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UDK 339.92:336.748

ECONOMIC INTEGRATIONS AND PURCHASING POWER PARITY ASSUMPTION

Abstract

The goal of the paper is to investigate in which way economic integration and economic relations affect mean reverting properties of real exchange rates. We have employed unconstrained and constrained augmented Dickey-Fuller unit root test and Im Pesaran Shin panel unit root test in order to investigate mean reverting properties of real exchange rates in transition, ASEAN, MERCOSUR countries and China vis à vis Germany and the USA. Our analysis is interesting due to the fact that it provides evidence of the impact of (further) integration on the problems with price competitiveness in EU and EMU periphery countries. Evidence suggests that economic relations of ASEAN and MERCOSUR countries vis à vis the USA and transition countries vis à vis Germany are affecting mean reverting properties of relative exchange rates. In all three groups of countries evidence of stationarity of real exchange rates is much stronger vis à vis major economic partner.

Keywords: *regional integrations, PPP, LOOP, the border effect, the power proble*

1. INTRODUCTION

The goal of this paper is to investigate the effect of regional economic integrations on mean reverting properties of real exchange rates in the second half of the twentieth century in Latin American, Asian and East European countries vis à vis the USA and Germany.

Having in mind Euro crises and problems with price competitiveness in periphery EU and EMU countries, estimated impact of economic integration on mean reverting properties might result with a clear policy recommendations. In the case that stronger integration results with stronger/faster mean reverting properties of real exchange rates, stronger economic integration might be suggested as a remedy for price divergence problems.

The paper is based on a comprehensive literature on testing the long-run validity of Purchasing Power parity (PPP), or equivalently the stationarity of the real exchange rate (RER) (Rogoff 1996, Sarno and Taylor 2002), and literature based on border effect on trade flows and law of one price (LOOP) (Engel and Rogers 1996).

According to the theories of PPP, LOOP and "border effect", stronger economic links and trade flows between countries should result in a faster convergence of relative prices. Methodology is based on the comparisons of number of the cointegrating vectors in constrained and unconstrained time series and panel tests between China, transition, ASEAN and MERCOSUR countries. In order to test for mean reverting properties of real exchange rates,

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we have employed augmented Dickey-Fuller (constrained) test and Johansen cointegration technique (unconstrained) test for each country bilaterally and Im-Pesaran-Shin (IPS) panel test for ASEAN, CEEC and MERCOSUR group of countries together with the USA and Germany as numeraire countries.

The remainder of the paper is divided into four sections. Section 2 provides a theoretical justification of real exchange rate convergence and border effect. Section 3 discusses the data and provides an overview of statistical methodology. Section 4 presents and discusses the results and Section 5 concludes.

2. PPP AND REGIONAL INTEGRATIONS

Mean reverting properties of real exchange rates (PPP assumption) are traditionally tested with unit root tests and cointegration tests. Rejection of the null hypothesis of unit root or zero cointegrating vectors is usually accepted as a proof of mean reverting properties of real exchange rates. Due to persistence of deviations and volatility of real exchange rates, both tests are faced with the lack of power to reject null hypothesis when performed on small number of observations – the Power Problem (Rogoff 1996, Sarno and Taylor 2002).

2.1. THE POWER PROBLEM

The basic idea behind the power problem was that if the real exchange rate reverts toward its mean over long periods of time, then the examination of one real exchange rate over a period of twenty-five years or so may not yield enough information to detect slow mean-reversion towards PPP. Artificially generated processes have indicated that for the speed of mean-reversion typically recorded in the literature (half-life of 2.5-7.3 years), the probability of rejecting the null hypothesis of a random walk real exchange rate, in the case when the real exchange rate is mean reverting, would only be between 5 and 7.5% for 15 years of data (Sarno and Taylor 2002, Lothian and Taylor 1997).

The first approach considered in the literature to circumventing the low power problem of conventional tests was to employ long-span data. Frankel (1986) rejected the null hypothesis for dollar-sterling real exchange rate using annual data from 1869 to 1984, Edison (1987) over 1890-1978 and Abuaf and Jorion (1990) rejected the random walk for eight countries during 1901-1972.

The alternative response to the power problem was the use of panel data studies to expand the range of countries (real exchange rates) being considered. The study of Abuaf and Jorion (1990) has stimulated a strand of literature which employs multivariate generalization of unit-root tests in order to solve the power problem. Abuaf and Jorion (1990) tested the null hypothesis for ten series in the float period. Results indicated a marginal rejection of the null hypothesis of joint nonstationarity at conventional nominal levels of significance.[3]

Prevailing consensus in both types of studies is that despite of some limitations to both the long-horizon and cross-section results on long-run convergence to PPP, it is possible to conclude that deviations tend to dump out, although only at the slow rate with half-life of 2.5-7.3 years (Rogoff, 1996; Sarno and Taylor, 2002).

3 See (Rogoff, 1996) and (Sarno and Taylor, 2002) for complete list of empirical tests

2.2 THE BORDER EFFECT AND TRADE REDIRECTION

Together with PPP studies, another string of research based on LOOP testing developed – "the border effect". Basic idea behind the approach is the fact that international and intranational borders distort relative prices and trade flows.

Engel (1993) discovered strong empirical regularity that the consumer price of a good relative to a different good within a country tends to be much less variable than the price of that good relative to a similar good in another country. This fact holds for all goods except for very simple, homogenous products. Engel suggested that models of the real exchange rate are likely to predict this relation, therefore this fact may provide a useful gauge for discriminating among models.

