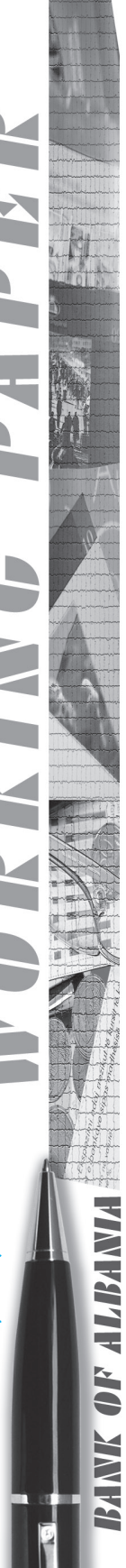

WORKING PAPER

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THE EQUILIBRIUM REAL EXCHANGE RATE OF LEK VIS-À-VIS 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 of 1999-2008 and finally check whether there is a significant misalignment. Foremost, we examine the impact of productivity differential and net foreign assets on the real exchange rate of lek. A number of other control variables have been added to the reduced-form equation, such as government expenditure, the terms of trade, remittances, uncovered interest parity, etc., but they did not significantly improve the explanatory power. The results confirm the benefits of the free-floating regime adopted in Albania that prevents long periods of significant misalignments.

JEL Classification: C1, C3, F3.
Keywords: exchange rate, stock-flow approach, emerging economies, Albania.

1. INTRODUCTION

Albania opted for a flexible exchange rate from the beginning of transition not simply because of its limited international reserves but also to avoid costly adjustments of possible exchange rate misalignments that usually characterize pegged 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 not least to highlight the importance of fiscal and monetary discipline to ensure the stability of internal and external equilibrium in absence of a very explicit anchor. This paper is a first attempt to assess the relationship between the Lek/Euro exchange rate and some key fundamentals as well as the role of other policies and factors that might disturb its equilibrium.

It would be misleading to adopt a strong definition of purchase power parity (PPP) for estimating the distance from the exchange rate equilibrium of an emerging market like Albania. The long process of convergence with more advanced countries involves several structural changes that shape the mid-term path of the exchange rate of emerging markets in a way that could diverge considerably from the very long-term PPP equilibrium 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 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 toward a PPP path gradually in the long run as the productivity level in the developing country converges toward that of more advanced economies. If the real equilibrium 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 mid-term equilibrium path based on productivity differentials. Another useful observation is that both government spending and interest rate differentials, which reflect fiscal and monetary stances respectively, do affect RER. A relaxation of either of them would lead to a depreciation of RER that would be reflected in higher domestic prices and/or depreciation of nominal exchange rate. The same impact could result from a drop in remittances and/or a deterioration of terms of trade.

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

2. OVERVIEW OF MODELING EQUILIBRIUM EXCHANGE RATE IN THE MEDIUM RUN

The purchasing power parity (PPP) doctrine came in handy during the interwar period in the twentieth century to solve the debate on how to restore international exchange rate parities. This view is still broadly accepted in the literature as a 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 under attack on both theoretical and empirical grounds. A substantial body of literature has, since the late 1970s, well documented that real exchange rates are either nonstationary, or that the speed of adjustment to the PPP equilibrium path is quite slow and takes many years and even decades to eventually converge.

Attempts to understand real exchange rate movements in the medium run 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 its medium-term equilibrium when the economy has reached its 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 unemployment rate is equal to its NAIRU level, below which inflation would accelerate. External balance, on the other hand, can be characterized by a 'sustainable' current account position (i.e. 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, also 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 of 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 (Egert 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 on the computations.

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, too (Égert, Halpern and MacDonald, 2006; Alberola and Navia, 2007). On the whole, their theoretical model, which encompasses the balance of payments and the Balassa-Samuelson approaches to the real exchange rate determinants, depends on a very limited set of fundamentals: 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 movements[1], the role of portfolio theory appears less clear. 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 & Tober, 2002; Égert, Lahrèche-Révil, Lommatzsch, 2004), while

other papers arrive at just opposite conclusions

(Rahn, 2003; Égert & Lommatzsch, 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. MODELING 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) to evaluate the equilibrium real exchange rate in Albania. The approach differentiates between the long-term misalignment (undervaluation) caused by 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 toward a PPP path gradually in the long run as the productivity level in the developing country converges toward that of more advanced economies. If 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 real exchange rate determination in a reduced-form equation, by estimating the CPI-based real exchange rate (RER) as a negative function of 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 nontradable sector should lead to a domestic currency appreciation. Because of data limitations, labour productivity 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 it 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 standard intertemporal macroeconomic models, a country with relatively high net foreign assets may be able to "handle" its currency appreciations – and the associated trade deficits – while still remaining solvent. Alberola and Navia (2007) argue that the relationship between 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 eq. (1) is checked by adding a set of other control variables that include government expenditure (EXP), openness (OPEN), public debt (PDEBT), terms of trade (TOT), worker remittances (REM), and uncovered interest parity (RIRD).

