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DETERMINANTS OF THE CURRENT ACCOUNT IN THE EU AND PIIGS

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Abstract

This paper investigates the relationship between current account balance and national savings, investment, budget deficit, and real exchange rate. These determinants of the current account are studied empirically by applying the Generalized Method of Moments for a sample of 24 European countries. The sample data are divided into three different groups, PIIGS, EU-PIIGS, and EU in order to study the group-specific estimations. The main result of the paper is that the determinants of our model are capable of accurately explaining past movements in current accounts for all selected groups. Additionally, current account determinants in the economically weak members, PIIGS, behave slightly differently from the rest of the EU.

JEL: F32: F41

Key Words: Current Account; European Union; Generalized Method of Moments

1. Introduction

A current account balance is one of the important measures of a country's foreign trade as it indicates the difference between the increase in residents' claims of foreign incomes or outputs and the increase in claims of foreigners on domestic income or output. A great deal of attention has been given to the disequilibrium

5

that exists in a nation's current account balances and to the policies that are responsible for adjustment mechanisms. On the one hand, current account balance is determined as the net export balance of a country where relative international prices are considered as major determinants of the current account balance (Campa and Gavilan, 2006; Bauakez and Kano 2008; Uz and Ketenci, 2013). On the other hand, the current account balance is determined as the difference between national savings and investments, where macroeconomic factors are considered to be the key determinants of current account balances (Chinn and Prasad, 2003; Bussiere et al., 2004; Brissimis et al., 2010).

Findings of Bussiere et al. (2004) indicate that countries with higher investment ratios tend to have higher current account deficits, while fiscal balance is related positively to current account balance. It was found that actual current account balances are close to their structural current account positions, which perfectly explains the deficits of the European Union countries. Belke and Dreger (2011) found that competitiveness channels are significant in determining current account balance, where real appreciation leads to an increase in external deficits.

The member States of the European Union (EU) have experienced great fluctuations in the current account balance for the last decade (Figure 1). During this period, the financial and economic crisis of 2008 had a significant negative impact on the current account of the EU-27. Since the third quarter of 2002, surplus in the current account of the EU-27 has been recorded only in the fourth quarter of 2011. The recovery was due mainly to the improvement in imports and exports of goods and services, while financial flows continued to deteriorate or grew very slowly. Annual data illustrate the fluctuations in current account deficit in the EU-27 countries (Figure 1b); however, if countries are considered in a separate group from countries that experience relatively high current account deficit (PIIGS) (Figure 1d), the recovery of current account balance after 2009 in these countries is more evident. Furthermore, the latest economic developments illustrate that the current account imbalances of European Union countries have highly negative impacts not only on member countries, but on outside partner countries as well. Hence, it indicates the great importance of empirical studies for the current account balance of the European Union's countries.

This study investigates the major determinants of the current account in the selected EU members. To this end, it studies whether there is a cointegration relationship between the current account and major variables such as the real exchange rate (RER), interest rate and the fiscal balance in new EU members. This also allows considering the effects of the government spending shock on the external sector. Understanding the factors behind the current account fluctuations could have important policy implications yet the recent episodes of macroeconomic turbulence in many emerging markets in the EU approves the increasing concerns and deserved attention on this topic.

The purpose of this paper is to determine the behaviour of the current account and the evolution of current account and its determinants. The paper employs the Generalized Method of Moments (GMM) to estimate the dynamic panel data model of the current account. The contribution of this paper is to study the determinants of current account for separate groups of 24 countries of the European Union, some of which experienced long-term current account deficit and some of which did not. The paper is structured as follows. Section 2 explains theory and model. Section 3 explains methodology and section 4 gives estimation results. Finally, section 5 gives summary and conclusion.