Parsley and Wei (1996) tested LOOP for 51 prices in 48 US cities. They found convergence rates substantially higher than what is typically found in cross-country data: that convergence occurs faster for larger price differentials and that rates of convergence are slower in cities situated farther apart from one another. Engel and Rogers (1996) discovered that distance between cities can explain the considerable amount of the price differential between 14 categories of consumer prices between US and Canadian cities. Furthermore, they found evidence that price differentials are considerably larger in two cities of different countries than in two equidistant cities of the same country.

The estimates of Engel and Rogers (1996) suggest that crossing the national border – the so called "border effect" – increases the volatility of price differentials by the same order of magnitude as would be generated by the addition of between 2,500 and 23,000 extra miles to the distance between cities considered. Rogers and Jenkins (1995) find similar results providing evidence that "the border effect" increases not only the volatility of price differentials but also their persistence. Gorodnichenko and Tesar (2009) show that border effect might be driven by intranational heterogeneity of prices and that there is not a clear benchmark we can use to separate the effect of border from the country heterogeneity effect.

McCallum (1995) showed that intranational trade flows are, ceteris paribus, 22 times larger than international trade flows. In a similar way to national borders, intranational borders account for a significant fraction of the decreased trade flows across states (Wolf 2000) and provinces (Helliwell and Verdier 2001).

2.3 THEORETICAL EXPECTATION

Empirical studies performed on LOOP and the "border effect" testing suggest that intra and international borders affect trade flows (home bias) and relative price. Closed borders dampen market mechanisms and increase volatility and persistence of price and the real exchange rate deviations. Economic integrations and cooperation, on the other hand, indicate opposite effects. Having in mind that there is a stronger bound between ASEAN and MERCOSUR countries to the US, this theory suggests that mean reverting properties in these countries should converge much faster vis à vis the US. Naturally, it is expected that transition countries should exhibit stronger convergence vis à vis Germany.

In order to test the hypothesis that regional integrations and trade help to eradicate persistence and volatility of real exchange rates, mean reverting properties of real exchange rates between MERCOSUR, ASEAN and transition countries (vis à vis Germany and the USA) are tested. If the theory is correct, mean reverting properties of real exchange rate are going to be stronger within groups of countries that are major economic partners or countries which are in the process of economic integration.

According to available data for 2010, EU27 share in MERCOSUR trade is 20.3% and 10.3% for ASEAN countries. USA share is 11.7% for MERCOSUR and 9.4% for ASEAN trade (DG Trade 2011). When it comes to Central and Eastern Europe, trade share of the entire North America was between 1.6 and 6%, while share of EU-15 was 49 and 60% in 2003 (ITS 2004).[4]

Obviously, the biggest difference between trade shares between EU and USA is present in the case of Eastern Europe. Therefore, it is reasonable to expect much faster and much significant convergence of relative prices between Germany (EU-15) and Central and Eastern Europe, compared to ASEAN and MERCOSUR countries, where inter-trade shares with EU are much smaller (compared to CEE). When it comes to USA shares in ASEAN, and MERCOSUR, EU-27 has slightly larger share of trade, but without CEE the opposite is the case.

Additional point emerges if we analyze inter and intra trade patterns of ASEAN, MERCOSUR and EU-27 during 2001-2010 (Figure 1, Figure 2 and Figure 3). There is one peculiar difference between EU-27 and two other regional integrations. Intra export and import are much larger in EU compared to ASEAN and MERCOSUR where majority of trade is still outside of the integration. Having in mind that most of the intra trade between EU-12 and EU 15 is euro based trade and most of the global trade is still dollar based trade, it is reasonable to expect that stronger mean reverting properties MERCOSUR and ASEAN vis a vis dollar and in transition countries vis a vis euro.

3. THE DATA AND STATISTICAL ANALYSIS

In order to test the validity of Purchasing Power Parity assumption relating to various economic integrations we used a large data set referring to 29 countries. The nominal exchange rate with respect to USD and DM and domestic price level (CPI) were compiled for each country. Exchange rate series are expressed in direct quotation, and CPI data is in indices form (2000=100). All series are in monthly frequencies, spanning at most from 1960:1 to 2007:10, and expressed in natural logarithms.

Countries were classified into 3 groups: ASEAN, MERCOSUR countries and transition countries. Argentina, Brasil, Chile, Paraguay and Uruguay were set as MERCOSUR countries. ASEAN group consisted of Singapore, Malaysia, Thailand, Indonesia, Japan, Cambodia, Vietnam and Laos. The most numerous group of countries are transition countries: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Slovakia and Slovenia. As an outlier, data for China was tested separately.

Unconstrained approach tests for cointegration between price levels of each country (generally measured by CPI) and the exchange rate expressing the domestic currency price

4 The last year with available data for CE Europe/BIS/CIS countries in regional trade section. In 2004 eight EE countries joined European Union.

of foreign exchange (or vice versa). Hence, the observed real exchange rate function can be expressed in the following log-linear form:

$$q_t = e_t + p_t - p_t^* \quad (1)$$

where q represents the real exchange rate vis à vis a certain currency, e is the nominal exchange rate, and p and p* are the domestic and foreign price level measured by CPI.
If put in a regression model frame, the observed function takes the following form:

$$q_t = \alpha + \beta_1 e_t + \beta_2 p_t - \beta_3 p_t^* + \varepsilon_t \quad (2)$$

where ε_t is a white noise process. In case of right-hand side variables from equation (2) being cointegrated, one can say that PPP holds.