RER = f(PROD, NFA, EXP)	(1A)
RER = f(PROD, NFA, OPEN)	(1B)
RER = f(PROD, NFA, PDEBT)	(1C)
RER = f(PROD, NFA, TOT)	(1D)
RER = f(PROD, NFA, REM)	(1E)
RER = f(PROD, NFA, RIRD)	(1F)

Private and public consumption are often included in the empirical literature to account for demand-side factors. If spending falls more on non-tradable than tradables, it could raise the relative price of non-tradable and thus strengthen the real exchange rate. Due to a lack of data, we will only use government spending

(as a ratio of GDP) to capture the demand factors. Nevertheless, it is argued that higher government spending could have an adverse effect on the real exchange rate in the longer run, assuming that 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 face of foreign competition, tradable prices may need to go down and thus increasing the real exchange rate. In case of Albania, an increase of openness resulting from trade liberalization is expected to cause the the current account position to deteriorate, hence causing the real exchange rate to 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 a 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, because the share of commodity exports in total exports is low, an improvement in the terms of trade leading to a boom in exports should generate higher income, thus causing a real appreciation of the domestic currency.

Remittances from Albanians working abroad have averaged around 12.6 percent of GDP during the period 1999-2008, therefore their impact could be regarded as an additional dimension in estimating the equilibrium real exchange rate of lek. In general, a rise in remittances implies a real exchange rate appreciation. However, as Mongardini and Rayner (2009) argue, it is only the portion of remittances that is used to increase demand in the nontradable sector that could strengthen the equilibrium real exchange rate. Conversely, if these transfers are used to ease supply constraints in the nontradable sector, the real exchange rate would likely depreciate.

The real interest rate differential is often included in real exchange rate modeling via the uncovered interest rate parity condition. According to 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 longer term. However,

the empirical evidence suggests that this condition does not

necessarily materialize within rather short periods of time, thus the inclusion of RIRD to explain deviations of 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

Data series are collected from the Bank of Albania and the Institute of Statistics (INSTAT) for Albania, and 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 unit of euro, thus a fall in the index indicates a lek appreciation. PROD is the productivity difference between Albania and Eurozone [ln(PRODAL) – ln(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 Eurozone (interest rate on 12-month T-bills adjusted for CPI inflation); and terms of trade (TOT, export over import prices), where export prices are constructed by making use of a PPI-export index 2, while the import price index is proxied by 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 using this approach

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.

instead of the conventional Johansen cointegration technique. While the latter requires all variables be integrated of order one in order 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 purely I(0), 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 short samples with a limited number of observations. For that reason, this study employs 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 eq. (1), we follow the bounds testing procedure (as summarized in Narayan, 2004) by first estimating an unrestricted error correction regression in the following form:

$$\Delta \ln RER_t = \alpha_0 + \beta_1 \ln RER_{t-1} + \beta_2 PROD_{t-1} + \beta_3 NFA_{t-1} + \\ + \sum_{i=1}^{p} \delta_i \Delta \ln RER_{t-i} + \sum_{j=1}^{q} \delta_i \Delta PROD_{t-j} + \sum_{m=1}^{q} \delta_i \Delta NFA_{t-m} + \varepsilon_t \qquad (2)$$

where β_1 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, while the lower bound is formed at the critical values for the I(0) series. If the F-test statistic 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 RER and the explanatory variables can be estimated as:

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

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

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

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

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:

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

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 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 unit root indicate that some underlying regressors are I(0) and others are I(1) (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 cointegration, 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 cointegration among the variables, which exists when 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.

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

[a]Automatic selection of lags based on SC; [b] Newey-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 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).

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 lek is linked to productivity and net foreign assets in the long term. 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.

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.

Furthermore, the inclusion of extra controlling variables does not appear to notably improve the explanatory power in the reduced-form equation. The Schwarz information criterion is not minimized when these variables are added to the original equation. All coefficients are statistically insignificant and in the case of openness, public debt and real interest rate differential they have 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 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 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, thus suggesting 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.