2. Theory and Model

The framework of the national accounts defines a clear relationship between external and internal balances within an economy.

$$Y_t = C_t + I_t + G_t + (X_t - M_t) + NFIA$$
(1)

By rearranging the variables,

$$(X_t - M_t) + NFIA = Y_t - C_t - G_t - I_t = S_t - I_t$$
 (2)

where $C_t - G_t - I_t$ is equal to the sum of private and public consumption. This means that the external account has to equal the difference of national savings and investment. This relation implies that current account is directly related to saving and investment in the economy. Therefore, the polices supporting investment have a negative impact on the current account, while policy measures reducing private or public consumption have a positive impact on the current account, because they increase national saving.

Further insights to policy implications are given by diving the national saving into public and private saving.

$$(X_t - M_t) + NFIA = (Y_t - T_t - C_t) + (T_t - G_t) - I_t = S_t^p + S_t^g - I_t$$
(3)

After inducing the real variables to the model, it becomes as follows:

$$\frac{CA_t}{P_t} = (Y_t - \frac{NT_t}{P_t} - \frac{P_{Ct}}{P_t}C_t) + (\frac{NT_t}{P_t} - G_t) - \frac{P_{It}}{P_t}I_t$$
(4)

where is CA_t the current account balance, P_t is the GDP deflator, NT_t is the taxes net of transfers, P_{Ct} is the price of final consumption goods that are purchased and P_{lt} is the price of final investment goods. So, the real current account balance is the sum of real private and public saving minus real investment. Therefore, the polices supporting investment have a negative impact on the current account, while policy measures reducing private or public consumption have a positive impact on the current account because they increase national saving. If the private savings are roughly equal to investment then the external account and public budget are directly interrelated, or twinned. According to the Mundell-Flemming approach, the external account and fiscal balance have to move in the same direction. In other words, increase in budget deficit causes an increase in interest rates that causes an increase in capital inflows and appreciation of the domestic currency thereby causing a current account deficit. Fiscal deficit is causing current account deficit, so-called the twin deficits.

Finally, this paper employs the real effective exchange rate in the estimations. An increase in the REER can decrease an economy's overall saving ratio because it increases the purchasing power of the domestic currency on foreign tradable and non-tradable goods, thereby encouraging domestic residents to purchase more imported goods. This will cause an increase in the real consumption relative to the output, thus lowering the saving ratio and the current account balance. On another hand, a rise in the real exchange rate increases the consumption-based real interest rate causing a reduction in the consumption of tradable goods and therefore a reduction in the total current consumption and improvement in the current account, or vice versa.

Based on the above discussion, the general function for the current account tested in this paper will take the following reduced form:

$$CA_{t,i} = \alpha + \beta_1 BB_{t,i} + \beta_2 INV_{t,i} + \beta_3 SAV_{t,i} + \beta_4 XR_{t,i} + \varepsilon_{t,i}$$
 (5)

where $CA_{t,i}$ denotes the current account at time t, for country i, BB is budget balance as a share of GDP, INV is gross capital formation as share of GDP, SAV is net savings values as a share of GDP, and XR is the real effective exchange rate.

3. Methodology

3.1 Unit root test

This paper used four different tests for determining the nonstationarity of the selected variables. These are the Levin, Lin, and Chu (LLC) test (Levin et al., 2002); the Breitung (Breitung, 2000) test; the Im, Pesaran, and Shin (IPS) test (Im et al., 2003); the Fisher-type tests using the ADF and PP tests (Maddala and Wu,

