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The equilibrium real exchange
rate of lek vis-à-vis euro:
is it much misaligned?

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Editorial

On 19-21 November 2009, the Bank of Greece co-organized with the Bank of Albania the 3rd Annual South-Eastern European Economic Research Workshop held at its premises in Athens. The 1st and 2nd workshops were organized by the Bank of Albania and took place in Tirana in 2007 and 2008, respectively. The main objectives of these workshops are to further economic research in South-Eastern Europe (SEE) and extend knowledge of the country-specific features of the economies in the region. Moreover, the workshops enhance regional cooperation through the sharing of scientific knowledge and the provision of opportunities for cooperative research.

The 2009 workshop placed a special emphasis on three important topics for central banking in transition and small open SEE economies: financial and economic stability; banking and finance; internal and external vulnerabilities. Researchers from central banks participated, presenting and discussing their work.

The 4th Annual SEE Economic Research Workshop was organized by the Bank of Albania and took place on 18-19 November 2010 in Tirana. An emphasis was placed upon the lessons drawn from the global crisis and its effects on the SEE macroeconomic and financial sectors; adjustment of internal and external imbalances; and the new anchors for economic policy.

The papers presented, with their discussions, at the 2009 SEE Workshop are being made available to a wider audience through the Special Conference Paper Series of the Bank of Greece.

Here we present the paper by Erjon Luçi (The World Bank) and Ilir Vika (Bank of Albania) with its discussion by Dimitrios Maroulis (Alpha Bank).

February, 2011

Altin Tanku (Bank of Albania)
Sophia Lazaretou (Bank of Greece)
(on behalf of the organizers)

THE EQUILIBRIUM REAL EXCHANGE RATE OF THE LEK VIS- À-VIS THE EURO: IS IT MUCH MISALIGNED?

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ABSTRACT

This study follows the stock-flow approach to examine the equilibrium real exchange rate in Albania - a methodology particularly suitable for emerging economies. Using the bound testing approach to cointegration, we identify the long-term factors that have influenced the real ALL/EUR exchange rate during the period from 1999 to 2008 and check whether there is a significant misalignment. Foremost, we examine the impact of the productivity differential and net foreign assets on the real exchange rate of the lek. A number of other control variables have been added to the reduced-form equation, such as government expenditure, the terms of trade, emigrant's remittances and the uncovered interest parity, without, however, having improved significantly the explanatory power of the model. The results confirm the benefits of the free-floating regime adopted in Albania which has avoided the presence of a long-lived period of significant misalignments.

JEL Classification: C1, C3, F3.

Keywords: exchange rate, stock-flow approach, emerging economies, Albania

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1. Introduction

Albania opted for a flexible exchange rate regime from the beginning of its transition process, not simply because of its limited international reserves but also to avoid costly adjustments of possible exchange rate misalignments that usually characterize the pegged rate regimes. While it is tempting to intuitively judge this choice as successful, a more formal assessment of whether the exchange rate in Albania does in fact reflect fundamentals is warranted to highlight the importance of fiscal and monetary discipline to ensure the stability of internal and external equilibrium in the absence of an explicit anchor. This paper is a first attempt to assess the relationship between the lek/euro exchange rate and its key economic fundamentals as well as the role of other policies and factors that may disturb its equilibrium.

It would be misleading to adopt a strong definition of the purchase power parity (PPP) for estimating the distance from the exchange rate equilibrium of an emerging economy like Albania. The long process of the country's convergence toward the advanced countries involves several structural changes that shape the medium-term path of the exchange rate of emerging markets in a way that could diverge considerably from the equilibrium long-term PPP without posing risks of an abrupt adjustment. The key developments that receive particular attention in the emerging market literature on exchange rates are the impact of the productivity differential and net foreign assets.

With these constraints in mind, we have adopted an approach proposed by Egert *et al.* (2004) which differentiates between the long-term misalignment (undervaluation) caused by the Balassa-Samuelson effect and other forms of misalignments that cannot be explained by the difference in productivity levels between developing and developed countries. The former is a misalignment that would adjust gradually toward a PPP path in the long-run as the productivity level in the developing country converges toward that of the advanced economies. If the equilibrium real exchange rate (RER) moves along this convergence path, it is considered to be in an equilibrium undervaluation which reflects productivity differentials.

The results show that regardless of the estimation method and the set of controlling variables used, there is little evidence that the RER in Albania is significantly misaligned

from the medium-term equilibrium path based on productivity differentials. Another useful finding is that both government spending and interest rate differentials, which reflect the stance of fiscal and monetary policy respectively, do affect the RER. A relaxation of either of them would lead to a depreciation of the RER that would be reflected in higher domestic prices and/or depreciation of the nominal exchange rate. The same impact could result from a drop in remittances and/or deterioration in the terms of trade.

The rest of the paper is organized as follows. Section 2 describes the mainstream exchange rate theories focusing on those that have particular relevance for emerging markets. Sections 3 and 4 present the methodology used and the results obtained from this exercise. In Section 5 we attempt to evaluate the degree of an exchange rate misalignment in Albania. Section 6 concludes.

2. An overview of modelling the equilibrium exchange rate in the medium-term

The purchasing power parity (PPP) doctrine came in handy during the interwar period to solve the debate on how to restore international exchange rate parities. This view is still broadly accepted in the literature as long-run equilibrium, in which relative prices for similar goods at home and abroad should be equal (when measured in a common currency). Hence, the real exchange rate is constant and equal to unity. This unvarying equilibrium is maintained not necessarily *via* consumer arbitrage, but also by the shift of production from the overvalued to the undervalued economy.

