Real Equilibrium Exchange Rate in European Union New Members and Candidate Countries

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ABSTRACT

We try to measure the size of a possible misalignment in the exchange rate of the UE new members and candidate countries in two ways. We address the issue of the "Balassa effect", which shows that the real exchange rate of a catching-up country should appreciate. We compare these countries with other emerging countries, in order to assess the size of a "normal" "Balassa effect". Two approaches are used: cross-section regressions on different samples of countries and panel-data estimations. Both methods lead to find very few significant misalignments for CEECs for the recent period.

JEL Classification: JEL: F31, F33
*Key Words*Balassa effect , EQUILIBRIUM EXCHANGE RATE, transition countries

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1. Introduction

This paper is aimed at assessing possible misalignment of currencies in the European Union (EU) new members and candidate countries. The main question is to know if these countries' exchange rates are in line with fundamentals. This issue has become crucial for the following reasons: firstly, at the time EU new members join the European Exchange Mechanism 2 (ERM 2), the chosen central parity inside the ERM2 has to be consistent with economic fundamentals. Secondly, currencies that are already in the ERM 2, (ie. Slovenia, Estonia, Lithuania) are also closely monitored, for a misalignment could trigger market pressures and threaten the integrity of the whole system. Thirdly, this issue will turn up again at the time when the countries will adopt the euro. It is likely that the conversion rate will tally with the ERM2 central rate, which is exactly what happened for the first set of countries which adopted euro in 1997. However, this is not obvious, for it implies that market rates will converge to this ERM2 central rate just before the euro adoption. Here again, for this to happen, the central rate should be perceived by market operators as sustainable and not misaligned.

The issue of possible misalignment is also raised because there have been large movements in the real exchange rates of Central and Eastern European countries (CEECs) since the beginning of the transition. In most of them, there has been a real appreciation since the mid 1990s. Roughly speaking, this can be explained by two successive phenomena, depending on the exchange rate regime. Until around 2000, the real appreciation was due to high inflation; in that period, CEECs with floating currencies or crawling pegs were better off than the ones with pegged currencies, for they could have nominal depreciation to compensate their high inflation. Afterwards, as inflation receded, real appreciation was mainly observed in CEECs with floating currencies, because the EU entry triggered huge capital inflows, resulting in nominal appreciation. In this sense, pegged exchange rates countries are much less affected nowadays by real appreciation. On the whole period, nevertheless, the real appreciation did occur, for all exchange rate regimes. A key question is assessing if this could have led to an overvaluation.

In fact, there is a two-sided risk in parities being misaligned. On one hand, an overvalued currency may lead to a lack of competitiveness, which may deteriorate the country's current account and dampen its real activity. On the other hand, an undervalued parity would generate losses for domestic agents when converting their local currency assets into euros, especially for households. So this question has to be taken in hand very cautiously by governments.

Central parities inside the former ERM were often chosen to match past trends in purchasing power parity (PPP). This explains why realignments were frequently sized to fit inflation differentials between countries. This PPP norm was considered as an acceptable basis for negotiations on parities between member countries, partly because of its simplicity and partly because the economic structures and productivity patterns of these countries were relatively homogeneous. However, PPP is clearly not suited to catching up countries such as CEECs, especially because of the Balassa effect. This effect plays a key role because of high productivity growth in the manufacturing sector.

This issue has already been tackled in numerous papers, trying to find equilibrium exchange rates for CEECs, since the pioneer paper by Halpern and Wyplosz [1996]. Except some rare attempts to use a macroeconomic approach (as Coudert and Couharde, 2003), most studies use a BEER approach (*Behavioural Equilibrium Exchange Rate*)as introduced by Clark and MacDonald (1998). Roughlt=y speaking, it consists in estimating a long-run econometric equation between the real exchange rate and several fundamental variables. Then, the equilibrium exchange rate is assumed to be the fitted value of the exchange rate in this equation. Most papers give figures of misalignment for CEEC currencies, computed by this kind of method (see for example, Egert and Lahrèche-Révil [2002]), Burgess et al. (2003), Egert. and K. Lommatzsch (2003), Maeso-Fernandez, F., Ch. Osbat and B. Schnatz (2004)). However, most papers on the subject are entirely empirical and do not include theoretical backgrounds. Some variables seem to have been included in the models for ad hoc reasons. Moreover the signs of some variables are ambiguous sometimes, for example for the terms of trade; the effect of foreign assets is also positive in most papers, but sometimes found negative (Burgess et al., 2003).