Constrained approach, so-called "strong" PPP assumption test implies proportionality between the obtained coefficients ($\beta_1 = -\beta_2 = \beta_3 = 1$), and it is based on the unit root test of the real exchange rate series. Both methods (unrestricted and restricted model) were used in the paper.

As the first step of the analysis the Augmented Dickey-Fuller (thereinafter ADF) unit root test was applied to every series of interest. Concurrently, the following procedure, introduced by (Dolado, Jenkinson and Sosvilla-Rivero, 1990), was used.

Firstly, each series in levels was tested with the least restrictive model, including a trend and an intercept. If the null hypothesis was not rejected, the analysis would be preceded with the model including only a constant. Otherwise, it was concluded that the observed process contains a unit root. If the second model showed that the drift term also is not significant, the procedure continued through a model without a drift, or a deterministic trend. In case the null hypothesis could not be rejected at any of the three steps of the analysis, it was concluded that the sequence of interest is stationary.

Afterwards, the procedure was developed in two directions. On one hand, the intention was to question the existence of long-run relationship between each country's price level, the USA price level and the exchange rate vis à vis USD. On the other hand, the same principle was employed for each country's relationship vis à vis Germany.

In order to circumvent the power problem of individual unit root tests during 1960:1 to 2007:10 period, panel approach was employed as well. Real exchange rates of countries grouped according to their affiliation to economic integrations were used in order to perform a panel unit root test. To be more precise, Im-Pesaran-Shin (IPS) panel unit root test was applied. This test is based on individual unit root test statistics obtained from the Augmented Dickey-Fuller unit root test.

Thereby, IPS test implies the application of the following ADF regression on each observed real exchange rate series[5]:

5 A deterministic time trend was not included in individual ADF regressions because the PPP does not allow real exchange rates to be trend stationary.

$$\Delta y_{it} = \alpha_{i0} + \gamma_i y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + e_{it}; \quad i = 1,...,n \tag{3}$$

That way a t-bar statistic can be estimated as a simple arithmetic mean of the individual ADF statistics:

$$t - bar_{NT} = \frac{\sum_{i=1}^{N} t_{it}}{N} \tag{4}$$

According to the (Im, Pesaran, Shin, 2003) paper, t-bar statistic can then be standardized in order to follow an asymptotic normal distribution:

$$W = \frac{\sqrt{N}\{t - bar_{NT} - N^{-1}\sum_{i=1}^{N} E(t_{iT})}{\sqrt{N^{-1}\sum_{i=1}^{N} Var(t_{iT})}} \tag{5}$$

where N is the number of cross sections and T is series length. $E(t_{iT})$ and $Var(t_{iT})$ are ADF regression t-statistic's expected value and variance, provided in (Im, Pesaran, Shin, 2003) using Monte Carlo simulations.

What we are interested here is to test the null hypothesis implying the existence of unit roots:

$$H_0 : \gamma_j = 0 \text{ for all i,}$$

against the alternative

$$H_1 : \begin{cases} \gamma_j < 0; & i = 1,2,...N_1 \\ \gamma_j = 0; & i = N_1 + 1, N_1 + 2,...,N \end{cases}$$

The adequacy of applying IPS over a variety of other available tests (Quah, 1994; Levin and Lin, 1993) can be argued by its better finite sample performance, as proven by stochastic simulations[6]. Also a glance at the alternative hypothesis reveals that it allows a fraction of individual series to be mean reverting, which is not the case in (Levin and Lin, 1993), e.g.

4. RESULTS

Table 1 and Table 2 summarize the cointegration analysis results for all the observed countries and economic integrations. In the second column the available data span is given for each country of interest. The following four columns show the ADF test results for each country's CPI and the exchange rate vis à vis numeraire country[7]. The results of the unrestricted test (guided by max-eigen value and trace statistics) are given in the following three columns. Finally, real exchange rate series were formed (restricted RER) and tested for mean-reverting properties with results presented in the last two columns. The results vis à vis USA are presented in and vis à vis Germany in Table 2[8].

6 For a complete review of different unit root tests in heterogenous panels see (Baltagi and Kao, 2000).

7 The reported ADF test statistics (t-statistics that rejected the null hypothesis of unit root) refer to series in levels. Namely, it is sufficient to prove that variables of interest are not stationary in levels to perform the Johansen's procedure (order of integration is not essential for the analysis performed here). If the null hypothesis could not be rejected, the t-statistics from the most restrictive ADF regression (no constant or trend) was reported.

8 Reffering to CEE countries cointegration analysis (Table 2 and 3), it can be seen that the time span used for Hungary is much wider than for other countries (as a result of other countries being a part of larger entitites before the 1990's). Hence, as a kind of

Figure 4, Figure 5 and Figure 6 show the number of cointegrating vectors for ASEAN, transition and MERCOSUR countries vis à vis the USA. It is obvious that MERCOSUR countries indeed exhibit a strong long-run relationship with the USA. On the other hand, real exchange rate in Croatia, Estonia, Lithuania, Poland and Slovenia do not form a long-run relationship with the USA.

