF).

The EFSF was created in response to the unprecedented financial crisis. The financial difficulties faced by Member States could threaten the financial stability of the European Union. Because of this it was crucial to establish the EFSF, as part of a wider safety net in order to provide temporary stability for Member States. The aim of the EFSF is to maintain the financial stability of the Economic and Monetary Union by providing temporary stability in Member States. The EFSF provides financial assistance to Member States, linked to appropriate conditionality. It provides financing by issuing bonds or other debt instruments on the financial markets that are guaranteed by the share holder Member States. These guarantees total €780 billion. EFSF was created as a temporary rescue mechanism. In October 2010, it was decided to create a permanent rescue mechanism, the European Stability Mechanism (ESM). The ESM entered into force on 8 October 2012 (European Council; EFSF).

In the light of the sustained sovereign tensions and the economic and financial difficulties faced by monetary union

Member States, policy makers decided that a permanent resolution mechanism that is able to provide financial stability support would be needed when euro area Member States are either threatened with or facing difficulties with respect to their financial instability that would threaten the stability of the European Union. (European Council-EFSF).

The ESM is a permanent international financial institution that gives assistance for preserving the financial stability of the European monetary union by providing temporary stability support to Member States. T*he Treaty Establishing the European Stability Mechanism* was signed on 2nd February 2012, establishing the ESM as an intergovernmental organization under public international law.

Another application that is implemented into force on 13 December 2011 for financial stability is called "six-pack". This package aimed to improve the co-ordination and supervision of the economic policies of the EU. The pack was introduced in order to ensure the financial stability, aimed at more powerful preventive and corrective implementation and through these mechanisms to decrease macroeconomic imbalance and increase competitiveness.

However, South Cyprus (Republic of Cyprus) crisis in 2013 requires questioning the effectiveness of the measures taken towards ensuring financial stability. In other words the measures taken against the crisis are not to overcome the structural problems that caused the crisis. Cyprus Greek Region (South Cyprus) was on the edge of bankruptcy with a high debt ratio as a result of the banking crisis on March 2013. Cyprus Greek region officially admitted to the European Financial Stability Fund (EFSF) previous year to get rid of the unsustainable situation. However, the EU countries lay condition that as a response to the rescue package, the country should put %10 tax on bank deposits available in the country. After the parliament vote against the rescue package because of high tax rates, the country chose to react to the Russian government for debt. On the other hand, ultimately in agreement with the EU for funding were made available. South Cyprus crisis happened after the measures were taken against the crisis. Therefore, short-term measures can be considered not to solve the structural problems caused the crisis.

The aim of this study is to provide the state of fiscal sustainability in Europe after the crisis. The short-term solutions passed by monetary union countries and national economies not to go to structural changes in their fiscal policies make it necessary to investigate the status of fiscal sustainability. It is obvious that short-term fiscal policy measures in countries of crisis could not be applied in the long-term. In this context, it is important for countries to have fiscal sustainability.

The paper is formed from three sections. First section contains literature survey and second section includes empirical analysis. Third part discusses the results from empirical analysis.

2. LITERATURE REVIEW

Abdullah, Mustafa and Dahalan (2012) used VAR and Multivariate Co-integration methodology for 1970-2009 periods for Malaysia. The data set contains the gross domestic product, government net financial liability, GDP deflator, gross government interest payments, gross government interest receipts, net government interest payments, government total disbursement, government total receipts, short-term nominal interest

rate, and long-term nominal interest rate. Authors indicated that fiscal sustainability indicators and Gross domestic product are co-integrated and financial sustainability is sustainable in the long run in Malaysia.

Cipollini and Lo Cascio (2012) estimated the response of primary surplus to debt ratios to GDP to test for debt sustainability in 12 EMU countries (Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal and Spain) using a factor model. The results of the analysis suggest that the 12 Euro zone countries as whole are on a sustainable public debt path.

Izák (2009) and Simonescu-Bratu (2013) investigated the effects of the primary balance on the unit costs of debt servicing in 10 post socialist members of the EU (Latvia, Poland, Romania, Slovenia, Slovakia, Bulgaria, the Czech Republic, Estonia, Hungary and Lithuania) with panel data analysis for 1995-2009 periods. According to the results except Poland other countries could stabilize their debt-GDP ratio with running a primary deficit.