After the breakdown of the Bretton Woods system, the PPP theory came into question on both theoretical and empirical grounds. Since the late 1970s, a substantial stream of literature has well documented that the real exchange rate is either non-stationary, or that the speed of adjustment to the PPP equilibrium path is quite slow and takes many years or even decades to eventually converge.

Attempts to understand real exchange rate movements in the medium-term have pushed economists to develop more sophisticated methods. By employing real economic

fundamentals, these models allow for a time-varying equilibrium path for the real exchange rate. According to Driver and Westaway (2004), the exchange rate is regarded to be in medium-term equilibrium when the economy has reached an internal and external balance, but asset stocks may still be changing. Internal balance is obtained when domestic production is at its potential level (so the output gap is zero) and the unemployment rate is equal to its NAIRU level. External balance, on the other hand, can be characterized by a ‘sustainable’ current account position, not necessarily equal to zero, which eventually converges to the stock-flow equilibrium.

Two noticeable methodologies with respect to estimating the medium-term equilibrium are the ‘macroeconomic balance’ approach and the reduced-form ‘equilibrium real exchange’ approach. The first methodology known as the fundamental equilibrium exchange rate approach (FEER) can be implemented by estimating either a full-scale macroeconometric model or a partial equilibrium form. In both cases, the optimal levels of current account position and output growth associated with low inflation have to be initially determined by the use of economic judgment or estimated regressions. In effect, this process consists in establishing a target of current account position, estimating the income and real exchange rate elasticities of trade, and calculating the change in the REER that is needed for the current account to adjust to its target value (Égert *et al.* 2006). On the other hand, the reduced form equilibrium exchange rate approach estimates the equilibrium relationship between the real exchange rate and a set of underlying fundamentals, which often include net foreign assets, the productivity differential, the terms of trade and government spending. Therefore, in contrast to the internal-external balance approach, the second methodology imposes less normative structure on the model and the computations as well.

This study follows the stock-flow approach to examine the equilibrium real exchange rate in Albania. The proposed methodology has been applied in the literature for developed countries (Faruqee 1995, Alberola *et al.* 1999) and more recently for Eastern European economies (Égert *et al.* 2006, Alberola and Navia 2007). Over all, their theoretical model, which encompasses both the balance of payments and the Balassa-Samuelson approach to the real exchange rate determinants, depends on a very limited set of fundamentals, namely the stock of net foreign assets and productivity differentials.

Using cointegration techniques, Alberola *et al.* (1999) conclude that net foreign assets and developments in the sectoral prices are the fundamental factors underlying the behaviour of the real exchange rate for major currencies as well as for a panel of currencies of the EU members. While most of the literature for transition economies focuses on productivity gains as a key determinant of the real exchange rate movements¹, the role of portfolio theory appears less clear-cut. A number of empirical findings suggest that increases in net foreign assets lead to exchange rate depreciation in emerging markets and the CEE countries (Burgess *et al.* 2003, Lomatzsch and Tober 2002, Égert *et al.* 2004), while other papers reach opposite conclusions (Rahn 2003, Égert and Lomatzsch 2003). After confirming the importance of relative productivity in driving exchange rates in transition economies, Alberola and Navia (2007) argue that the impact of net foreign assets may be positive or negative, depending on the relation between financing costs and growth. Assuming that financing costs exceed growth, the exchange rate is going to appreciate if assets continue to accumulate.

3. Modelling the equilibrium real exchange rate

As mentioned earlier, this paper adopts the stock-flow approach developed by Alberola *et al.* (1999) and Égert *et al.* (2004) in order to evaluate the equilibrium real exchange rate in Albania. This approach differentiates between the long-term misalignment (undervaluation) caused by the Balassa-Samuelson effect and other forms of misalignments that cannot be explained by the difference in the productivity levels between developing and developed countries. The former is a misalignment that would adjust toward a PPP path only gradually in the long-run as the productivity level in the developing country converges toward that of the advanced economies. If the RER moves along this convergence path, it is considered to be in an equilibrium undervaluation which reflects productivity differentials.

The approach incorporates two competing theories of the real exchange rate determination in a reduced-form equation, by estimating the CPI-based real exchange rate

¹ See Égert *et al.* (2006) for an excellent literature review related to the transition countries.

(*RER*) as a negative function of the productivity differentials (*PROD*) and net foreign assets (*NFA*):

$$RER = f(PROD, NFA) \quad (1)$$

The impact of the productivity differential between home and abroad is expected to match the so-called Balassa-Samuelson effect, which states that a faster productivity growth in the tradable sector compared to the non-tradable sector should lead to a domestic currency appreciation. Because of data limitations, labour productivity in each country has been measured as real domestic GDP divided by total employment. Although this composition does not closely capture the effect of productivity increases in the traded goods sector, we expect to follow a similar pattern with the B-S effect as the catching-up process is taking place.

The accumulation of assets is also expected to increase the value of the domestic currency. According to the standard inter-temporal macroeconomic models, a country with relatively high net foreign assets may be able to ‘handle’ its currency appreciation and the associated trade deficits while remaining solvent. Alberola and Navia (2007) argue that the relationship between the real exchange rate and net foreign assets depends on (a) the divergence of actual asset holdings from its targeted holdings and (b) the stock of net foreign assets. An accumulation of assets would require the real exchange rate to adjust by appreciating (assuming that the difference between the cost of financing abroad and growth is positive).