Figure 7, Figure 8 and Figure 9 show the number of cointegrating vectors for ASEAN, transition and MERCOSUR countries vis à vis Germany. It is more than obvious that the largest number of cointegrating vectors is in the group of transition countries. Here again the Johansen's procedure resulted in spurious regression for Croatia, Estonia, Lithuania, Poland and Slovenia.

In total, five ASEAN countries turned out to be cointegrated to the USA, in contrast to only three of them vis à vis Germany. With MERCOSUR countries similar findings have been found (four countries vs. two of them)[9]. As far as transition countries are concerned, they are strongly connected to Germany (six countries cointegrated to Germany vs. three cointegrated to the USA).

In order to circumvent the power problem, a panel approach had been conducted in order to increase the power of the unit root test to reject null hypothesis. IPS panel unit root test was conducted on three groups of countries and are presented in the Table 3[10]. Results suggest that countries from different economic integrations are very much related to the USA or Germany as global economic leaders. In ASEAN countries the PPP assumption holds with respect to the USA at 10% significance level and in MERCOSUR at 5% significance level. On the other hand, for transition countries stationarity can be proven only vis à vis Germany. Obviously, rejection of the null hypothesis for the transition countries in panel approach suggest that short sample of newly found countries is the reason of spuriousity in time series analysis.

CONCLUSIONS

In this paper we have investigated the relationship between trade or economic cooperation in general and strength of evidence of mean reverting properties of real exchange rates. Results have supported the thesis that the level of economic cooperation or international trade is closely connected with the strength of evidence of stationarity of real exchange rates.

ASEAN and MERCOSUR countries have much stronger evidence of PPP assumption vis à vis the USA, on the other hand, in transition countries there is much stronger evidence of stationarity of real exchange rates vis à vis Germany.

Results suggest that economic cooperation and trade improve the functioning of international market mechanisms and convergence of real exchange rates. The more countries trade, the more evidence of cointegration of relative prices is to be found. In terms of policy recommendations, our results imply that stronger economic integration between

robustness check, the analysis was repeated using shorter series for Hungary (see Appendix)

9 Chile would be the fifth country cointegrated to the USA according to the trace statistic, but max-eigen criterion is dominant over the trace statistics (Enders, 2004).

10 As real exchange rate series significantly vary for different countries, a balanced panel was used, with the time span set at 1995:1 to 1999:1.

countries might improve mean reverting properties of real exchange rates. In terms of present competitiveness problems in EMU and EU, our results might be used as supportive for stronger economic integration within EMU and EU.

Recommendation for further research is to apply structural break unit root tests on the same sample of countries in order to investigate connection between identified potential structural break dates with structural breaks in trade or investment flows and/or institutional reforms such as establishments of tree trade, monetary and/or fiscal unions.

Tables

Table 1: Cointegration analysis for countries and economic integrations vis à vis- the USA

	vis à vis the USA		CPI		ER		Unrestricted RER			Restricted RER	
		Data span	ADF	No. Of lags	ADF	No. Of lags	mex-	trace rank	No. Of lags	ADF	No. Of lags
ASEAN	Singapore	1961:1-2007:9	2,571217	16	-2,226613	0	1	0	7	-1,9206	1
	Malaysia	1960:1-2007:9	3,360015	16	0,485751	17	1	1	2	-0,8853	7
	Thailand	1965:1-2007:10	2,714215	15	0,763108	7	0	0	8	-1,5286	7
	Philippines	1960:1-2007:10	3,150424	15	2,602730	0	0	0	8	-3,0313**	0
	Indonesia	1968:1-2007:9	2,540996	15	2,252134	14	1	1	6	-1,1756	14
	Japan	1960:1-2007:9	1,273809	14	-1,545648	8	1	1	7	-2,0304	13
	Cambodia	1994:10-2007:10	1,470280	12	1,846842	9	0	0	4	-2,3895	7
	Vietnam	1995:1-2007:5	1,661380	13	0,781815	0	0	0	3	-1,253	1
	Laos	1987:12-2007:10	0,904744	14	0,682702	0	1	1	3	-3,0252**	2
Central and Eastern Europe	China	1987:1-2007:8	-2,221772	13	-2,221772	13	multicollinearity			-1,722225	15
	Bulgaria	1991:1-2007:10	1,024152	1	-2,021692	1	0	0	4	-2,3317	4
	Croatia	1992:1-2007:10	-8,802750***	14	-4,161554***	3	spurious			-5,6426***	1
	Czech	1993:1-2007:10	1,307459	13	-0,943541	0	0	0	7	-0,2094	0
	Estonia	1992:6-2007:10	-6,712423***	13	-0,357567	0	spurious			-3,5831***	1
	Hungary	1976:1-2007:10	0,685063	14	1,011881	11	2	1	3	0,5266	0
	Latvia	1992:2-2007:10	2,520711	14	0,161986	1	1	1	8	0,1919	13
	Lithuania	1992:1-2007:10	-6,038950***	12	1,264329	14	spurious			-4,4178***	14
	Macedonia	1993:12-2007:10	2,346201	12	-0,159692	0	1	0	3	-1,5024	13
	Poland	1988:1-2007:10	-6,419933***	14	-3,290852*	5	spurious			-1,3172	7
	Romania	1990:10-2007:10	0,144694	10	-1,876975	7	0	0	8	-0,7495	8
	Slovakia	1993:1-2007:10	1,907081	12	-0,600190	1	0	0	3	0,8771	1
	Slovenia	1990:1-2006:12	-9,244395***	14	-4,710412***	9	spurious			-2,4886	9
MERCOSUR	Argentina	1960:1-2007:10	-1,763602	13	-2,105528	8	1	1	8	-3,0131**	8
	Brazil	1979:12-2007:10	-1,784455	4	-2,079151	2	1	1	3	-1,7607	0
	Chile	1960:1-2007:10	-1,612300	18	-0,861487	14	0	1	8	-1,9021	16
	Paraguay	1960:1-2007:10	2,128640	12	2,884553	3	2	2	2	-1,5586	0
	Uruguay	1964:1-2007:10	-1,534118	8	-2,955238	0	1	0	8	-2,5503	2
	Germany	1960:1-2007:10	4,375648	0	-1,678737	0	1	1	2	-1,349619	0