Haureret et al. (2007) examined the fiscal sustainability in G-7 countries (France, Germany, Italy, United Kingdom, Canada, Japan and United States). According to the results of the analysis using general equilibrium model for the period 2001-2005 in referred countries, primary surplus/GDP rate needs to be improved up to %4 to ensure fiscal sustainability.

Croce and Ramon (2003) examined fiscal sustainability of a group of countries by individual causality and table analysis for 1990s decade. They concluded that Turkey, Argentina and Brazil did not have fiscal sustainability in 1990s and fiscal sustainability exists in Belgium, Indonesia, Ireland and Mexico.

Joseph (2008) investigated the fiscal sustainability for 1970-2005 periods for Caribbean countries (St. Kittsand Nevis, Dominica, St. Vincent and the Grenadines and Jamaica). As a method of analysis unit root analysis was applied to the real Public expenditures/GDP, and real public revenues/GDP, and concluded that fiscal sustainability exist in referred countries.

Joseph (2010) in another study has addressed the fiscal sustainability in East Caribbean Countries. The paper analyzed the stationarity of real public revenues and real public expenditures series by unit root test. As a result the study showed that fiscal sustainability did not exist in relevant countries.

Landolfo (2008) analyzed the fiscal sustainability in Euro Area (1966-2004) and USA (1977-2003). As a result of the co-integration and unit root tests applied to public debt, primary surplus and interest rates, both Euro Area and USA have the fiscal sustainability.

Uctum and Wickens (2000) studied the fiscal sustainability of USA and EU11 countries (Germany, France, United Kingdom, Austria, Denmark, the Netherlands, Spain, Belgium, Italy, Ireland and Portugal) for 1965-1994 periods. The study examined stationarity of public debt stock series by unit root analysis. The results showed that there is not fiscal sustainability in the countries except France, Denmark, the Netherlands and Ireland.

Güven and Kalyoncu (2006) searched the fiscal sustainability of 16 EU countries (Germany, Austria, Finland, Ireland, Spain, Switzerland, Malta, Portugal, Greece, Belgium, Denmark, France, Netherlands, United Kingdom, Luxembourg and Hungary). They analyzed the public expenditure co-integration analysis by using

public revenue and interest payments in a different period of time for each country for 1968-2001 periods. As a result of the paper, they concluded that fiscal sustainability can be achieved by fiscal policy except for Belgium, Denmark, France, Netherlands, United Kingdom, Luxembourg and Hungary series.

Hamilton and Flavin (1986) analyzed the fiscal sustainability of USA for period 1960-1981 by applying unit root test to public debt stock/GDP ratio series. As a result of unit root analysis the series was found to be stationary and there was fiscal sustainability for USA.

Wilcox (1989) following the study by Hamilton and Flavin (1986) investigated the fiscal sustainability for USA by unit root analysis. The results showed that there was no fiscal sustainability for USA for the 1960-1984 periods.

3. DATA AND METHODOLOGY

In empirical analysis, the complementary approach has been used to analyze the sustainability of fiscal policy. The first approach is based on the condition that if the government debt/GDP is stationary, the implication is that fiscal policy is sustainable. Hamilton and Flavin (1986), Kremer (1996) suggest that to use of unit root tests on debt/GDP.

In our analysis, firstly we tested whether debt/GDP series of EMU 12 countries have unit root. Secondly, in order to determine the affects of primary surplus, the panel co-integration test is used.

3.1. Data

This paper investigates the stability of fiscal sustainability in a set of EMU 12 countries by taking a longer-run method. For this aim we use a balanced panel covering EMU 12 (Austria, Belgium, Finland, France, Germany, Luxemburg, Ireland, Portugal, Netherland, Italy, Greece, Spain) over the period 1995-2011. Data on the key variables of interest were sourced from the World Bank's *World Development Indicators*.

In empirical analyses, we used three variables as annual. As an indicator of fiscal sustainability debt/GDP ratio (de) is used. The primary surplus (pri) discussed as determinant of fiscal sustainability.