Initially, the relationship between the real exchange rate and the two core variables is examined. Then, the robustness of the results in equation (1) is checked by adding a set of other control variables that include government expenditure (*EXP*), openness (*OPEN*), public debt (*PDEBT*), the terms of trade (*TOT*), emigrants remittances (*REM*) and the uncovered interest rate parity (*RIRD*), i.e.

$$RER = f(PROD, NFA, EXP) \quad (1A)$$

$$RER = f(PROD, NFA, OPEN) \quad (1B)$$

$$RER = f(PROD, NFA, PDEBT) \quad (1C)$$

$$RER = f(PROD, NFA, TOT) \quad (1D)$$

$$RER = f(PROD, NFA, REM) \quad (1E)$$

$$RER = f(PROD, NFA, RIRD) \quad (1F)$$

Private and public consumption are often included in the empirical literature to account for demand-side factors. If spending falls more on non-tradables than tradables, it could raise the relative price of non-tradables and thus strengthen the real exchange rate. Due to lack of data, we will only use government spending (as a ratio of GDP) to capture demand factors. Nevertheless, it is argued that higher government spending could have an adverse effect on the real exchange rate in the long-run, assuming that the Ricardian equivalence holds. The overall effect of this variable might therefore be ambiguous.

Trade openness may be viewed as a transition component of the real exchange rate dynamics, since a full-grown economy would experience limited variation in its total trade to GDP. In the face of foreign competition, tradable prices may need to go down and thus increase the real exchange rate. In the case of Albania, an increase in openness resulting from trade liberalization is expected to deteriorate the current account position and hence the real exchange rate will depreciate.

Due to a shortage of data, the country risk premium is approximated by using the ratio of public debt to GDP. A surge in government debt is generally perceived as higher risk, thus reducing the desire of holding more of that country's currency.

A positive shock to the ratio of export to import prices is expected to have real income or wealth effects. In Albania, the share of commodity exports in total exports is low and thus an improvement in the terms of trade will lead to a boom in exports and generate higher income. Therefore, the domestic currency will appreciate in real terms.

The remittances from Albanian emigrants working abroad have averaged around 12.6 percent of GDP during the period 1999-2008. Consequently, their impact can be regarded as an additional dimension in estimating the equilibrium real exchange rate of the lek. In general, a rise in remittances implies a real exchange rate appreciation. However, as Mongardini and Rayner (2009) argue, it is only that portion of the remittances that is used to increase demand in the non-tradable sector that could

strengthen the equilibrium real exchange rate. Conversely, if these transfers are used to ease supply constraints in the non-tradable sector, the real exchange rate would likely depreciate.

The real interest rate differential is often included in real exchange rate modelling *via* the uncovered interest rate parity condition (UIP). According to the UIP, ‘similar assets’ should yield ‘similar expected returns’. Therefore, a positive difference between domestic and foreign interest rates should be offset by an expected depreciation of the domestic currency in the long-run. However, the empirical evidence suggests that this condition does not necessarily materialize within rather short periods of time, thus the inclusion of the *RIRD* to explain deviations of the *RER* from its medium-term equilibrium path seems to be justified in this context. Because a positive interest rate differential should induce portfolio reallocation and higher demand for the currency with higher return, one would expect the latter to appreciate relative to the other currency.

4. The econometric methodology

4.1. Data description and methodology

The data series are collected from the Bank of Albania and the Institute of Statistics (INSTAT) for Albania, the European Central Bank and the Deutsche Bundesbank for the euro area. The empirical analysis is based on 40 observations of quarterly data from 1999Q1 to 2008Q4.

In the equations above, *RER* is the natural logarithm of the ALL/EUR exchange rate adjusted for consumer prices. It is expressed as Albanian leks per one euro, thus a fall in the index indicates a lek appreciation. *PROD* is the productivity differential between Albania and the euro area [$\ln(\text{PRODAL}) - \ln(\text{PRODXZ})$], where productivity is measured as real GDP divided by total employment. *NFA* is the ratio of net foreign assets to gross domestic production. The control variables that have been added to the reduced-form equation (1) consist of public spending to GDP ratio (*GOV*); openness (*OPEN*), measured as total trade to GDP; public debt to GDP; remittances to GDP; real interest rate differential (*RIRD*) between Albania and the euro area (i.e. the interest rate on 12-

month T-bills adjusted for CPI inflation); and the terms of trade (*TOT*, export over import prices), where export prices are constructed by using a PPI-export index², while the import price index is proxied by the euro area (16) export prices.

We adopt the bound testing (or autoregressive distributed lag ARDL) cointegration procedure developed by Pesaran and Shin (1999) to determine the direction of causation among variables in equation (1). There are certain advantages to use this approach instead of the conventional Johansen cointegration technique. While the latter requires all variables to be integrated of order one to test for the existence of a long-run relationship among them, the ARDL method is less strict and tests the variables irrespective of whether they are either purely $I(0)$, or purely $I(1)$ or a mixture of both. Next, the cointegration relationship can be estimated by OLS in a single reduced form equation once the lag length of the model is identified. Moreover, the test is relatively more efficient in small samples with a limited number of observations. For that reason, we employ the set of critical values for samples between 30 to 80 observations developed originally by Narayan (2004).

To test for cointegration among the variables in equation (1), we follow the bounds testing procedure (as summarized in Narayan 2004) by first estimating an unrestricted error correction regression in the following form:

$$\begin{aligned} \Delta \ln RER_t = & \alpha_0 + \beta_1 \ln RER_{t-1} + \beta_2 PROD_{t-1} + \beta_3 NFA_{t-1} + \\ & + \sum_{i=1}^p \delta_i \Delta \ln RER_{t-i} + \sum_{j=1}^q \delta_j \Delta PROD_{t-j} + \sum_{m=1}^q \delta_m \Delta NFA_{t-m} + \varepsilon_t \end{aligned} \quad (2)$$

where β_i are the long-term multipliers, α_0 is the drift and Δ is the first-difference operator.