These drawbacks in econometric approaches incite us to drastically limit the explicative variables in the regression. Eventually, taking stock of a large number of studies, we found that there is only one type of variable, that is found significant, with the same sign, in every study on the subject. This is the "Balassa-Samuelson" (BS) variable. Moreover, this effect has the advantage of being theoretically founded, unambiguous and is also found significant in many empirical studies using large sample of emerging countries (for a survey, see Edwards and Savastano, 1999). Therefore, we focus here on this BS effect. This paper tries to assess the equilibrium parity for CEECs which would result from a BS effect. The econometric estimations are made by two different methods, each using a large sample of countries: cross-section estimations and panel-data cointegration. For both methods, we also try to check how changes in the sample affect results.

The rest of the paper is organised as follows. Section 2 presents the Balassa effect. Section 3 gives the results of cross-section estimations. Section 4 deals with panel data cointegration. Section 5 concludes.

2. The Balassa effect

The "Balassa-Samuelson" effect, first formulated by Balassa (1964) and Samuelson (1964) describes the distortion in purchasing power parity (PPP) resulting from the international differences in relative productivity between the tradable goods sector (constituted more or less by manufacturing and agriculture) and the non-tradable goods sector (roughly speaking, services). Accordingly, during the development process, productivity tends to increase more quickly in the tradable goods sector than in the services sector. Given that the prices of tradable goods are set by international competition, an increase in productivity in this sector leads to an increase in wages, which is not detrimental to competitiveness. Since this increase in wages spreads across the economy as a whole, there is a rise in relative prices in the non-tradable goods sector, where productivity has not grown at the same pace. Given that the price index is an average of these two sectors, there is an increase in the prices of domestic goods relative to those from abroad, which results in an appreciation of the real exchange rate.

Let us take the example of an emerging economy whose exchange rate is calculated against the currency of an advanced foreign country, marked *, for instance the United States. The real exchange rate of the emerging country is defined as:

$$\dot{q} = \dot{e} + \dot{p} - \dot{p}^* \qquad (1)$$

where *q* and *e* are the real and nominal exchange rate against dollar respectively; *p* and *p** are the final demand price index in the emerging country and the United States respectively. The lower-case variables marked with a dot indicate rates of growth (logarithmic derivatives). The nominal exchange rate is expressed as the number of dollars per domestic currency unit; therefore, an increase in the nominal and real exchange rate stands for an appreciation.

The relative price of tradable goods, between the two countries is given by $\dot{q}_T$

$$\dot{q}_T = \dot{p}_T + \dot{e} - \dot{p}_T^* \qquad (2)$$

where $\dot{p}_T$ stands for the tradable price index. By subtracting the two equations (1) and (2), we can express the real exchange rate as the total of the relative price for tradable goods between the two countries and the difference between the two countries of relative prices for goods across the board and the exposed sector T:

$$\dot{q} = \dot{q}_T + [(\dot{p} - \dot{p}_T) - (\dot{p}^* - \dot{p}_T^*)] \qquad (3)$$

An equivalent expression can be obtained by expressing the final demand price as a weighted average of prices in the two sectors:

$$\dot{p} = \dot{p}_T + (1-\gamma)(\dot{p}_N - \dot{p}_T) \qquad (4)$$

where $\dot{p}_N$ is the price index in the non-tradable goods sector *N* and γ is the share of tradable goods in final demand. As this definition is also valid for the United States, the real exchange rate set out in equation (1) can be written:

$$\dot{q} = \dot{q}_T + (1-\gamma)\left[(\dot{p}_N - \dot{p}_T) - (\dot{p}_N^* - \dot{p}_T^*)\right] - (\gamma - \gamma^*)(\dot{p}_N^* - \dot{p}_T^*) \qquad (5)$$