3.2. Descriptive Statistics

The common methodology starts with a descriptive statistics of these variables for the twelve countries (Table 1). The econometric methodology consists of three steps. First, panel unit roots tests is applied to the data in order to determine whether the series are stationary. Then the Pedroni (1999) and Kao (1999, 2004) statistics are used to determine the existence of unique co-integration relationships. Finally, the long-run co-integrating equations are estimated with the Error-Correction Mechanism

Table 1. Descriptive Statistics

	de	pri
Mean	66.7099	2904.627
Median	62.2500	2704.100
Maximum	143.9000	88800
Minimum	3.6000	-191906
Std. Dev.	33.4554	28466.89
Skewness	0.2648	-2.39103
Kurtosis	2.5371	17.6506
Jarque-Bera	3.9581	1850.584
Probability	0.1382	0.000000
Sum	12808.30	543165.2
Sum Sq. Dev.	213779.9	1.51E+11
Observations	192	187
Cross sections	12	12

because this methodology allows taking both long and short term coefficients among variables.

3.3. Methodology

3.3.1. Panel Unit Root Tests

Several types of panel unit root tests are undertaken in this paper. The Levin, Lin, and Chu (2002) and the Breitung (2002) statistics have a common unit root process as their null hypotheses. The Im, Pesaran, and Shin (2003), Fisher-type test by Maddala and Wu (1999), as well as the Augmented Dickey Fuller (ADF) Fisher Chi-square (Dickey & Fuller, 1979) and the Phillips-Perron (PP) Fisher Chi-square (Phillips & Perron, 1988) tests have the null hypothesis as an individual unit root process.

Levin at al. (2002) and Breitung (2002) assume that all individuals in the panel have identical first order partial autocorrelation, but all other parameters in the error process are permitted to vary freely across individuals.

The model is expressed in the following three hypotheses evaluated, under the null hypothesis, there is a unit root:

$$(1): \Delta y_{it} = \delta y_{it-1} + e_t, H_0 : \delta = 0, H_1 : \delta \langle 0,$$
$$(2): \Delta y_{it} = \alpha_{oi} + \delta y_{it-1} + e_t, H_0 : \delta = 0, \alpha_{0i} = 0, H_1 : \delta \langle 0, \alpha_{0i} \in R$$
$$(3): \Delta y_{it} = \alpha_{oi} + \alpha_{1i} t + \delta y_{it-1} + e_t . H_0 : \delta = 0, \alpha_{1i} = 0, H_1 : \delta \langle 0, \alpha_{1i} \in R$$

In model 2, the y_{it} series has an individual-specific mean but does not contain a time trend and in the model 3, the y_{it} series has an individual-specific mean and time trend.

Im at al.(2003), the Fisher-ADF and PP tests allow δ_i vary across cross-section, i.e. by allowing heterogeneity. Im et. al. tests the null hypothesis, there is an unit root.

$$H_0 : \delta \text{ i} = 0 \text{ for all I}$$

$$H_1 : \left\{ \begin{array}{l} \delta_i < 0 \text{ for i} = 1, 2, \ldots, N_1 \\ \delta_i = 0 \text{ for i} = N_1 + 1, \ldots, N \end{array} \right\}$$

The null hypothesis recommends that non-stationary series in the panel are the series of all cross sections. The model is tested with a restrictive assumption that T should be the same across individuals.

3.3.2. Panel Co-integration Tests

Many of the non-stationary time series macro-economic studies directed attention to the analysis of co-integration. In fact, non-stationary time series, alone, at linear combinations of integrated process create stability. Due to the difference of the series to be non-stationary, relationships between variables, but may occur in the short term, and long-term use of this method has been spreading. Short-term shocks to the variables of their own, but as a partner to express the long-term stochastic trends in the variables will have. Thus, the observed long-term relationship between the variables and the long-term coefficients obtained substituting the error correction model; a dynamic state of equilibrium will be reached.