The statistic underlying the procedure is the *F-statistic* of the Wald test, which is used to test for the joint significance of the coefficients of the lagged levels of the variables, i.e. the null hypothesis of no cointegration among variables is $H_0: \beta_1 = \beta_2 = \beta_3 = 0$ against the alternative hypothesis $H_A: \beta_1 \neq \beta_2 \neq \beta_3 \neq 0$. The test involves asymptotic critical value bounds, which depend on the integration order of the variables $I(d)$ (where $0 \leq d \leq 1$). The *upper* bound of the test corresponds to the critical values for the $I(1)$ series,

² INSTAT reports PPI-export prices starting from Jan-07; the series is extrapolated before that with selected tradable items in the PPI index weighted according to their respective shares in the PPI-export index.

while the *lower* bound is formed at the critical values for the $I(0)$ series. If the value of the F -test is above the upper bound, it indicates that variables are cointegrated regardless of their order of integration. Conversely, the null hypothesis of no long-run relationship cannot be rejected if the test statistic falls below the lower bound.

Once cointegration among variables is established, the long-run relationship between the RER and the explanatory variables can be estimated as:

$$\ln RER_t = \alpha_0 + \sum_{p=1}^m \beta_1 \ln RER_{t-p} + \sum_{p=0}^n \beta_2 PROD_{t-p} + \sum_{p=0}^p \beta_3 NFA_{t-p} + \varepsilon_t \quad (3)$$

where all variables are as previously defined. Pesaran and Shin (1999) recommended choosing a maximum of 8 lags for quarterly data. To this end, we allow the lag length of the explanatory variables to be determined by the Schwarz criterion.

Having estimated the long-run parameters, the short-run relationship can be derived by using an error correction model of the form:

$$\Delta \ln RER_t = \delta_0 + \sum_{p=1}^n \delta_1 \Delta \ln RER_{t-p} + \sum_{p=0}^n \delta_2 \Delta PROD_{t-p} + \sum_{p=0}^n \delta_3 \Delta NFA_{t-p} + \lambda ECM_{t-1} + \varepsilon_t \quad (4)$$

where δ_i indicate the short-term dynamics, λ measures the speed of adjustment of the real exchange rate towards equilibrium, and ECM is the error correction term from equation (3), defined as:

$$ECM_t = \ln RER_t - \alpha_0 - \sum_{p=1}^m \beta_1 \ln RER_{t-p} - \sum_{p=0}^n \beta_2 PROD_{t-p} - \sum_{p=0}^p \beta_3 NFA_{t-p} \quad (5)$$

4.2 Empirical findings

The bound test on cointegration is based on the assumption that the variables are integrated of order $I(0)$ or $I(1)$, but not $I(2)$ or a higher order. Therefore, a unit root test for the variables is still necessary to ensure whether the ARDL model should be used or

not. The augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests for a unit root indicate that the underlying regressors either are $I(0)$ or $I(1)$ (see Table 1), so the bound test for cointegration could be relevant.

The presence of long-run relationships is tested by estimating equation (2) as prescribed in Pesaran and Pesaran (1997). To check whether there exists more than one cointegrated vector, each variable is estimated as a dependent variable on the left hand side of equation (2). Table 2 displays the calculated F -statistics when the regressions are normalized on RER , $PROD$ and NFA variables. The results indicate only one cointegrated vector which exists when the RER is regressed on $PROD$ and NFA . The calculated F -statistics for regressions normalized on $PROD$ and NFA are found to be under the lower bound at 1, 5 and 10 percent level of significance. Therefore, the null hypothesis of no cointegration cannot be rejected.

[Insert table 1 here]

[Insert table 2 here]

Having found that cointegration exists among the variables when normalizing on RER , equation (3) is then estimated in order to assess how the real exchange rate of the lek is linked to productivity and net foreign assets in the long-run. Similarly, we estimate equations 1A through 1F to check whether additional factors have influenced the CPI-based real exchange rate developments in Albania. The long-run relationship between the real exchange rate and the explanatory variables is presented in Table 3.³

The parameter estimates for our main variables of interest, i.e. productivity and net foreign assets, have the expected negative sign, indicating that an increase in either variable would lead to a real exchange rate appreciation. Although coefficients for NFA are in general not statistically significant, they preserve their negative sign and magnitude in all of the estimated equations. The results seem to be in line with other empirical findings for the transition economies, where productivity gains have appeared to be the main driving force behind the CPI-deflated exchange rate movements.

³ This study is concerned about the long-term determinants of the real exchange rate, which we have presented in Table 3. The short-term reactions can be provided by the authors upon request.

Furthermore, the inclusion of extra controlling variables does not appear to notably improve the explanatory power of the reduced-form equation. The Schwarz information criterion is not minimized when these variables are added to the initial equation. All coefficients are statistically insignificant and in the case of openness, public debt and the real interest rate differential they take an incorrect sign. With respect to *RIRD*, Driver and Westaway (2004) argue that in an economy where the ‘real exchange rate is converging towards its long-run stock-flow equilibrium, domestic real interest rates will still be in the process of converging to world levels’; hence the contradictory parameter estimate on the real interest rate differential. An increase in government spending (as a ratio of GDP) seems to undermine credibility in the domestic currency, thus leading to a real depreciation of the lek. On the other hand, inflows of remittances and improved terms of trade are predisposed to strengthen the domestic currency in real terms.