Notes: *** 1%, **5%, *10% significance level

Source: Author calculation

Table 2: Cointegration analysis for countries and economic integrations vis à vis-Germany

	vis à vis Germany		CPI		ER		Unrestricted RER			Restricted RER	
		Data span	ADF	No. Of lags	ADF	No. Of lags	mex-	trace rank	No. Of lags	ADF	No. Of lags
ASEAN	Singapore	1961:1-2007:9	2,571217	16	-0,489257	0	1	1	1	-1,0701	0
	Malaysia	1960:1-2007:9	3,360015	16	-0,052574	7	0	0	6	-0,7055	17
	Thailand	1965:1-2007:10	2,714215	15	2,467086	13	0	0	4	-0,6633	13
	Philippines	1960:1-2007:10	3,150424	15	2,489234	0	0	0	6	-2,0371	0
	Indonesia	1968:1-2007:9	2,540996	15	2,493822	12	0	0	4	-0,9059	12
	Japan	1960:1-2007:9	1,273809	14	0,710287	3	0	0	4	-1,3941	0
Central and Eastern Europe	Cambodia	1994:10-2007:10	1,470280	12	1,855709	8	1	1	2	-1,1493	0
	Vietnam	1995:1-2007:5	1,661380	13	0,555858	0	0	0	5	-1,2346	0
	Laos	1987:12-2007:10	0,904744	14	1,028564	0	0	0	2	-1,2152	8
	China	1987:1-2007:8	-2,221772	13	1,251341	0	1	1	3	-2,3711	5
	Bulgaria	1991:1-2007:10	1,024152	1	-1,964428	1	1	1	5	-3,2743**	3
	Croatia	1992:1-2007:10	-8,802750***	14	-4,827013***	3		spurious		-4,9102***	0
	Czech	1993:1-2007:10	1,307459	13	0,396507	0	0	2	7	-1,9785	0
	Estonia	1992:6-2007:10	-6,712423***	13	0,845365	0		spurious		-4,9826***	0
	Hungary	1976:1-2007:10	0,685063	14	3,111774	0	0	0	2	-2,2116	0
	Latvia	1992:2-2007:10	2,520711	14	-1,621752	0	1	1	5	-4,0364***	0
	Lithuania	1992:1-2007:10	-6,038950***	12	-3,929974**	0		spurious		-5,4183***	0
	Macedonia	1993:12-2007:10	2,346201	12	1,093103	0	1	1	4	-0,9819	0
	Poland	1988:1-2007:10	-6,419933***	14	-3,480132***	1		spurious		-2,4604	0
	Romania	1990:10-2007:10	0,144694	10	-1,786952	7	2	2	8	-3,8062***	8
	Slovakia	1993:1-2007:10	1,907081	12	0,741746	0	1	1	7	-1,5033	0
	Slovenia	1990:1-2006:12	-9,244395***	14	-0,980238	0		spurious		-2,155	0
MERCOSUR	Argentina	1960:1-2007:10	-1,763602	13	-2,152546	8	1	1	6	-2,2644	11
	Brazil	1979:12-2007:10	-1,784455	4	-1,867952	4	0	0	3	-1,8545	0
	Chile	1960:1-2007:10	-1,612300	18	-0,968632	14	0	0	6	-1,8095	7
	Paraguay	1960:1-2007:10	2,128640	12	4,050932	0	1	1	1	-0,9754	0
	Uruguay	1964:1-2007:10	-1,534118	8	-2,362019	0	0	0	7	-2,3005	2
	USA	1960:1-2007:10	1,682718	13	-1,390181	0	1	1	2		0

