

INTERTEMPORAL APPROACH TO THE BALANCE OF PAYMENT OF THE EUROZONE COUNTRIES¹

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—Abstract—

The intertemporal current account approach is based on an analysis of relation between domestic savings and investments. In this paper we use intertemporal approach to the current account and test relationship between the level of domestic investments and savings in order to see whether they are relevant for explaining the evolution of the current account of single Eurozone members during the period of 2000-2009.

We distinguish between The “Old” Eurozone members who entered Eurozone at the beginning of 1991 and The “New” Eurozone members such as Slovenia, Slovakia and Estonia who have become members only recently. Such a comparison enables us to compare development of the balance of payment with respect to intertemporal approach before and after joining the Eurozone.

Key Words: *balance of payment, intertemporal approach, Eurozone*

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1. INTRODUCTION

The relationship between level of investment and saving in economy and its relationship to current account balance has been widely discussed over the last few decades. Since the first publication of the Feldstein and Horioka working paper (1979) the question whether the assumption of high international capital mobility is relevant for macroeconomic modeling has been analyzed and reviewed in the light of internationalization of capital markets or establishment of common monetary union in Eurozone.

The purpose of this paper is therefore to test hypothesis whether the accession of some European countries to common monetary union in 1998 has come hand in hand with increase in the level of capital mobility. Based on this prediction we assume that an increase in overall capital mobility should be significant and observed throughout the period of the last ten years.

Additionally, we would like to compare our estimation with the current situation of the group of new member countries which have accessed the Eurozone during the last five years. As those countries are mostly considered as countries in transition we expect the level of capital mobility to be approximately the same or slightly lower as in the case of developed countries (Brada, Mandel and Tomšík, 2008:159).

The analysis described in this paper will proceed in next steps.

First, we use panel data for the time period from 2000 to 2009 for the level of saving, investment and GDP and estimate value of the Feldstein-Horioka coefficient for level of international capital mobility. Second, we estimate change in this coefficient over the last ten years using simple panel data regression for 2 periods. Finally, relationship between the level of savings and investments in domestic country to the current account balance is examined by linear regression for panel data. All these steps are repeated for the group of The “Old” Eurozone member countries as well as for the group of The “New” Eurozone member countries.

2. THEORETICAL OVERVIEW

2.1. Basic macroeconomic identities

The relationship between the level of investment and savings in economy can be derived from basic macroeconomic identity for GDP composition. By neglecting the government expenditure we may write as follows:

$$S = GDP - C$$

$$NX = EX - IM$$

$$GDP = C + I + EX - IM$$

where GDP represents abbreviation for gross domestic product, C for consumption, I for investment (gross capital formation), EX for export of goods and services and IM for import of goods and services, S for national saving. By using substitution method the previous equations may be rewritten as follows:

$$EX - IM = S - I$$

Based on the last equation, it is evident why it is necessary to analyze the relationship between domestic saving and investments with regard to international trade and current account balance. Clearly, the higher level of international capital mobility the stronger the influence of capital movements on evolution of current account.

2.2. Description of the regression model

For our further analysis we will consider concept suggested by Feldstein and Horioka (1979) but adjusted for the needs of panel regression with fixed effect for both cross-sectional as well as time component. In our analysis we examine relationship between the ratio of domestic investments to GDP and ratio of domestic savings to GDP. The estimated **model of type 1** is therefore specified as follows:

$$\frac{I_{i,t}}{GDP_{i,t}} = \beta_1 \frac{S_{i,t}}{GDP_{i,t}} + a_i + \delta_t + u_{it}$$

where a_i represents fixed effect for cross-section part, δ_t represents time fixed effect and u_{it} represents errors term which is expected to follow white noise process. By including the cross-sectional fixed effect we eliminate unobserved differences in the level of gross capital formation among different countries in our sample groups. Including of the time fixed-effect enables us to capture factors which might have affected the level of investments within all countries simultaneously and varied over time.

Our hypothesis states that coefficient β_I – Feldstein-Horioka coefficient is expected to be statistically significant and at the same time lower than 1. Moreover, the lower the value of the coefficient β_I , the higher the level of international capital mobility for selected countries.

In order to be able to evaluate the evolution of capital mobility during the period from the accession to common monetary union up to today we regress two-period panel data **model of type 2** in following form:

$$\frac{I_{i,t}}{GDP_{i,t}} = \beta_0 + \delta_0 * _009q4 + \beta_1 \frac{S_{i,t}}{GDP_{i,t}} + a_i + u_{it}$$

where $_009q4$ is a dummy variable with value equals 1 for the 4th quarter of 2009 and zero for the 1st quarter of 2000. Interpretation of all other variables in this model follows the interpretation related to the first model described above. In the case of the group of The “Old” countries, by using this regression we will estimate the change in the level of capital mobility over the last 10 year, e.g. during the period of their membership.