A negative and significant error correction term at 1 percent level is found in all equations, suggesting thus that there is causality in at least one direction (Granger 1986). The coefficient on the error correction term of around -0.73 indicates a rather fast convergence to equilibrium.

[Insert table 3 here]

[Insert table 4 here]

Have the estimated parameters changed over time? The in-sample Chow breakpoint test suggests that a structural break exists in each of the coefficients between 2001 and 2003. For that reason, the long-run equations were re-estimated by adding intercept and slope dummies that were equal to one from 1999 to around 2002 quarters and zero after that. The results indicate that the impact of productivity on the real exchange rate has risen considerably in the second sub-period, while that of net foreign assets has fallen (Table 4). *RER* has also been very sensitive to government spending in the earlier period, and the size of its reaction appears to have diminished after 2002. Even though public debt maintains its incorrect sign in both periods, trade liberalization and openness seem to have been associated with real depreciation of the lek until 2002. However, this link is not clear cut while it changes sign thereafter. The impact of remittances has intensified and becomes significant in the second sub-period.

Moreover, the new estimates uncover the ambiguity pertaining to the incorrect sign on *RIRD* in Table 3. The coefficient is positive in the first sub-period where the exchange rate and the interest rate convergence process toward long-term levels was taking place, and it turns negative in the second sub-period in line with the UIP and portfolio theory predictions. Interestingly, the parameter estimate for the terms of trade turn out to be different from *a priori* expectations in both periods, hence raising doubts about the previous inference of a negative link from Table 3.

5. Real misalignments

In this section, we investigate whether or not the ALL/Euro exchange rate has been closely aligned to its medium-term equilibrium path. We also try to distinguish between *speculative* and *total* (cyclical *plus* speculative) misalignments. The first is defined as deviations of the actual real exchange rate from the estimated equilibrium real exchange rate. It denotes the exchange rate misalignment in the short run. The total real misalignment represents the divergence of the observed real exchange rate from an estimated equilibrium that is based on sustainable values of the fundamentals. The medium-term equilibrium is thus obtained by applying the Hodrick-Prescott filter to the estimated equilibrium real exchange rate to get rid of the cyclical and speculative elements.

[Insert figure A here]

[Insert figure B here]

The short-run and medium-run misalignments obtained by using the estimated equations (1) to (1F) are displayed in Figures A and B, respectively. The real exchange rate exhibits considerable speculative and total deviations until 2004, and much less in the following years. The total real misalignments suggest that the lek was undervalued in 1999. A substantial overvaluation by as much as 10 percent seems to have taken place about the time of the euro currency release in early 2002. The situation quickly reversed and the lek remained fundamentally undervalued at approximately 5 percent for an

extended period from mid-2002 to 2003. From that time onward, the lek has shown the tendency to stay rather close to its short- and medium-term equilibrium path.

6. Conclusion

Estimating real exchange rate (RER) misalignments for Albania is not an easy task given both the short time series available and their quality and the existence of several structural breaks - a typical feature of any transition country – as well as the uncertainty surrounding the methodologies used for calculate the equilibrium RER. With these difficulties in mind, we carry out an exercise to get a broad sense of the degree to which medium-term misalignments could lead to costly adjustments.

The empirical findings suggest that during the period 1999Q1-2008Q4, the bilateral real exchange rate of the lek against the euro has been affected considerably by the relative productivity at home and abroad and to a lesser extent by net foreign assets. The parameters in front of other controlling variables added to the reduced-form equation are statistically insignificant, or even have a non-expected sign, implying a limited role in determining the real exchange rate equilibrium of the lek.

The results also show that regardless of the set of controlling variables used, there is little evidence that the *RER* in Albania is significantly misaligned from the mid-term equilibrium path based on productivity differentials and net foreign assets. It is interesting to observe that both government spending and interest rate differentials, which reflect the stance of the fiscal and monetary policy pursued, do affect *RER*. A relaxation of either of them would lead to a real depreciation of the lek that would be reflected in higher domestic prices and/or depreciation of the nominal exchange rate. The same impact could result from a drop in emigrant's remittances and perhaps a deterioration of the terms of trade.