Two statistics for the existence of co-

integrating relationships between the variables are employed, namely those of Pedroni (1999, 2000, 2004) and Johansen Fisher panel co-integration test developed by Maddala & Wu (1999). Pedroni (1999, 2000, 2004) co-integration test is based on the Engle-Granger co-integration test and it develops several within dimension and between dimension tests which have no co-integration as their null hypotheses.

$$Y_{it} = \alpha_i + \delta_i t + \beta_i X_{it} + e_{it} \quad (4)$$

where T is the number of observations over time, N denotes the number of individual members in the panel. $e_{it} \sim N(0,1)$ error term stability in the event of order I (0) will be. The null hypothesis of this situation, *yit* and X_{it} are not co-integrated, e_{it} has an unit root, I(1). The slope coefficients b_i are also permitted to vary by individual, so that in general the co-integrating vectors may be heterogeneous across members of the panel.

$$e_{it} = \rho e_{it-1} + \nu_{it} \quad (5)$$

Pedroni's analysis of the error term, defined as within the groups and between groups, and argued the seven statistics. Using the residuals that are calculated either of parametric and non-parametric form.

1) Panel ν-Statistic: $T^2 N^{3/2} \hat{Z}_{\nu N,T} \equiv T^2 N^{3/2} \left(\sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2}\right)^{-1}$

2) Panel ρ-Statistic: $T\sqrt{N}\hat{Z}_{\rho N,T-1} \equiv T\sqrt{N}\left(\sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2}\right)^{-1} \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2} \left(\hat{e}_{i,t-1}^{2} \Delta \hat{e}_{i,t} - \hat{\lambda}_i\right)$

3) Panel t-Statistic : $Z_{t N,T} \equiv \left(\tilde{\sigma}^2 \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{2}\right)^{-1/2} \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2} \left(\hat{e}_{i,t-1}^{2} \Delta \hat{e}_{i,t} - \hat{\lambda}_i\right)$

(non-parametric)

4) Panel t-Statistic: $Z^*_{t N,T} \equiv \left(\tilde{s}^{*2}_{N,T} \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2} \hat{e}_{i,t-1}^{*2}\right)^{-1/2} \sum_{i=1}^{N}\sum_{t=1}^{T} \hat{L}_{11i}^{-2} \left(\hat{e}_{i,t-1}^{*2} \Delta \hat{e}^{*}_{i,t}\right)$

(parametric)

5) Group ρ-Statistic: $TN^{-1/2}\tilde{Z}_{\rho N,T-1} \equiv TN^{-1/2} \sum_{i=1}^{N}\left(\sum_{t=1}^{T} \hat{e}_{i,t-1}^{2}\right)^{-1} \sum_{t=1}^{T} \left(\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i\right)$

6) Group t-Statistic: $N^{-1/2}\tilde{Z}_{tN,T} \equiv N^{-1/2} \sum_{i=1}^{N} \left(\hat{\sigma}_i^{2} \sum_{t=1}^{T} \hat{e}_{i,t-1}^{2}\right)^{-1/2} \sum_{t=1}^{T} \left(\hat{e}_{i,t-1} \Delta \hat{e}_{i,t} - \hat{\lambda}_i\right)$

(non-parametric)

7) Group t-Statistic: $N^{-1/2}\tilde{Z}^*_{tN,T} \equiv N^{-1/2} \sum_{i=1}^{N} \left(\sum_{t=1}^{T} \hat{s}_i^{*2} \hat{e}_{i,t-1}^{2}\right)^{-1/2} \sum_{t=1}^{T} \hat{e}^{*}_{i,t-1} \Delta \hat{e}^{*}_{i,t}$

(parametric)

The non-parametric panel-t and group-t statistics –the same as conventional Phillips-Perron test-and parametric panel-t and group-t statistics are obtained from the following regressions respectively, calculating equation 1:

$$\hat{e}_{i,t} = \hat{\gamma}_i \hat{e}_{i,t-1} + \hat{\mu}_{i,t}, \quad (6)$$

$$\hat{e}_{i,t} = \hat{\gamma}_i \hat{e}_{i,t-1} + \sum_{k=1}^{K_i} \hat{\gamma}_{i,k} \hat{\Delta} \hat{e}_{i,t-k} + \hat{\mu}_{i,t}^{*}$$

The panel - ρ and panel - t statistics are estimated with the long-run variance of η_{it} calculating the following regression:

$$\Delta Y_{it} = \alpha_i + \delta_i t + \beta_i \Delta X_{it} + \eta_{it} \quad (7)$$

The initial four statistics are referred to as the within dimension-group statistics (simple panel co-integration tests), and the rest are referred to as between dimension-group statistics. For the first group (within-dimension statistics) the null of no co-integration hypothesis; $H_0 : \gamma_i = 1$ for all i, versus the alternative hypothesis $H_1 : \gamma_i = \gamma \langle 1$. Thus, the slope coefficient is assumed homogeneous for members of panel. But, for the second group (between-dimension statistics) the null of no co-integration hypothesis $H_0 : \gamma_i = 1$ for all i, versus the alternative hypothesis $H_1 : \gamma_i \langle 1$ for all i. Thus, the between-dimension-based statistics allow heterogeneity (Pedroni, 1999).