Notes: *** 1%, **5%, *10% significance level

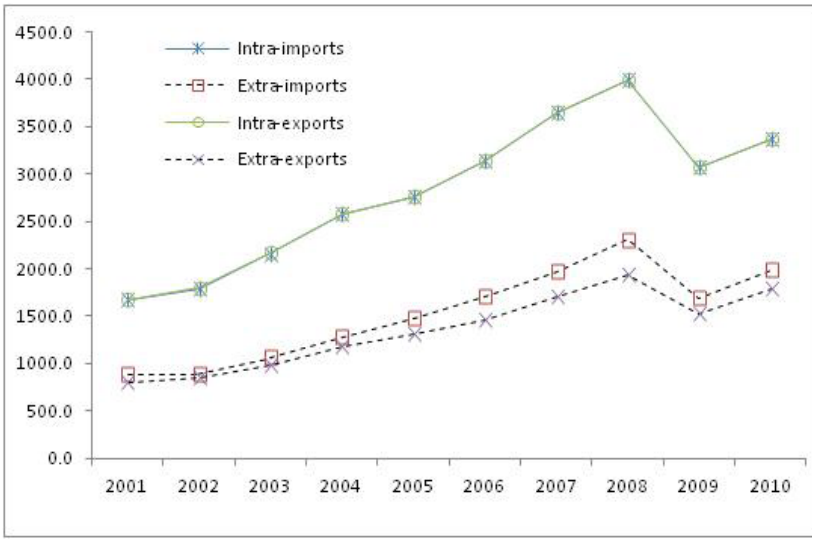
Source: Author calculation

Table 3: IPS test results

Im Pesaran Shin panel unit root test	*t-bar*	*w-stat*	*p-value*
ASEAN vis à vis USA	-1,9155	-1,43269	**0,0760**
CEE vis à vis USA	-1,7206	-0,87528	0,1907
MERCOSUR vis à vis USA	-2,157	-1,6770	**0,0468**
ASEAN vis à vis Germany	-1,1528	1,1795	0,8809
CEE vis à vis Germany	-3,1432	-6,5026	**0,0000**
MERCOSUR vis à vis Germany	-1,8409	-0,8647	0,1936

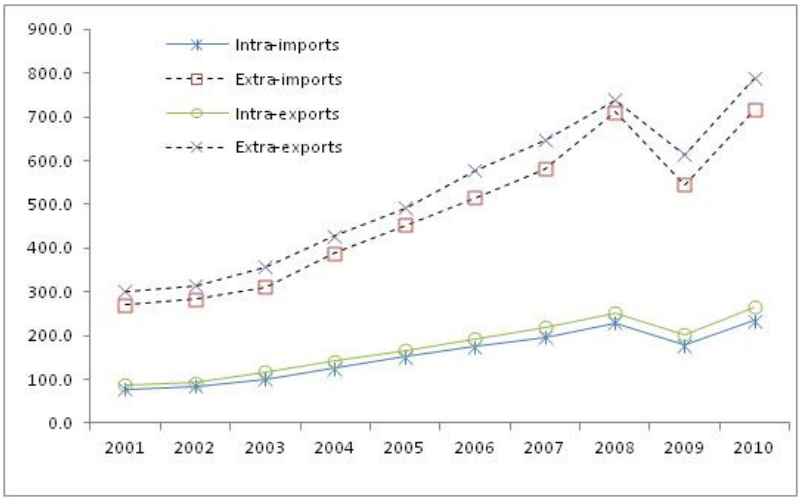
Source: Author calculation

Figure 1: Intra and extra trade of EU-27 (billion dollars)



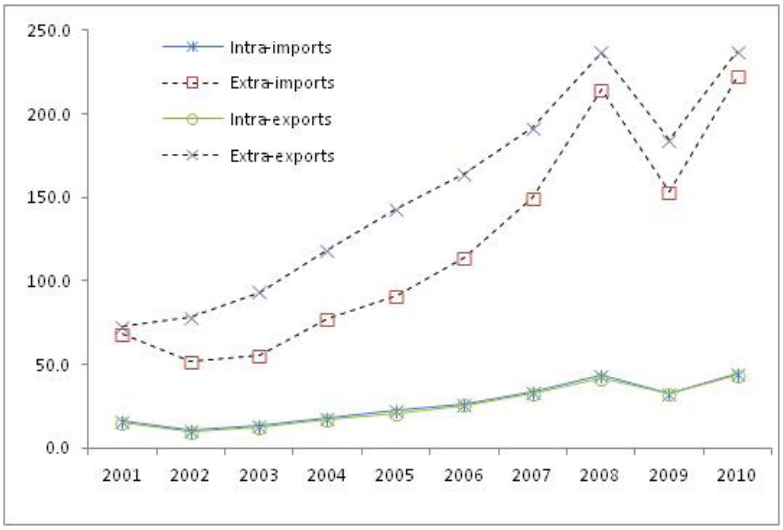
Source: ITS (2011)

Figure 2: Intra and extra trade of ASEAN (billion dollars)



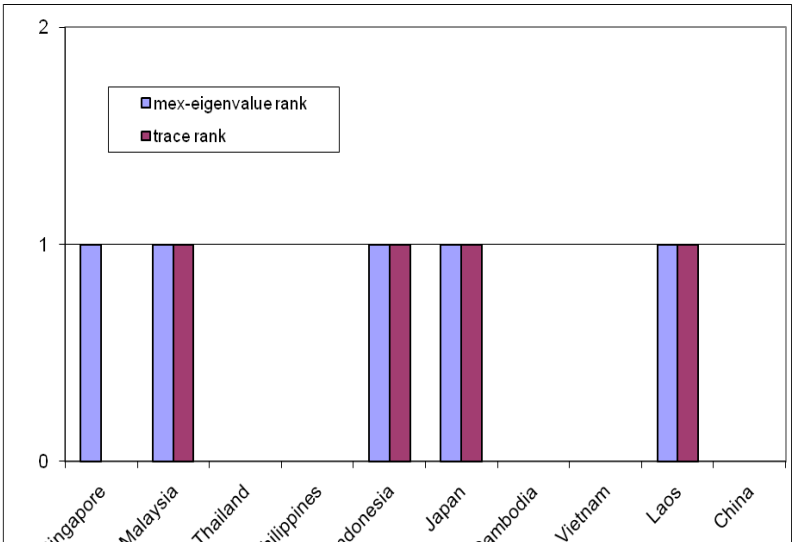
Source: ITS (2011)