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Table 1: Unit Root Tests

Variable	ADF test results				Phillips-Perron test results			
	Null Hypothesis: Unit root				Null Hypothesis: Unit root			
	Levels		1 st difference		Levels		1 st difference	
	Prob.	Lag ^a	Prob.	Lag ^a	Prob.	Bandwidth ^b	Prob.	Bandwidth ^b
	With constant							
<i>RER</i>	0.0053	0	0.0001	0	0.0051	2	0.0001	1
<i>PROD</i>	0.0114	2	0.0523	2	0.0549	5	0.0000	4
<i>NFA</i>	0.5123	0	0.0001	0	0.4108	2	0.0001	0
<i>EXP</i>	0.5419	3	0.0001	2	0.0000	14	0.0001	11
<i>TOT</i>	0.1661	0	0.0000	0	0.1112	2	0.0000	1
<i>RIRD</i>	0.0272	3	0.0097	1	0.4570	2	0.0000	1
<i>REM</i>	0.0000	0	0.0000	2	0.0000	5	0.0001	39
<i>OPEN</i>	0.9051	3	0.0000	2	0.3710	5	0.0001	16
<i>PDEBT</i>	0.2166	0	0.0000	0	0.0287	11	0.0000	5
	With constant and trend							
<i>RER</i>	0.0166	0	0.0001	0	0.0172	2	0.0002	3
<i>PROD</i>	0.7194	2	0.0000	1	0.3520	5	0.0000	4
<i>NFA</i>	0.9408	0	0.0001	0	0.9320	1	0.0001	3
<i>EXP</i>	0.9909	3	0.0000	2	0.0000	39	0.0000	10
<i>TOT</i>	0.1030	0	0.0000	0	0.1030	0	0.0000	3
<i>RIRD</i>	0.0000	7	0.0552	1	0.3436	3	0.0002	0
<i>REM</i>	0.0003	0	0.0000	2	0.0003	5	0.0000	39
<i>OPEN</i>	0.0004	0	0.0000	2	0.0004	2	0.0000	16
<i>PDEBT</i>	0.7725	0	0.0000	0	0.8309	4	0.0000	17
	Without constant and trend							
<i>RER</i>	0.0263	0	0.0000	0	0.0263	0	0.0000	0
<i>PROD</i>	0.7762	3	0.0746	2	0.8997	5	0.0000	5
<i>NFA</i>	0.6411	0	0.0000	0	0.6334	2	0.0000	0
<i>EXP</i>	0.5520	3	0.0000	2	0.4783	12	0.0000	11
<i>TOT</i>	0.5960	0	0.0000	0	0.5958	1	0.0000	1
<i>RIRD</i>	0.2109	0	0.0005	1	0.2114	1	0.0000	1
<i>REM</i>	0.2251	3	0.0000	2	0.1176	26	0.0000	39
<i>OPEN</i>	0.9994	3	0.0016	3	0.9857	14	0.0000	26
<i>PDEBT</i>	0.0255	0	0.0000	0	0.0039	8	0.0000	0

^aAutomatic selection of lags based on SC; ^bNewey-West bandwidth selection using Bartlett kernel.

Table 2: Results from Bound Tests on Equation (2)

Dependent Variable	AIC-SC lags	F-statistic	df	Prob.	Outcome ^{a)}
$F_{RER}(RER PROD,NFA)$	0	4.7992	3, 33	0.0070	Cointegration
$F_{PROD}(PROD RER,NFA)$	0	0.7730	3, 33	0.5174	No cointegration
$F_{NFA}(NFA RER,PROD)$	1	2.2693	3, 33	0.0987	No cointegration

^{a)} Based on critical values suggested by Narayan (2004) at 5 percent significance level (Note: the critical values for an equation with intercept and no trend where $k=2$ and $n=40$, the lower bound $I(0)=4.770$ and higher bound $I(1)=5.855$ at 1% level of significance; $I(0)=3.435$ and $I(1)=4.260$ at 5% significance level; and $I(0)=2.835$ and $I(1)=3.585$ at 10% significance level).

Table 3: Estimations of the Long-Run Parameters (1999Q1:2008Q4)

	Reduced-form equation (1)	<i>EXP</i>	<i>OPEN</i>	<i>PDEBT</i>	<i>REM</i>	<i>RIRD</i>	<i>TOT</i>
<i>PROD</i>	-0.2681 *** <i>0.0001</i>	-0.2698 *** <i>0.0001</i>	-0.2595 *** <i>0.0002</i>	-0.3279 *** <i>0.0002</i>	-0.2813 *** <i>0.0000</i>	-0.2164 *** <i>0.0002</i>	-0.2677 *** <i>0.0001</i>
<i>NFA</i>	-0.0918 <i>0.1168</i>	-0.0850 <i>0.2306</i>	-0.0984 * <i>0.0997</i>	-0.1027 <i>0.1374</i>	-0.0855 <i>0.1273</i>	-0.0231 <i>0.7708</i>	-0.0965 <i>0.1210</i>
<i>Control Variables</i>		0.0189 <i>0.7741</i>	-0.0295 <i>0.3665</i>	-0.2628 <i>0.2100</i>	-0.0887 <i>0.3834</i>	0.3926 <i>0.1870</i>	-0.0159 <i>0.7260</i>
<i>ECM_{t-1}</i>	-0.7276 *** <i>0.0001</i>	-0.7261 *** <i>0.0001</i>	-0.7805 *** <i>0.0000</i>	-0.7082 *** <i>0.0001</i>	-0.7327 *** <i>0.0001</i>	-0.5741 *** <i>0.0005</i>	-0.7462 *** <i>0.0000</i>
Adj. R ²	0.9222	0.9199	0.9205	0.9228	0.9221	0.9275	0.9198
S.E. of regression	0.0206	0.0209	0.0208	0.0205	0.0206	0.0199	0.0209
SC criterion	-4.4161	-4.3256	-4.3340	-4.3627	-4.3536	-4.4256	-4.3248
JB test (prob.)	0.3065	0.3589	0.2464	0.6106	0.0501	0.9279	0.3315
LM test (prob.(4))	0.7964	0.8013	0.6902	0.9020	0.9096	0.3280	0.8328
White test (prob.)	0.1059	0.1477	0.0466	0.3194	0.0179	0.1246	0.1669