Pedroni (2004) shows that properties of residual-based tests for dynamic panel and allows for the null of no co-integration for dynamic panel in which both the short-run and long-run slope coefficients are permitted to be heterogeneous across individual members of panel. For regressions of the form given in (1), the null hypothesis, *Ho* : "All of the individuals of the panel are not co-integrated". And allowing the co-integrating vectors may be heterogeneous across members of the panel, the alternative hypothesis should be H_1 : "A significant portion of the individuals are co-integrated".

The Johansen-type panel co-integration test is developed by Maddala and Wu (1999). The test is based on Fisher procedure. The Fisher test allows the p-values to be different. The Maddala and Wu (1999) test results are based on p-values for Johansen's co-integration trace test and maximum eigenvalue test.

3.3.3. Panel Causality Analysis

A panel-based on error correction model (ECM) followed by the two steps of Engle and Granger (1987) is employed to investigate the long-run and short-run dynamic relationships. The first step estimates the long-run parameters in equation (1) in order to obtain the residuals corresponding to the deviation from equilibrium. The second step estimates the parameters related to the short-run adjustment.

3.4. Empirical Results

The Granger causality test requires the variables to be stationary. We check their stationarity using common panel unit root tests, Levin, Lin, and Chu (2002), Breitung (2002), the Im, Pesaran, and Shin (2003) and Fisher-type test by Maddala and Wu (1999). The panel unit root tests are reported in Table 2 for all countries.

Table 2. Panel Unit Root Test Results

Method	de	pri
Levin, Lin & Chu		
Level	3.9435	0.5955
	(1.0000)	(0.7243)
First Difference	-6.0497	-3.9905
	(0.0000)	(0.0000)
Im, Pesaran and Shin W-stat		
Level	1.9867	-0.6574
	(0.9765)	(0.2555)
First Difference	-3.9172	-9.7685
	(0.0000)	(0.0000)
ADF - Fisher Chi-square		
Level	21.1703	35.9205
	(0.6287)	(0.2555)
First Difference	54.7897	133.156
	(0.0003)	(0.0000)
PP - Fisher Chi-square		
Level	4.7339	29.9774
	(1.0000)	(0.1855)
First Difference	58.2595	205.328
	(0.0001)	(0.0000)

The overall analysis of these tests indicates that the debt/GDP, pri are not stationary in levels and integrated of order one [I(1)]. Because of variables are integrated of order one I(1), we test for co-integration using the panel co-integration test developed by Pedroni (1999, 2004) and Johansen Fisher panel co-integration test by Maddala-Wu (1999). These tests allow heterogeneous slope coefficients, fixed effects and individual specific deterministic trends.

As shown in Table 3, the results of Pedroni's (2004) panel tests indicate that the null of no co-integration can be rejected at the 5% significance level. The results of Johansen's (1988) Fisher panel co-integration test reported in Table 4, are based on Fisher's tests and support the presence of a co-integrated relationship between variables at the 1% significant level, respectively, indicating that the variables exhibit a co-integration relationship. Thus these variables move together in the long run.

To explore the short-run and long-run dynamics of fiscal sustainability we apply a generalized one-step error-correction model (ECM) in combination with panel data. The resulting equations are used in conjunction with panel Granger causality testing:

Table 3. Pedroni Co-integration Results

The null hypothesis is that the variables are not cointegrated.	Statistic (prob)
Panel v-Statistic	1.352807 (0.1598)
Panel rho-Statistic	--0.985431 (0.2455)
Panel PP-Statistic	-5.364158 (0.0000)
Panel ADF-Statistic	-2.107352 (0.0433)
	Statistic (prob)
Group rho-Statistic	1.131609 (0.2103)
Group PP-Statistic	-3.807657 (0.0003)
Group ADF-Statistic	-2.641780 (0.0122)

Table 4. Johansen Fisher Panel Co-integration Test

Hypothesis of no cointegration	Max-Eigenvalue Fisher Stat.*	Prob.	Trace Fisher Stat.*	Prob.
None	64.18	0.0000	78.33	0.0000
At most 1	53.96	0.0004	53.96	0.0004

(*)Signify rejection of the unit root hypothesis at the 1% levels, respectively.