Figure 3: Intra and extra trade of MERCOSUR (billion dollars)



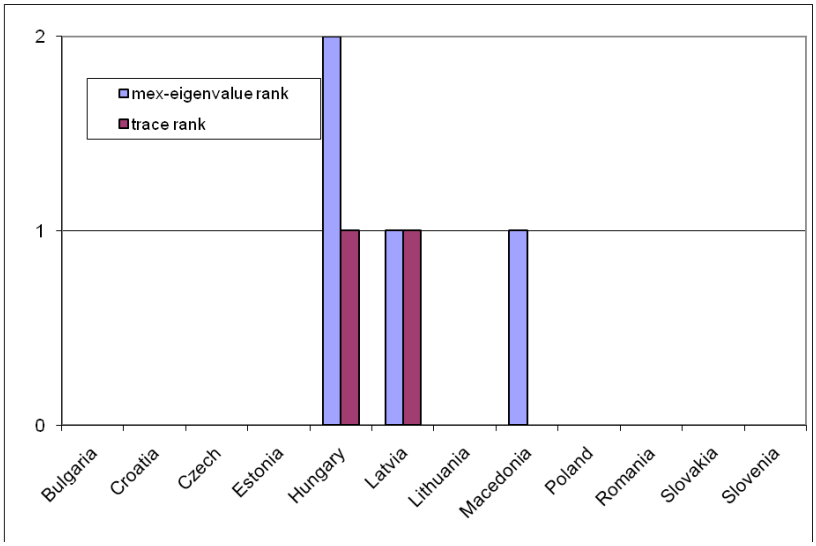
Source: ITS (2011)

Figure 4: The number of cointegrating vectors in ASEAN and China vis à vis USA



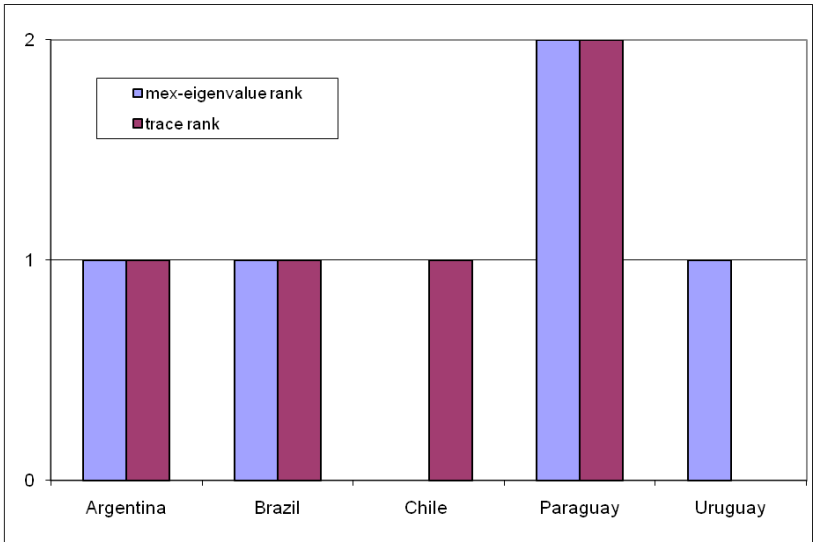
Source: Author calculation

Figure 5: The number of cointegrating vectors in transition countries vis à vis USA