Table 4: Change in the long-term relationship

		Eq. (1)		<i>EXP</i>		<i>OPEN</i>		<i>PDEBT</i>		<i>REM</i>		<i>RIRD</i>		<i>TOT</i>	
<i>PROD</i>	1999-2002	-0.391	**	-0.326	***	-0.422	***	-0.355	***	-0.410	***	-0.363	***	-0.368	***
	2003-2008	-0.532	***	-0.490	***	-0.575	***	-0.531	***	-0.511	***	-0.448	***	-0.495	***
<i>NFA</i>	1999-2002	-0.234	***	-0.202	***	-0.166	***	-0.237	***	-0.210	***	-0.173	**	-0.170	***
	2003-2008	-0.182	***	-0.152	***	-0.111	***	-0.187	***	-0.155	***	-0.127	***	-0.121	***
<i>Control Var.</i>	1999-2002			0.163	***	-0.134	***	-0.017		-0.017		0.212	*	0.234	***
	2003-2008			0.038	***	0.128	***	-0.149		-0.138		-0.308	**	0.184	***

Figure A: Short-term (speculative) real misalignment

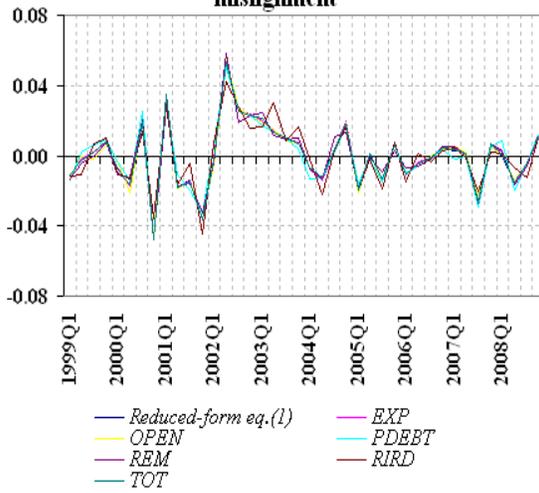
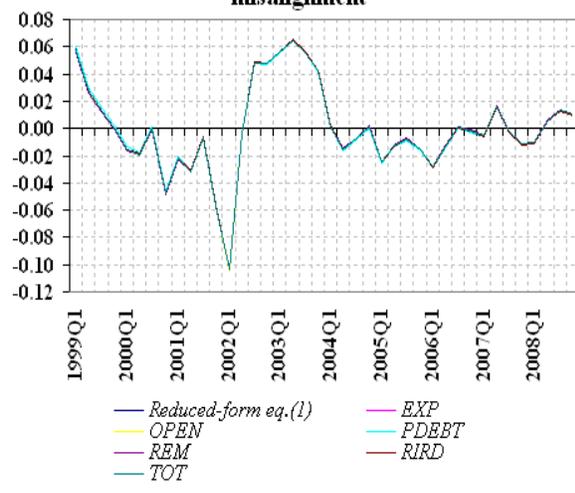


Figure B: Medium-term (total) real misalignment



Discussion

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1. Introduction

This is a very interesting paper, which tries to explain and evaluate the evolution of the exchange rate in Albania, an emerging small open economy following a freely floating exchange rate policy.

The study determines the equilibrium exchange rate path of the lek (the currency of Albania) against the euro (ALL/EUR) as a function mainly of the productivity growth differential between Albania and the euro area. The net foreign liabilities position of Albania is also included as a determining factor, without, however, an unambiguous theory explaining its effect on the evolution of the exchange rate over time. Finally, other factors are also used, including the rate of increase of government expenditure (as a proxy for domestic demand), the terms of trade, openness, emigrant's remittances, the uncovered interest rate parity and the level and the growth rate of public debt. Then, it checks for periods of significant misalignment of the actual foreign exchange rate from the estimated equilibrium exchange rate. The conclusion is that the free floating exchange rate regime seems to work well in Albania, as it has prevented long periods of significant misalignment of the actual exchange rate from the estimated time varying equilibrium path of the real exchange rate.

My own discussion will concentrate on the following topics:

- (1) The meaning of the equilibrium exchange rate.
- (2) The effect on the exchange rate of the structure of the balance of payments, especially in countries like Albania and Greece.

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(3) The notion that the appropriate (i.e. optimal) exchange rate may be different for various sectors of the economy, which may be of interest for the economic policy of the country.

2. The main building blocks of the model

The study chooses to estimate the equilibrium path of the real effective exchange rate (REER) in terms of the relative CPI. The REER in terms of the relative Unit Labour Cost (REERULC) is not considered, mainly due to the lack of ULC data in Albania.

The appreciating trends of the REER are attributed to the existence of the Balassa-Samuelson effect, according to which high relative productivity growth in the tradable sector of emerging economies leads to real appreciation. This conclusion seems to be supported by the widely held view that wages and prices are determined to a great extent by productivity in Albania. In fact, the relevant index of the relationship between productivity and wages presented by the World Economic Forum (WEF) takes the value of 4.7 (out of 7), compared with the low value of 3.8 for Greece.

Moreover, the concentrated Net Foreign Liabilities (NFL), i.e. the concentrated capital account surpluses (current account deficits) of Albania are assumed to imply a depreciation of the REER, as the inflow of foreign capital falls as the risk from the high level of NFL grows. Moreover, as the level of NFL grows, it implies even higher future current account deficits, due to the increased interest payments to foreign investors. On the other hand, these capital inflows, and especially inward FDI, are also assumed to be great contributors to the observed high productivity growth in Albania. The possibility that this capital account surplus contributes also to current appreciation is not taken into account.

3. The exchange rate and the structure of the balance of payments

Albania's balance of payments has some peculiar characteristics, which are determined by and also affect the level and the evolution of the exchange rate. Imports of goods and services exceed 57% of GDP, while exports of goods and services do not exceed 52.5% of imports. The capital account surplus reached 16.7% of GDP in 2008 and averaged 12.6% of GDP in the period 1999-2008, with almost half of it being Foreign Direct Investment (FDI). This capital inflow financed the current account deficit (14.3% of GDP in 2009) and also boosted foreign exchange reserves (see Table 1).