The rise in the relative price of non-tradable goods compared with that of tradable goods may stem from a variety of factors, from the supply or the demand side. According to Balassa (1964), it results from larger productivity gains in the manufacturing sector in catching-up countries. To see this, let us start by determining the relative price of non-tradable goods compared with tradable goods in a single economy; this relative price is also called the “internal exchange rate”, given that it compares the price of domestic goods with those exposed to international competition. After setting the usual assumptions (see for example, Coudert, 2004), it may be expressed as follows:

$$\dot{p}_N - \dot{p}_T = \frac{\alpha_N}{\alpha_T}\dot{\theta}_T - \dot{\theta}_N \qquad (6)$$

where θ_i designates the total factor productivity in sector $i = N,T$, and α_i the share of labour in the sector i ‘s value added. Thus, the relative price of non-tradable goods, i.e. the “internal exchange rate”, appreciates with productivity gains in the tradable goods sector. Generally, we have: $\theta_T > \theta_N$ and

$$\frac{\alpha_N}{\alpha_T}\dot{\theta}_T > \theta_N$$

i.e. the relative increase in the productivity in tradable goods leads to an appreciation of the "internal exchange rate", especially in emerging countries.

When considering the external real exchange rate between two countries, this expression is written as

$$\dot{q} = \dot{q}_T + (1-\gamma)\left((\frac{\alpha_N}{\alpha_T}(\dot{\theta}_T - \dot{\theta}_T *) - (\dot{\theta}_N - \dot{\theta}_N *) \right) \qquad (7)$$

The second term at the right hand side of the equation $\left((\frac{\alpha_N}{\alpha_T}(\dot{\theta}_T - \dot{\theta}_T *) - (\dot{\theta}_N - \dot{\theta}_N *) \right)$ is generally positive, since the productivity gains in the tradable sector are higher than in the reference advanced country, while there is not such great difference for the non tradable sector. Therefore, according to equation (7), the real exchange rate of an emerging country has a tendency to appreciate.

3. Cross-section estimations

In this framework, one way to assess the misalignment of currencies is to use a PPP criterion corrected by a Balassa effect. A first estimation can be given by a cross-section regression in the spirit of Rogoff (1996), De Broeck and Slok (2001) or others surveyed by Edwards and Savastano (1999). A number of studies seek to explain differences in price levels between countries by the Balassa effect (see for example Edwards and Savastano's survey of 1999). The Balassa effect can also be used to explain the lower price levels in emerging countries. All we need to do is to take the mechanism described above in level form, since real exchange rates in level form are by definition equal to relative prices between countries. In emerging countries, productivity in the tradable goods sector is low compared with advanced economies. The fact that prices in this sector are assumed to be subject to competition from international trade explains the lower wages (measured in international currency) found in less developed countries. Given that these low wages prevail in the economy as a whole, the comparatively stronger productivity of the non-tradable goods sector leads to a lower price level than abroad. As a result, the price level across the economy as a whole, which is the weighted average of the two sectors, is lower in less developed countries. Consequently, their real exchange rate is systematically undervalued compared with the PPP exchange rate (i.e. the exchange rate that equates the price of a basket of goods between countries). This has to be taken into account when calculating a reference parity for an emerging country.

We only have to transpose equation (7) into level form for this to be apparent. This we do by using, to keep it simple, the same capital intensity in the two sectors based on the assumption of a single price for tradable goods (which makes the first term disappear):

$$P - P^* = (1-\gamma)\left(\frac{\alpha_N}{\alpha_T}(\theta_T - \theta_T^*) - (\theta_N - \theta_N^*)\right) \approx (1-\gamma)\left((\theta_T - \theta_N) - (\theta^*_T - \theta_N^*)\right)$$

The level of relative productivity in tradable goods, which is lower in emerging countries, $(\theta_T - \theta_N) < (\theta^*_T - \theta_N^*)$, means that average prices are lower in these countries, $P < P^*$. In other words, the real exchange rate of these countries is undervalued compared with the purchasing power parity (PPP).

In order to test this effect, the PPP GDP per capita is generally taken as a proxy for the relative productivity differentials between sectors, as the latter is not available for emerging countries and the two variables are positively correlated. (see for example Rogoff, 1996, De Broeck and Slok, 2001). Relative price levels of a group of countries are regressed on PPP GDP per capita. Real exchange rates are assimilated to relative price levels between countries.

Here, we calculate GDP per capita and price levels relatively to the euro area. We estimate the following equation

$$\log(p_i / p_{EUR}) = \alpha \log(y_i / y_{EUR}) + \mu + \varepsilon_i \qquad (8)$$

where p_i indicates country *i*'s price level, calculated as indicated above, y_i is country *i*'s PPP GDP per capita.

Price levels of different countries are calculated by dividing their GDP in dollars by their GDP in PPP. The relative price levels can be interpreted as deviations of the real exchange rates to PPP. Data are extracted from the CEPII-CHELEM for a large sample of countries over the year 2003.