1999); the Choi (2001) test; and the Hadri (Hadri, 2000) test. The first one was the Levin, Lin, and Chu (LLC) test (Levin et al., 2002), which is based on orthogonalized residuals and the correction by the ratio of the long-run to the short-run variance of each variable. Although the LLC test has become a widely accepted panel unit root test, it has homogeneity restriction, allowing for heterogeneity only in the constant term of the ADF regression. Due to this homogeneity restriction, the LLC test is likely to reject the panel unit root (Fidrmuc, 2009). The second applied test was the Im, Pesaran, and Shin (IPS) test, which is a heterogeneous panel unit root test based on individual ADF tests. It was proposed by Im et al. (2003) as a solution to the homogeneity issue. This test allows for heterogeneity in both the constant and slope terms of the ADF regression. As in the LLC test, the null hypothesis of the IPS test is that each series has a unit root for all cross-section units and the alternative hypothesis inserts that at least one unit of the panel is stationary rather than the more restrictive alternative hypothesis of the LLC test. Finally Maddala and Wu (1999) and Choi (2001) proposed an alternative approach by using the Fisher test, which is based on combining the P-values from the individual unit root,, test statistics such as ADF and PP. One of the advantages of the Fisher test is that it does not require a balanced panel.

3.2 Generalized Method of Moments

There are mainly three common problems in the econometric analyses. These are endogeneity (the simultaneous determination of response variable and regressor), omitted-variable bias, and finally, errors in variables (measurement error in the regressor). Even though they may be caused by different factors, it is the same econometric tool that is used to solve these problems, the instrument variables (IV) estimator. Baum (2006) explains the use of IV estimators and the summary is given as follows. A variable is endogenous if it is correlated with the disturbance. In the model:

$$y = \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k + u$$

 x_j is endogenous if $Cov[x_j,u]=0$. x_j is exogenous if $Cov[x_j,u]=0$. The "Generalized Method of Moments" (GMM), first introduced by Hansen (1982), is an economteric framework that allows estimating the parameters of models that deal with endogenous variables. Economists often model endogenous variables that are determined by each other and some additional exogenous variables. In this model we specify and instrument for x_j that is uncorrelated with u but highly correlated with x_j . In an economic model, this is termed the identification problem, what will allow us to identify or trace out y. So we are looking for two properties: instrument z must be uncorrelated with u, $Cov[x_j,u]=0$, but highly correlated with x_j , $Cov[x_j,u]=0$. We cannot test the first property because it involves a correlation between the IV and unobserved error. However, we can test the second property as follows:

$$x_j = \pi_1 + \pi_2 z_j + \zeta$$

if we fail to reject the null hypothesis H_0 : π_2 =0, we conclude that z is not a valid instrument. So, the use of valid instruments in the model takes the matrix form as follows:

$$y = X\beta + u$$

where β is the vector coefficients (β_1 , β_2 , β_3)' and X is Nxk. Define a matrix of the same dimension as X in which the exogenous regressor is replaced by z. Then it takes the following form:

$$Z'y = Z'X\beta + Z'u$$

The assumption that Z is unrelated to u is shown as 1/N(Z'u) and it goes to zero in probability as N becomes large and the estimator $\hat{\beta}$ takes the following form:

$$Z'y = Z'X\hat{\beta}$$

$$\hat{\beta} = (Z'X)^{-1}Z'y$$

The assumption that the instruments z are exogenous can be expressed as a set of moment conditions $\mathbb{E}[\mathbf{z}\mathbf{u}]=0$. The 1 instruments give us a set of 1 moments:

$$g_i(\beta) = Z'_i u_i = Z'_i (y_i - x_i \beta)$$

where g_i is 1 x1 orthogonality conditions. To drive the GMM estimator, replace the above equation by its empirical counterpart. Then the equation becomes as follows:

$$\overline{g}(\beta) = \frac{1}{N} \sum_{i=1}^{N} g_i(\beta) = 0$$

The above equation shows we have 1 sample of condition. If the equation is exactly identified then 1 = k, where we can solve the 1 moment conditions for the k coefficients in $\hat{\beta}_{GMM}$ that solves $\overline{g}(\beta_{GMM}) = 0$.