	Million €	% of GDP
GDP	8.694,0	100,0%
Imports of goods and services	-4.967,3	-57,1%
Exports of goods and services	2.605,2	30,0%
Incomes balance	106,4	1,2%
Current & capital transfers	1.015,0	11,7%
Current Account	-1.240,6	-14,3%
Capital Account	1.454,6	16,7%
Source: Bank of Albania and the IMF		

Therefore, the current ALL/EUR exchange rate is determined by the financing of imports of goods and services by 20.4% from emigrants remittances and by 29,8% from net capital inflows from abroad. Exports contributed to the financing of imports by only 52.6%.

4. Emigrant's remittances, capital account surplus and the equilibrium exchange rate

The equilibrium exchange rate is estimated for Albania assuming that emigrant's remittances and other income transfers from abroad, which exceeded 14.3% of GDP in 2008 and the capital account surplus (16.7% of GDP in 2008) are permanent characteristics of the Albanian economy. In fact, in high growth periods, capital inflows (including FDI) are induced by the existence of emigrant's remittances, while in a recession these two sources of purchasing power from abroad fall together. These two sources of supply of foreign exchange have contributed to the maintenance of the nominal exchange rate of the lek at an appreciated rate against the euro for the whole period from 2000 until 2008 (Diagram 1). Was this an appropriate, i.e. an equilibrium exchange rate for Albania? In order to answer this question we must determine the reference value with respect to which this rate is considered as the equilibrium rate of the appropriate exchange rate.



The lek exchange rate appreciated over the whole period 2003-2008, implying a continuous increase in the country's current account deficit, despite the rapid increase in emigrant's remittances. This appreciating trend was mainly due to increasing emigrant's remittances and capital inflows in the 2000s and (notwithstanding productivity differentials) may have implied an overvaluation of the exchange rate in this period, at least for the main tradable goods and services sectors of the Albanian economy.

This structure of Albania's Balance of Payments implies a current real exchange rate overvaluation concerning the domestic tradable goods and services sectors (manufacturing industry, agriculture and tourism). In fact, nominal and real exchange rate overvaluation contribute to sifting investment and production towards non-tradables and explain why exports of goods and services in Albania do not exceed 52% of imports of goods and services (see Table 1). This may be considered a not acceptable economic development pattern for an emerging economy. Then, a freely floating exchange rate may not be the more appropriate policy for Albania.

The study under review tells us that in the long-run capital inflows (and especially FDI) to emerging economies contribute to the substantial increase in domestic relative productivity, justifying the observed appreciation of the domestic real exchange rate in the short- and the long-run. This productivity increase and the existence of the Balassa-Samuelson effect in the countries of central and eastern Europe are verified by the data. However, the current account deficits of some countries became obviously unsustainable in 2008-2009.

Moreover, some countries may not consider remittances or other financial transfers a permanent feature of their economies. Remittances may fall suddenly, as actually happened in Albania in 2009, causing an abrupt devaluation of the nominal exchange rate and a substantial fall of domestic bank deposits (Diagram 1). Therefore, the government could consider that the proper real exchange rate for the country should be at a level at which it would imply a current account deficit not exceeding net FDI inflows, given the existence of substantial inflows of emigrant's remittances or other financial transfers.

Overall, the optimal structure of the domestic economy may be substantially different from that implied by the overvalued exchange rate prevailing under the influence of emigrant's remittances and excessive capital inflows.

Finally, the real exchange rate implied by the structure of Albania's Balance of Payments as it is today, may not be that determined by the optimal rate of investment and savings in Albania over the medium and the longer term. For the above reasons, the term

equilibrium real exchange rate, as determined in the present paper, may not be the most relevant one for determining economic policies in countries like Albania and Greece. In fact, exchange rate policy of various governments around the world does not pay much attention to equilibrium REERs. Many countries target international competitiveness in order to achieve higher GDP growth through exports and imports substitution. Others countries target higher GDP growth through domestic spending financed by capital inflows. Consider, for example, the exchange rate policies of the following countries:

Albania (GDP: € 9 billion): Flexible exchange rates (managed?). CA Deficit: 12% of GDP in 2008. REER: appreciating until 2008.

Greece: (GDP: € 240 billion): A member of the euro area. CA Deficit: 12.7% of GDP in 2008. REER: appreciating in terms of both relative CPI and ULC.

Germany: (GDP: € 2.500 billion): A member of the euro area. CA Surplus: 6.6% of GDP. REER: Depreciating in terms of both CPI and ULC.

Bulgaria: Unilateral Fixed exchange rate to the euro since 1997. REER: Appreciating in terms of both CPI and ULC.

Romania, Hungary: Managed float exchange rate, appreciating in 2005-2008, but with substantial depreciation during the financial crisis. The IMF and the euro area provided protection for orderly exchange rate policy.

China: Fixed to the dollar. REER: Depreciating consistently.

Euro area: Flexible -Passive. REER: Appreciating consistently.

5. Conclusion

A higher growth in productivity is not enough to explain a fast appreciating REER in countries which experience substantial and increasing inflows of income and capital from abroad. Moreover, the REER based on relative CPI may not accurately measure domestic real appreciation in terms of relative ULC, as domestic inflation is determined

by imports, which constitute more than 50% of GDP, and the purchasing power to pay for them is not provided by domestic production or exports but from emigrant's remittances and huge capital inflows.

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