In this straightforward approach, the fitted values could be interpreted as a reference exchange rate for a PPP exchange rate taking into account the Balassa effect. Therefore, the estimated residuals $\hat{\varepsilon}_i$ are directly considered as misalignments.

$$\hat{\varepsilon}_i = \log(p_i / p_{EUR}) - \hat{\alpha} \log(y_i / y_{EUR}) - \hat{\mu} \qquad (9)$$

Graphically, countries above the regression line are considered to have high prices relatively to other countries of the same living standards, underlying an overvalued exchange rate. Countries below the line can be thought to have low prices, which accounts to an undervalued exchange rate. However, if misalignments are close to the regression line, in the area between the two dotted lines, they are not significantly different from zero (see Figure 1).

Let us notice that the choice of the reference country (euro area or the United States) has no impact on the misalignment results. This can be checked easily looking at equation (8). Only the intercept is affected by a change in the reference country.

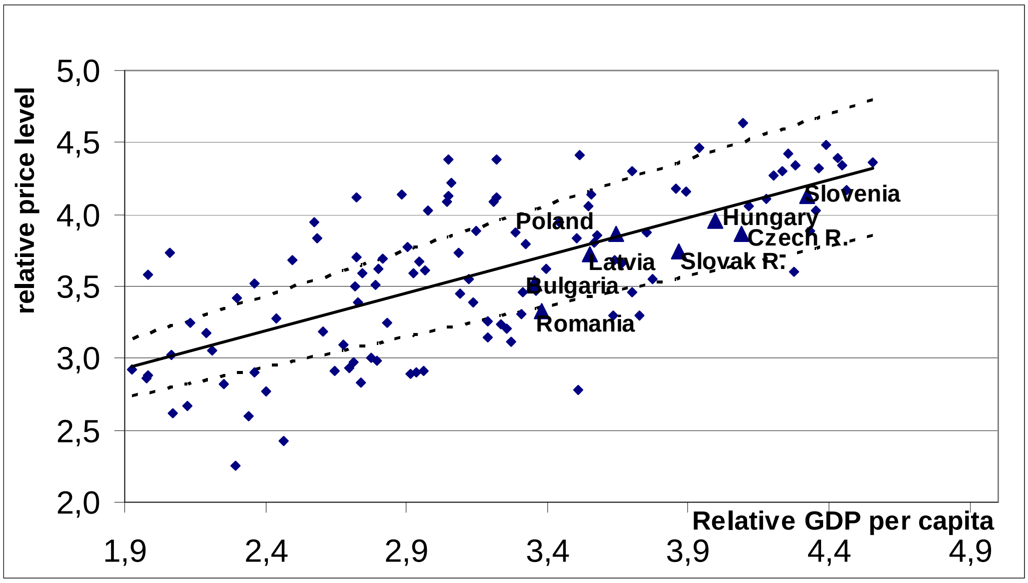
$$\hat{\varepsilon}_i = \log(p_i / p_{EUR}) - \hat{\alpha} \log(y_i / y_{EUR}) - \hat{\mu} = \log(p_i / p_{US}) - \hat{\alpha} \log(y_i / y_{US}) - \hat{\mu}'$$

If the United States were taken as a reference, we would find the same misalignment for each country. The intercept of the regression would be adapted to take into account of the new basis:

$$\hat{\mu}' = \hat{\mu} + (\log(p_{EUR} / p_{US}) - \hat{\alpha} \log(y_{EUR} / y_{US})) \qquad (10)$$

The first regression is carried out on a large sample of 173 countries, including all advanced, emerging and developing countries for which data are available. In order to check that the results do not depend on the sample, we make the same regression on different sub-samples, containing more homogeneous data. In sub-sample 1, we leave out the group of very poor countries, with PPP GDP per capita smaller than 5% of the United States' GDP. Sub-sample 2 retains only emerging and developing countries with PPP GDP of less than 70% of the US level. Sub-sample 3 is composed by medium-type countries with PPP GDP per capita comprised between 5 and 70% of USA.

Figure 1: Relative price levels and GDP per capita compared to the euro area in 2003 (1)



(1) Sub-sample 1 of countries with PPP GDP per capita greater than 5% of the US one; data are taken in logarithm. The two dotted lines around the regression line stand for a 95% confidence interval.