If 1 > k, then we have moment condition and so the parameters to estimate. The GMM estimator chooses the $\hat{\beta}_{GMM}$ that minimizes in the following equation.

$$J(\hat{\beta}_{GMM}) = N\overline{g}(\hat{\beta}_{GMM})'W\overline{g}(\hat{\beta}_{GMM})$$

where W is an 1 x 1 weighting matrix that accounts for the correlations among the $\overline{g}(\hat{\beta}_{GMM})$ when the errors are not i.i.d. The GMM estimator is defined as the following:

$$\hat{\beta}_{GMM} = (X'ZWZ'X)^{-1} X'ZWZ'y$$

The results of the minimisation will be identical which will be identical for all W matrices which differ by a factor of proportionality. The optimal weighting matrix, as shown by Hansen (1982), chooses $W = s^{-1}$, where S is the covariance matrix of the moment conditions to produce the most efficient estimator:

$$S = E[Z'uu'Z] = E[Z'\Omega Z]$$

With a consistent estimator of S derived from 2SLS residuals, we define the feasible IV-GMM¹ estimator as the following:

 $\hat{\beta}_{\textit{FEGMM}} = (X'Z\hat{S}^{-1}Z'X)^{-1}X'Z\hat{S}^{-1}Z'y$

where F Moment condition is equal to the identification of restrictions, which is also equal to instruments. The validity of the instruments can be assessed by using J-test by Hansen (1982). It is used to test for overidentification, in other words, it explains whether the orthogonality conditions are right. J-value is the minimised value of the objective function and it is calculated as:

$$\frac{1}{T}u'Z(s^2Z'Z/T)^{-1}Z'u$$

where Z is the matrix of instruments, u is error term and s^2 is the estimated residual variance (square of the standard error of regression). J-value (J_T) is a weighted sum of squared deviations of the sample moments from 0. J-value multiplied by the number of observation is equal to χ^2 with degrees of freedom, where H_0 : overidentifying restrictions are satisfied. If we reject H_0 , it could be for one or more of a number of reasons. For example, there may be model misspecification or use of invalid instruments, or the model may be correct but the finite sable distribution of J_T is substantially different from the asymptotic distribution. The Sargan test (Sargan, 1958) is a version of the J-test and it examines the correlation between the residuals from the instrumental variables estimation and the instruments. The Sargan test (Sargan, 1958) is a version of the J-test and it examines the correlation between the residuals from the instrumental variables estimation and the instruments.

The major focus of the analysis starts with the distinction of within-country and cross-country effects. The within-country effects model includes country-specific factors. The regression equation becomes as follows:

$$CA_{t,i} = c + \beta X_{i,t} + \eta_i + u_{i,t}$$
 (6)

¹⁾ FEGMM refers to the feasible efficient GMM estimator.

where X is a set of economic determinants of current account; η_i represents country-specific factors. In the cross-country effects country-specific factors are not controlled.

$$CA_{t,i} = c + \beta X_{i,t} + \mu_{i,t} \tag{7}$$

One of the possible reasons for choosing a panel analysis is to be able to control for individual heterogenity. We test the model for current acount and it is modeled as a function of budget balance, investment, savings, and real effective exchange rates. These variables vary with country and time. We also consider the past values of explanatory variables as instruments in the resulting estimates. Additionally, the fixed effects model was used for the GMM because the countries studied in this paper are not selected randomly. They are EU member countries, but the study includes three different panels. The first group selects all EU members (except Luxembourg, Hungary, and Malta due to the non-availability of data). The second group selects the five economically weaker eurozone members, Portugal, Italy, Ireland, Greece, and Spain, known by the acronym PIIGS. The last group includes EU members without the PIIGS. The aim of this study is to test the behaviour of current account determinants for different groups of countries, including country-specific effects in our analysis.

4. Empirical Results

GMM estimations require stationary data, therefore the empirical results will first report the panel unit root tests. Table 1 shows the results of the unit root tests employed in the study. In the unit root tests, the appropriate lag lengths are determined with the automatic selection of the Akaike Information Criteria (AIC). CA, BB, INV, SAV, and XR represent variables such as current account, budget balance, investment saving, and exchange rate, respectively.