By regressing data for the group of new member countries we will be able to evaluate evolution of capital mobility before their accession and shortly after the joining. Estimated coefficients will be compared with results from Blanchard and Giavazzi (2003:37).

Finally, in order to estimate possible impact of savings and investment on the current account balance we will run regression by **model of type 3** in the form as described below:

$$\frac{CA_{i,t}}{GDP_{i,t}} = \beta_1 \frac{S_{i,t}}{GDP_{i,t}} + \beta_2 \frac{I_{i,t}}{GDP_{i,t}} + a_i + \delta_t + u_{it}$$

The structure of this regression is equivalent to the structure of model of type 1 except of using new explanatory and dependent variables. From this reason the interpretation of fixed effects and error variable remains unchanged. Coefficients β_1 and β_2 might be used as a measure of relative response of current account to the level of domestic savings/investments.

Finally, it is necessary to point out that the estimated results are possibly to be inconsistent because of the small number of observations in the cross-sectional part of panel data (only 3 countries) and therefore interpreted very carefully especially for the group of The “New” Countries..

2.3. Data description

Data used for our regression estimation are taken all from Eurostat database as the major source for information related to Eurozone and European Union member countries. All data are denominated in domestic currencies.

In our analysis we consider time period starting from 1st quarter of 2000 to the 4th quarter of 2009 in order to be able to include data for Greece to our analysis.² Because of the missing data for variable gross domestic savings for Luxemburg we do not include this country into our analysis³.

In order to distinguish between the different time of the accession among current Eurozone member countries we have created two separated groups as specified below:

- The “Old” Countries – the countries that accessed Eurozone effectively to 1999, January 1st including Greece which joined 2001 and excluding Luxemburg.
- The “New” Countries - the countries that accessed Eurozone after Greece accession. This group includes data for Slovenia, Slovakia and Estonia exclusively as data for Malta and Cyprus are unavailable in Eurostat database and therefore are not included in our analysis.

2.4. Estimated results

The estimated results from regression of **type 1 model** are shown in the Table-1. As far as the level of international capital mobility is concerned the group of The “Old” Countries reports coefficient of 0.12 which shows a pretty strong international mobility of capital for the countries listed in this group. Moreover, this coefficient is highly statistically significant (t-statistics more than 4).

According to the Blanchard and Giavazzi (2003:37) the Feldstein-Horioka coefficient as a measurement of international capital mobility is 0.14 for 11 old members of Eurozone for the period 1991 – 2001⁴. Our results are therefore in

² The data for Greece were not available for year 1999.

³ Although we could include relevant data for Luxemburg taken from different sources in seek of consistency the Luxemburg is excluded.

⁴ Blanchard and Giavazzi use the same group of Eurozone member countries in their estimation therefore their results are comparable.

accordance with their findings; moreover current data show only small change in the level of capital mobility in the last decade. Apparently, the Feldstein-Horioka paradox has vanished as the integration of European countries has continued even without establishment of common monetary union. Over the last decade we see no further improvement what may indicate that integration of national economies into international capital markets has been almost completed.

More controversial are results for regression of The “New” Countries group as visible in the Table-1. Surprisingly, the value of coefficient β_1 is not statistically distinguishable from zero which is in contradiction to our hypothesis. Apparently, the intense engagement in international economy and the high openness of those countries toward international trade makes the level of international capital mobility almost perfect for them.

While taking possible flaws of the model into consideration as described in the previous section, it is still necessary to point out that even the possibility of almost perfect capital mobility in new Eurozone member countries needs to be strongly emphasized.

Table-1: Results of estimated regression for type 1 model (2000Q1 – 2009Q4)

Dependent Variable: RATIOCAP				
The "Old" Countries				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.189430	0.006067	31.22524	0.0000
RATIOSAV	0.126040	0.028860	4.367245	0.0000
R-squared	0.688608	Mean dependent var	0.215640	
Adjusted R-squared	0.648584	S.D. dependent var	0.031369	
The "New" Countries				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.303920	0.026230	11.58669	0.0000
RATIOSAV	-0.156738	0.115466	-1.357439	0.1786
R-squared	0.666512	Mean dependent var	0.268478	
Adjusted R-squared	0.484610	S.D. dependent var	0.038317	

Source: Own computation

In the next step of our analysis we would like to take a look on the estimated evolution of level of capital mobility in our two sample groups. As the results for period 2000 – 2009 relevant for the group The “Old” Countries are almost

indistinguishable from the level of capital mobility in previous period of 1991 - 2000 we do not expect finding of significant results in our analysis.

As shown in the Table-2 neither the data for the group The “Old” Countries nor the estimation for the group The “New” Countries are statistically significant at 5% or even higher levels.