Source : Authors' calculations using CEPII-CHELEM database.

The slope of the regression indicates the average appreciation of the real exchange rate to be expected from a 1% increase in relative GDP per capita across countries. The slope ranges between 0.34 and 0.58, depending on the sample used for the estimates (Table 1).

Misalignment calculations show that all European Union new members and candidate countries have undervalued exchange rates in 2003, when regressions are made on the whole sample (see Table 1). When the estimation is made on the sub-samples 1 and 3, the undervaluation remains in most countries except for Lithuania and Poland. When using sub-sample 2 including only advanced and emerging countries, the results show less undervaluation for the New and Candidate EU countries; and 4 countries out of 10 become overvalued. However, taking into account the standard-error of the coefficient, we find that most misalignments are not significantly different from zero. The only exception is Romania, which has a significantly undervalued exchange rate. The Bulgarian currency is also considered undervalued, but only in the case that the whole sample of countries is retained.

In order to check the results, we perform the same regression again, excluding very small countries. The rationale is that; in some very small countries, especially tiny islands, the price levels may be abnormally high, because of increased transport costs and tourism activity. Consequently, the presence of these countries may distort the results. Therefore, we leave them out of the sample here, setting the threshold at 1 million habitants. The results of these new regressions are not very different from the previous ones (Table 2). As expected, because we have excluded some countries with very high prices, estimated undervaluations are smaller than in table 1. However, here again, we find that most misalignments are not significantly different from zero at 95% threshold, except for Romania (and Bulgaria, if we retain the regression on the whole sample).

Table 1: Estimated exchange rate misalignment for EU new members and candidate countries for 2003, using several samples

	Whole	Sub-sample 1	Sub-sample 2	Sub-sample 3
Composition of the sample	All countries	Excluding very poor countries	Emerging and developing	Emerging
PPP GDP per capita relative to the US		>5%	<70%	>5% and <70%
Number of countries	*173*	*136*	*152*	*115*
Regression results				
Slope of the regression	0.42	0.58	0.34	0.53
t-stat	*14.6*	*15.6*	*9.7*	*10.0*
R^2	0.55	0.64	0.38	0.47
Estimated misalignment, in %				
Bulgaria	-27,1 *	-22,3	-21,0	-20,1
Czech Republic	-20,4	-24,8	-9,0	-19,4
Estonia	-7,6	-7,7	3,0	-2,9
Hungary	-9,5	-13,2	2,7	-7,5
Latvia	-13,3	-10,5	-4,8	-7,0
Lithuania	-1,9	0,9	7,9	5,0
Poland	-3,7	-2,1	6,5	2,3
Romania	-37,1*	-33,2*	-31,7*	-31,2*
Slovenia	-5,8	-14,4	9,5	-7,1
Slovak Republic	-22,1	-23,7	-12,5	-19,2

* significant at a 5% level

Source : Authors' calculations, using CEPII-CHELEM database.

Table 2: Estimated exchange rate misalignment for EU new members and candidate countries for 2003, using several samples of countries of more than 1 million habitants

	Whole	Sub-sample 1	Sub-sample 2	Sub-sample 3
Composition of the sample	All countries	Excluding very poor countries	Emerging and developing	Emerging
PPP GDP per capita relative to the US		>5%	<70%	>5% and <70%
Number of countries	*145*	*111*	*127*	*93*
Regression results				
Slope of the regression	0.41	0.59	0.33	0.51
t-stat	*13.4*	*14.3*	*8.6*	*8.7*
R^2	0.56	0.64	0.37	0.45
Estimated misalignment, in %				
Bulgaria	-25,1*	-20,1	-16,9	-16,6
Czech Republic	-18,0	-23,3	-2,9	-14,8
Estonia	-4,9	-5,5	9,3	2,0
Hungary	-6,8	-11,4	9,5	-2,4
Latvia	-10,9	-8,2	0,6	-2,6
Lithuania	0,9	3,5	14,1	10,0
Poland	-1,0	0,3	12,7	7,3
Romania	-35,3*	-31,3 *	-28,1 *	-28,2
Slovenia	-2,9	-12,9	17,4	-1,4
Slovak Republic	-19,8	-21,9	-7,0	-15,0

* significant at a 5% level

Source : Authors' calculations, using CEPII-CHELEM database.