Table 1. Panel unit root tests

		LLC	IPS	PP	Fisher
EU	CA	-1.324	-2.630*	324.168*	83.529*
	BB	1.095	-4.107*	474.899*	84.502*
	INV	1.401	-2.582*	281.139*	71.191*
	SAV	3.434	-0.330	355.602*	60.684
	XR	-2.948*	-1.394	53.037	64.795
EU-PIIGS	CA	-2.300*	-3.019*	268.157*	75.199*
	BB	0.771	-3.661*	386.695*	65.809*
	INV	-0.597	-3.651*	241.559*	68.353*
	SAV	0.927	-2.579*	318.277*	59.385*
	XR	-1.534	-1.032	36.111	49.693
PIIGS	CA	1.575	0.058	56.011*	8.331
	BB	0.363	-1.862*	88.204*	18.693*
	INV	2.783	1.362	39.580*	2.839
	SAV	3.955	4.340	37.325*	1.298
	XR	-3.302*	-1.031	16.927	15.102

^{*-}denotes absence of the unit root

For the group of EU member counties, all of the variables were found to be stationary, at the 5 per cent critical level, except for the SAV and XR variables. Only one out of four tests rejected the hypothesis of non-stationarity for these variables. In the group of EU members that excludes PIIGS countries, enough evidence was found to conclude that all variables except XR do not have unit root, while unit root process was found by all tests only in the XR variable. On the other hand, estimating panel of PIIGS countries all variables except BB were found to be non-stationary, whereas BB variable was found to be stationary, where 3 out of 4 tests rejected the hypothesis of the unit root process. In further estimations first differences were used for non stationary variables.

Table 2. GMM Estimations

	GMM				FEGMM	
С	EU 0.194***	EU-PIIGS 0.129***	PIIGS -0.004**	EU 0.108***	EU-PIIGS 0.133***	PIIGS -0.003*
	(0.0213) (0.0069)		(0.0073) (0.0018)		(0.0018)	(0.0121)
BB	0.008*** (0.0010) (0.0003)	0.001**	0.000 (0.0004) (0.0003)	0.002***	0.000 (0.0002)	0.000 (0.0005)
INV	-0.009*** (0.0009) (0.0004)	-0.008***	-0.011*** (0.0003) (0.0006)	-0.006***	-0.008*** (0.0005)	-0.010 *** (0.0005)
SAV	-0.022*** (0.0005) (0.0023)	-0.007***	0.006** (0.0026) (0.0023)	-0.022***	-0.011*** (0.0024)	0.005 ** (0.0042)
XR	-0.004*** (0.0012) (0.0008)	0.006***	0.006*** (0.0005) (0.0003)	0.000	0.006*** (0.0003)	0.006 *** (0.0006)
No of Inst.	9	11	9	35	29	15
Sargan	0.27	0.34	0.58	0.46	0.57	0.58

^{*, **, ***} indicate significance at 10%, 5% and 1% levels, respectively. Standard errors for the coefficient estimates are given in parenthesis. Sargan p values are reported.

Both EU estimations and EU excluding PIIGS estimations with GMM show that all of the variables used are statistically significant. There is a positive relationship between current account and budget balance that favours the existence of the twin deficit phenomenon where budget deficit causes current account deficit. The results show a negative relationship between current account and exchange rate. In other words, the appreciation of the domestic currency causes current account deficit. This is also consistent with the literature and related theories. Furthermore, there is a negative relationship between current account and investment. This is also consistent with the literature. Finally, our results found a negative relationship between current account and ss. Theories expect a positive relationship between current account and savings, assuming investment is constant. However, when the country has large budget deficit, this reduces national savings and sometimes the reduction in savings reduces investment to such a degree that it causes current account improvement. If this reduction in national savings is not offset by a decrease in investment, then it would cause a reduction in exports, leading to deterioration in current account.