Table 5. Panel Causality Results (Dependent variable: Debt/GDP)

Method	$F_{wald,pri}$	Error-Correction coefficient
Panel OLS	8.9883*	-0.02411**
	(0.0031)	(0.0431)
Fixed Effect	5.9841**	-0.0466
	(0.0155)	(0.1587)
Random Effect	14.7712*	-0.0198
	(0.0002)	(0.2499)

(*)(**))Signify rejection of the unit root hypothesis at the 1%, 5% levels, respectively.

With regard to table 5, the error-correction coefficients ($ECT_{(-1)}$) which contains the long-run information are negative sign for each of three methods but only statistically significant for OLS equation. This result shows that the mechanism of from short-run endogenous adjustment to long-run trend doesn't work for fixed and random effect models. For this reason, the system doesn't turn back to its long-run equilibrium. The Wald test of the primary surplus indicated a short-run causal effect running from it to debt/GDP. This result is valid for all models. Our empirical analysis reveals that there are causal relationships between variables in short-run and long-run causality and causality direction runs from primary surplus.

4. CONCLUSION

As a result of the study, it can be seen that both primary surplus and debt/output series are not stationary. In this context, it can be said that sustainability does not exist for union countries. On the other hand, according to the Panel VECM analysis results, there is not a relationship between series neither in the short or long-run. In this context, policy-makers may provide the fiscal sustainability through primary surplus by fiscal policies.

Union countries were noticed to apply many Short-term policy implementations over their economies in order to eliminate the destructive effects of the European crisis, sustainable growth and well functioning of financial markets. However, financial sustainability is not achieved by short-term policy implementation. On the other hand, it is not possible to maintain the long-term austerity. In this context, European Union countries producing anti-crisis policies will enable to prevent the future crisis by improving financial integration and producing structural policies to ensure financial sustainability.

In our study we examine the existence of financial sustainability in EMU 12 countries. In the next stage, we tested determinates of fiscal sustainability. We analyzed the relationship between debt/GDP and primary surplus for panel causality covering EMU 12 (1995-2011) using annual data.

The result on the panel co-integration tests, Pedroni (1999) and Fisher-type co-integration test by Maddala and Wu (1999) revealed that the variables are co-integrated which means statistical significance long-run relationship among the variables. The direction of relation is that primary surplus causes financial sustainability. According the panel VECM results, the direction of causality exists in the short run for all models and long-run relation is valid in Panel OLS. These findings support significant directional causality between variables.

ЕМПИРИЈСКА СТУДИЈА О ФИСКАЛНОЈ ОДРЖИВОСТИ ЕУРОЗОНЕ

Hilal Yildiz, Durmuş Çağrı Yıldırım

Извод

Економска криза утицала је на финансијску стабилност Монетарне уније негативно. Земље уније покушавају да умање краткорочне ефекте кризе применом економских полиса. Да ли ће земље уније превазићи кризу краткорочним полисама, може се проценити истраживањем њихове финансијске стабилности.

Циљ ове студије био је проучавање земље чланице Европске монетарне уније у смислу финансијске одрживости. У циљу овог истраживања употребљен је билансни панел који укључује ЕМУ 12 земље (Аустрија, Белгија, Финска, Француска, Немачка, Луксембург, Ирска, Португал, Холандија, Италија, Грчка, Шпанија) за период 1995 - 2011. Анализирани су односи између дуга/БНП и примарни вишак за панел узрочност који обухвата ЕМУ 12 земље. Резултати панелних тестова коинтеграције показали су да су варијабле међусобно повезане. Другим речима, постоји статистички значајан дугорочни однос између варијабила.

Кључне речи:Унионизација, одрживост, панел, емпиријска студија

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