Apparently, new member countries are characterized by high level of capital mobility even before their Eurozone accession. This result is in accordance with the situation in the group of The “Old” Countries when we observe substantially high level of capital mobility during the last ten years even before their joining to Eurozone. Moreover, the level of capital mobility has not changed after their accession at all and that is likely to be observed also in the new member countries. From this reason our results support the idea of highly synchronized characteristics of countries that are about to join common currency union.

Table-2: Results of estimated regression for type 2 model (2001Q – 2009Q)

Dependent Variable: RATIOCAP Cross-section fixed (dummy variables)				
The "Old" Countries				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.133508	0.057347	2.328070	0.0449
009Q4	-0.013104	0.016745	-0.782567	0.4540
RATIO SAV	0.409468	0.268817	1.523219	0.1620
R-squared	0.585703	Mean dependent var		0.205897
Adjusted R-squared	0.033306	S.D. dependent var		0.033137
The "New" Countries				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.255926	0.039721	6.443095	0.0076
009Q4	-0.029924	0.015456	-1.936112	0.1483
RATIO SAV	-0.057987	0.162334	-0.357208	0.7446
R-squared	0.558783	Mean dependent var		0.228091
Adjusted R-squared	0.264638	S.D. dependent var		0.021087

Source: Own computation

Finally, we would like to estimate significance of relationship between the level of domestic savings/investments and the current account balance of Eurozone member countries. Based on the results shown in the Table-3 we may conclude

that all explanatory variables are statistically significant and therefore relevant for our further analysis.

Additionally, our hypothesis regarding the expected positive relationship between the level of domestic savings and current account balance and negative relationship between the level of domestic investments and current account balance respectively is confirmed. On average, domestic savings are characterized by lower impact on current account than domestic investments.

Table-3: Results of estimated regression for type 3 model (20001Q – 20094Q)

Dependent Variable: RATIOCA Cross-section fixed (dummy variables) Period fixed (dummy variables)				
The "Old" Countries				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.027720	0.013663	2.028933	0.0432
RATIOSAV	0.591919	0.035651	16.60333	0.0000
RATIOCAP	-0.741008	0.061188	-12.11040	0.0000
R-squared	0.884172	Mean dependent var		-0.009643
Adjusted R-squared	0.868626	S.D. dependent var		0.061555
The "New" Countries				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.104839	0.040829	2.567771	0.0122
RATIOSAV	0.584113	0.109800	5.319790	0.0000
RATIOCAP	-1.090424	0.107095	-10.18187	0.0000
R-squared	0.857393	Mean dependent var		-0.055833
Adjusted R-squared	0.776708	S.D. dependent var		0.054707

Source: Own computation

This difference is even more noticeable in case of The “New” Countries group where approximate impact of domestic level of capital is almost twice as high as in old Eurozone member countries. Not surprisingly, countries in transition accounts for higher sensitivity towards the gross capital formation as a potential source of their high-speed growth.

Interestingly, a ratio of average variation in domestic savings⁵ to variation in domestic investments is almost one and half. This implicates that higher fluctuation in savings is accompanied with lower impact on current account balance. Almost perfectly elastic capital mobility enables countries to borrow on international capital markets and financed their investments with help of international capital. Through this channel the impact of domestic investments on current account balance may be amplified relatively to the level of domestic savings.

3. CONCLUSION

In this paper the intertemporal approach to the balance of payment has been used in order to estimate evolution of level of international capital mobility. Our analysis is based on the Feldstein-Horioka concept of relationship between domestic level of savings and investments as a tool for measurement of international capital mobility.

We estimate the impact of savings and investments on current account balance by conducting a panel data regression in three steps. Firstly, by estimating the value of Feldstein-Horioka for domestic savings and investments in group of old and new Eurozone member countries we may conclude that the level of international capital mobility is substantially high and almost perfectly elastic in the case of new member countries.

Additionally, the accession to common monetary union has not been followed by improvement in international capital mobility in the group of old members. This may indicate that the integration process toward international capital markets had fully completed already before the establishment of Eurozone.

Currently, the new Eurozone member countries are in the same situation as old members approximately 10 years ago. Almost perfect capital mobility indicates that synchronization of business cycle achieved before full integration into monetary union may be also applied to the level of capital mobility.

⁵ Variation in the volume of domestic savings or investments is measured by its standard deviation computed for every single country and then taken as a simple average for group of countries. Average standard deviation for The "New" Countries group is 0.3 for savings and 0.3 for investments. Average standard deviation for The "Old" Countries group is 0.33 and 0.18 for investments.

Another possible explanation for our findings is related to the gross capital stock formation and its relevance as a source of high-speed growth of countries in transition. Higher level of openness toward international capital flows is necessary in order to finance extended formation of capital stocks. Throughout the channel of internationally mobile capital countries in transition may further fuel their expansion which is eventually reflected in the current account balance.

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