For the GMM estimations as PIIGS are excluded we found that reduction in savings causes further reduction in investment which increases current account balance. So, in other words, investment is more important than the national savings in determining the current account. For the PIIGS, however, changes in sav-

ings are associated with changes in current account. We found similar results for the relationship between current account and variables such as investment and savings in the GMM, including the cross-section fixed effect. Budget balance is not statistically significant for PIIGS and EU, excluding PIIGS. Finally, the relationship between current account and exchange rate is negative in EU with GMM and positive in the rest of the estimations. It is common in the literature to have mixed relations between current account and exchange rate. The positive relationship, in other words, the appreciation of domestic currency causing improvement in current account, can be explained by the short and medium term of the J-curve.

5. Summary and Conclusion

This paper examined the behaviour and determinants of the current account for a sample of 24 European countries. Estimations were made for three different groups of European countries, PIIGS, EU and EU without PIIGS countries. A Generalized Method of Moments was applied to test the model of current account as a function of budget balance, investment, savings, and real effective exchange rates. The analysis included estimations with and without country specific effects. The results of estimations indicated that coefficients are statistically significant and values of coefficients are similar in both models. Inclusion of country-specific effects did not improve the model.

The results of estimations provide enough evidence to conclude that the budget balance, national savings, investments, and real exchange rate determine the current account in the medium term. Our results show the existence of the twin deficit phenomenon for the EU countries. Our results support a negative relationship between investment and current account for the selected groups. Analysis of the behaviour of PIIGS and the rest of the EU provide enough evidence to conclude that behaviour of the CA determinants are different for these two regions. Increases in national savings cause improvements in PIIGS, but deterioration in the rest of the EU. Current account for the EU members excluding PIIGS is highly determined by the investment decisions rather than national savings.

Appendices

Appendix 1. Data

This study covers quarterly data for the period 2000Q1-2011Q4 for 24 EU members, Austria, Belgium, Bulgaria, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom. Selected member countries are studied in three different panels. In the first panel, all of the countries are included, in the second panel the so-called PIIGS, namely Portugal, Ireland, Italy, Greece and Spain, are excluded from the whole sample, and in the final panel, only the PIIGS are included.

CA Current account balance (as a % of GDP)

BB Budget balance (as a % of GDP)

SAV Net Savings (as a % of GDP)

INV Gross capital formation (as a % of GDP)

XR Real Effective Exchange Rates (deflator: consumer price indices, including 27 trading partners, index as 1999=100) (increases denotes real appreciation of domestic currency)

All data are obtained from the official site of the EU, the Eurostat.

Appendix 2. Figures

Figure 1.a

Current account balance of EU-27
(in million Euro)

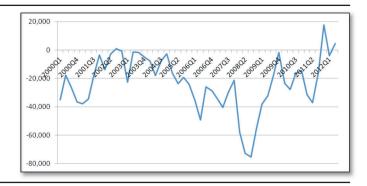


Figure 1.b

Current account balance of EU-27
(as the share of GDP)

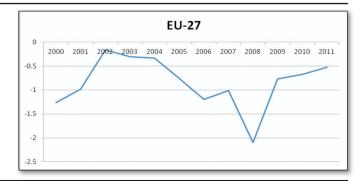


Figure 1.c

Current account balance in PIIGS
(as the share of GDP)

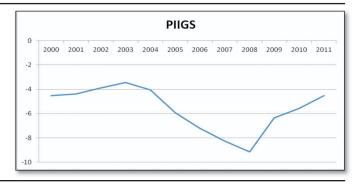
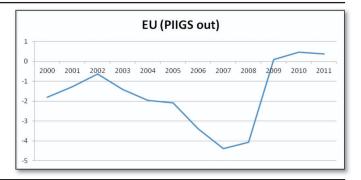


Figure 1.d

Current account balance in the EU except PIIGS

(as the share of GDP)



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