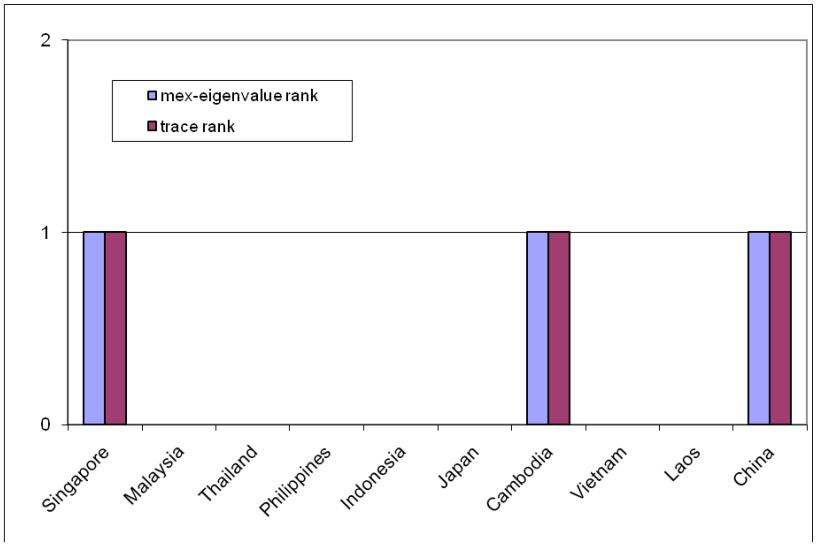
Source: Author calculation

Figure 6: The number of cointegrating vectors in MERCOSUR vis à vis USA



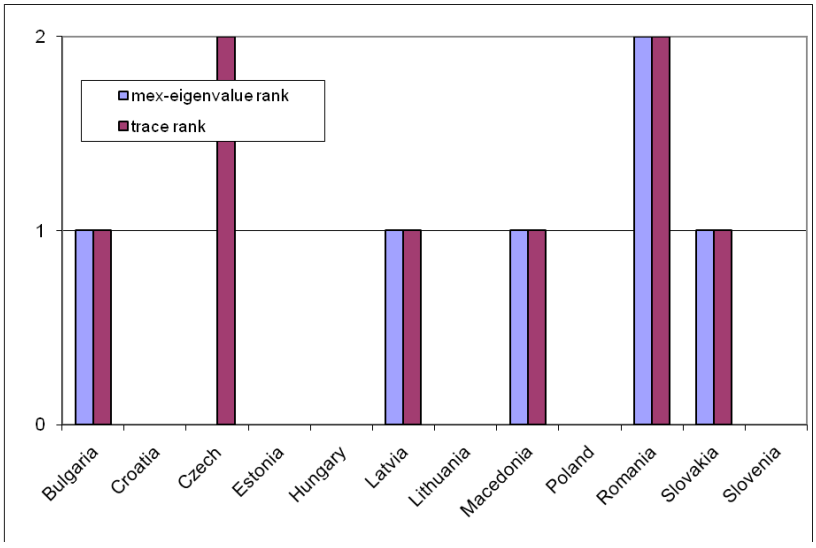
Source: Author calculation

Figure 7: The number of cointegrating vectors in ASEAN and China vis à vis Germany



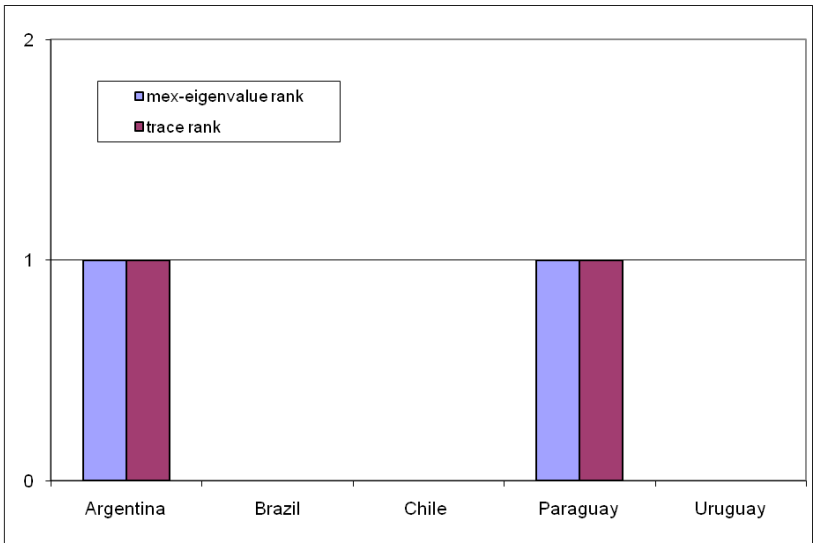
Source: Author calculation

Figure 8: The number of cointegrating vectors in transition countries vis à vis Germany



Source: Author calculation

Figure 9: The number of cointegrating vectors in MERCOSUR vis à vis Germany



Source: Author calculation

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Appendix: Cointegration analysis for countries and economic integrations: Hungary vis à vis-the USA and Germany

vis à vis the USA		CPI		ER		Unrestricted RER			Restricted RER	
	Data span	ADF	No. Of lags	ADF	No. Of lags	mex-eigenvalue rank	trace rank	No. Of lags	ADF	No. Of lags
Hungary	1990:1-2007:10	0.219978	14	2.141613	0	1	1	3	-0.629639	0
vis à vis Germany		CPI		ER		Unrestricted RER			Restricted RER	
	Data span	ADF	No. Of lags	ADF	No. Of lags	mex-eigenvalue rank	trace rank	No. Of lags	ADF	No. Of lags
Hungary	1990:1-2007:10	0.219978	14	2.395821	0	1	1	3	-0.571145	1

EKONOMSKE INTEGRACIJE I PRETPOSTAVKA PARITETA KUPOVNE MOĆI

Sažetak

Cilj rada je istražiti na koji način ekonomske integracije i ekonomski odnosi utječu na trend kretanja prosječnih vrijednosti stvarnog tečaja. Koristili smo neograničeni i ograničeni prošireni Dickey-Fullerov test jediničnog korijena i Im Pesaran Shin panelni test jediničnog korijena kako bismo istražili trendove kretanja prosječnih vrijednosti stvarnog tečaja u tranzicijskim zemljama, zemljama ASEAN-a, MERCOSUR-a i Kini u odnosu na Njemačku i SAD. Naša je analiza interesantna stoga što pruža dokaze o utjecaju (daljnje) integracije oko problema s konkurentnosti cijena u perifernim zemljama EU-a i EMU-a. Dokazi upućuju na to da gospodarski odnosi zemalja ASEAN-a i MERCOSUR-a s SAD te tranzicijskih zemalja s Njemačkom utječu na trend kretanja prosječnih vrijednosti relativnog tečaja. U sve tri grupe zemalja dokaz o stacionarnosti stvarnog tečaja je puno jači u usporedbi s najvećim ekonomskim partnerom.

Ključne riječi: *regionalne integracije, PPP, LOOP, granični efekt, problem moći*