4. Panel data estimation

Although this cross-section approach above can give a first insight, it presents two caveats. First, the data sample covers only one year. Second, it is based on price level comparisons, the data of which may lack reliability. In this section, we take over these two drawbacks, by using panel data for a larger period and using real exchange rates in evolution instead of levels. We directly estimate equation (3). This formula is straightforward to use, unlike the usual formulations given by equations (4), (5) and (7), for it requires knowing neither the weighting between the sectors γ nor the productivity gains θ.

The dependant variable is the real bilateral exchange rate against the US dollar, as defined in equation (1). The explanatory variable is the relative price index, calculated as the ratio of the consumer price index to the producer price index in difference between the home country and the United States. This ratio is usually considered to be a proxy for the relative price between all goods and tradables.

We consider now two types of samples. The first one involves 44 countries, 21 advanced countries[1] and 23 emerging ones[2] and the second one only includes the 23 emerging countries. The sample covers quarterly data for the period 1980q1 to 2002q4. The panel is unbalanced, because of the unavailability of some countries' data. Data are extracted from the IMF's IFS database and Datastream.

As the size of the sample is large, the test statistics conveniently converge asymptotically to the standard normal distribution. We carried out panel unit root tests on the basis of the Im et al. (2003) test (IPS-t-test).

The structure of the IPS t-test is based on augmented Dickey-Fuller regressions

$$\Delta y_{it} = \rho_i y_{i\,t-1} + \sum_{j=1}^{p_i} \varphi_{ij} \Delta y_{it-j} + \alpha_i + \gamma_i t + \varepsilon_{it} \quad \text{for } t=1,\ldots T, \text{ and } i = 1,.., N \quad (11)$$

where T is the time-length of the sample, N is the cross-section dimension. The term $\sum_{j=1}^{p_{i_i}} \varphi_{ij} \Delta y_{it-j}$ represents lagged dependent variables with country-specific lag length p_i; ρ_i, φ_{ij}, α_i, γ_i are country-specific coefficients, α_i being an intercept (standing for fixed effects) and γ_i the trend coefficient. The error term ε_{it}, is distributed as a white-noise random variable, with possibly different variance for each member of the panel.

The null hypothesis is that all series have a unit root, that is $H_0 : \rho_i = 0$ for all countries *i*. The test allows for heterogeneity in the value of the autoregressive coefficient under the alternative hypothesis, that is $H_1 : \rho_i < 0$ for at least one country *i*.

The test used here is the group-mean t-bar statistic, based on the t-statistics derived from the N augmented Dickey-Fuller regressions. According to the test, the null hypothesis cannot be rejected, for the absolute value of the t-bar test is smaller than the critical value . Therefore, we consider that the panel data for real bilateral exchange rate series are I(1). The same result holds for the relative price ratios (see Table 3).

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1 The United States, the United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, Canada, Japan, Finland, Greece, Ireland, Spain, Australia, New Zealand and South Africa.

2 Argentina, Brazil, Chile, Colombia, Mexico, Venezuela, India, Indonesia, Korea, Malaysia, Philippines, Singapore, Thailand, China,P.R.: Mainland, Czech Republic, Slovak Republic, Estonia, Latvia, Hungary, Lithuania, Slovenia, Poland, Romania, Bulgaria.

Table 3: Panel unit root IPS test

	Variable	Real bilateral exchange rate	Relative price ratio
Full sample 44 countries	t-bar [(1)]	-0.73	-0.40
	Critical value of the tbar stat 5%	-2.36	-2.36
Emerging countries 24 countries	t-bar [(1)]	-0.46	-0.05
	Critical value of the tbar stat 5%	-2.43	-2.43

(1) statistic t-bar with OLS estimations with trend

To perform panel cointegration tests, we apply the seven tests proposed by Pedroni (1999). The relationship estimated is the following one:

$$y_{it} = \alpha_i + \gamma_i t + \theta t + \beta_1 x_{1,it} + ... + \beta_K x_{K,it} + \varepsilon_{it} \qquad (12)$$

where K is the number of regressors and β the elasticities. The deterministic elements are defined as above and θt are common time effects.

Among the seven Pedroni's tests, four are based on the within dimension (panel cointegration tests) and the three others on the between dimension (group mean panel cointegration tests). All tests are based on the null hypothesis of no cointegration for all countries. Under the alternative hypothesis, for the panel statistics, there is cointegration for all countries. However, the group mean panel cointegration statistics allow for heterogeneity across countries under the alternative hypothesis. Table 4 displays the results of Pedroni's tests.

For the whole sample of 44 countries, 6 out of 7 panel and group mean statistics reject the null hypothesis of no cointegration at a 10% threshold. For the sample of emerging countries, evidence is less clear-cut for 4 out 7 reject the null hypothesis of cointegration at a 10% threshold. On the whole, it seems reasonable to conclude that the variables are cointegrated.

Table 4: Pedroni panel cointegration test

	Panel cointegration tests				Group mean cointegration tests		
	v-stat	rho-stat	Pp-stat	adf-stat	Rho-stat	pp-stat	Adf-stat
44 countries	4.10***	-3.51***	-2.29**	-2.27**	-0.681	-1.50*	-1.47*
p-values	0.000	0.000	0.011	0.011	0.248	0.066	0.070
23 Emerging countries	2.24**	-2.44**	-1.63*	-1.27*	-0.47	-1.24	-0.37
p-values	0.012	0.007	0.051	0.101	0.318	0.108	0.357

p-values are given in parentheses.
* rejection of the null hypothesis at the 10% significance level
** rejection of the null hypothesis at the 5% significance level
*** rejection of the null hypothesis at the 1% significance level
Source: Authors' calculations

In order to estimate the cointegration vectors for the considered countries, we use the Fully-Modified Ordinary Least Squares (FM-OLS) proposed by Phillips and Hansen (1990). According to Pedroni, this method leads to more robust results when working with small size samples than the standard OLS method. We consider now a two types of estimation: a panel estimation with fixed effects. The cointegration vector obtained by the panel estimations with fixed effects is shown in table 5. The explanatory variable is significant and correctly signed.

Table 5: Cointegration vectors, panel group FMOLS results

	Coefficient of the relative prices
All countries	1.99(15.01)
Emerging countries	1.35 (7.14)

t-statistic is given in brackets. *Source:* Author's calculations

We now calculate the real bilateral equilibrium exchange rate of each country as the fitted values obtained with the coefficient of relative price in the panel cointegration vector. As usual, the misalignments are obtained as the difference between this fitted value and the observed real exchange rate.

We calculate four types misalignments. Two are obtained in using the cointegration vector estimated on the whole sample and two are obtained with the vector calculated on the emerging countries only. Then two different methods are used for each cointegration vector : in the fist one, a country-by-country intercept is added ; in the second one, the intercept is a country average on the whole sample. Table 6 reports the results for 2005:2. Most CEECs countries have overvalued currencies with this method. However, most misalignments are low and not significantly different from zero.

Table 6: Real bilateral exchange rate misalignments in 2005:2

sample	All countries		Emerging countries	
	intercept1	intercept 2	intercept 1	intercept 2
Czech Republic	0,19	0,19	0,23	0,19
Slovak Republic	0,17	0,19	0,25	0,25
Estonia	0,00	-0,11	0,08	-0,06
Latvia	0,01	-0,07	0,08	-0,06
Hungary	-0,01	-0,09	0,10	0,02
Lithuania	0,11	0,71	0,20	0,52
Slovenia	-0,30	-0,18	-0,16	-0,13
Poland	0,06	0,04	0,11	0,06
Romania	0,54	0,69	0,49	0,56
Bulgaria	0,31	0,30	0,32	0,26

Intercept 1 : one intercept per country,
Intercept 2 : one single intercept for all countries

Source: Authors' calculations

5. CONCLUSION

Two approaches are used in this paper to assess the existence and the size of misalignments for CEECs' currencies. First, we used cross-section regressions relating the real exchange rate to a "Balassa effect", on different samples of countries. Second, we addressed the issue of the "Balassa effect" in the framework of a BEER approach using panel-data estimations. With both methods, we find that most CEECs' currencies are not significantly misaligned in the recent period.

Both methods also confirm the existence of a Balassa effect on a sample of emerging countries including the CEECs. This is in line with most studies on the subject. Indeed, the characteristic features of the Balassa effect can be simultaneously observed over the last decade, in most of these countries. These involve a rise in the relative prices of services, an increase in relative productivity in the tradable goods sector and a trend appreciation of the real exchange rate. Therefore, the trend appreciation in real exchange rates in the CEECs over the past decade is at least partly stems from a Balassa effect, which is not surprising for a catching-up country. This explains why we do not find significant misalignments in the considered countries, despite a sustained real appreciation.

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