Table 3: Estimations of the Long-Run Parameters (1999Q1:2008Q4)														
	Reduced-form equation (1)		EXP		OPEN		PDEBT		REM		RIRD		TOT	
PROD	-0.2681	***	-0.2698	***	-0.2595	***	-0.3279	***	-0.2813	***	-0.2164	***	-0.2677	***
	0.0001		0.0001		0.0002		0.0002		0.0000		0.0002		0.0001	
NFA	-0.0918		-0.0850		-0.0984	*	-0.1027		-0.0855		-0.0231		-0.0965	
	0.1168		0.2306		0.0997		0.1374		0.1273		0.7708		0.1210	
Control Variables			0.0189		-0.0295		-0.2628		-0.0887		0.3926		-0.0159	
			0.7741		0.3665		0.2100		0.3834		0.1870		0.7260	
ECMt-1	-0.7276	***	-0.7261	***	-0.7805	***	-0.7082	***	-0.7327	***	-0.5741	***	-0.7462	***
	0.0001		0.0001		0.0000		0.0001		0.0001		0.0005		0.0000	
Adj. R2	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)		EXP		OPEN		PDEBT		REM		RIRD		TOT	
PROD	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	***
NFA	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	***
Control Var.	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	***

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 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. While public debt maintains its incorrect sign in both periods, trade liberalization and openness seems to have been associated with real depreciation of lek until 2002, though this link is not clear and thereafter changed its sign. The impact of remittances has intensified and become significant in the second period.

Also, the new estimations uncover the ambiguity pertaining to the incorrect sign on RIRD in Table 3. The coefficient is positive in the first period where a lot of exchange rate and interest rate convergence towards longer-term levels was taking place, and it turned negative in the second period in line with the UIP and portfolio theory predictions. Interestingly, the parameter estimate for the terms of trade turned 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 Lek/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.

The short-run and medium-run misalignments obtained from using estimated equations from (1) through (1F) are displayed in Figure 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 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 had the tendency to stay rather close to its short- and medium-term equilibrium path.

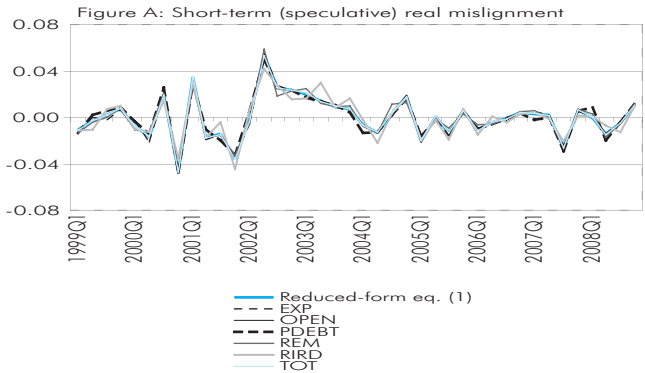
Figure A: Short-term (speculative) real mislignment
0.08
0.04
0.00
-0.04
-0.08
1999Q1
2000Q1
2001Q1
2002Q1
2003Q1
2004Q1
2005Q1
2006Q1
2007Q1
2008Q1
Reduced-form eq. (1)
EXP
OPEN
PDEBT
REM
RIRD
TOT

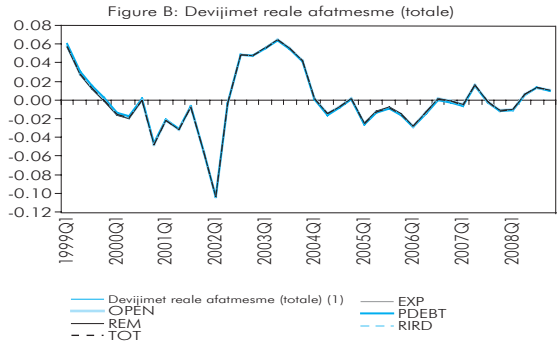
Figure B: Devijimet reale afatmesme (totale)
0.08
0.06
0.04
0.02
0.00
-0.02
-0.04
-0.06
-0.08
-0.10
-0.12
1999Q1
2000Q1
2001Q1
2002Q1
2003Q1
2004Q1
2005Q1
2006Q1
2007Q1
2008Q1
Devijimet reale afatmesme (totale) (1)
OPEN
REM
TOT
EXP
PDEBT
RIRD

6. CONCLUSION

Estimating real exchange rate (RER) misalignments for Albania is not an easy task given the limited length of time series available and their quality, not to mention the structural breaks typical of a transition country and the uncertainty surrounding methodoliges for calculate RER equilibrium. With these difficulties in mind, we carry out an exercise to get a broad sense of the degree to which mid-term misalignment could lead to costly adjustments.

The empirical findings suggest that during the period 1999Q1:2008Q4, the bilateral real exchange rate of lek against euro has been affected considerably by 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 lek.

The results 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 fiscal and monetary stances respectively, do affect RER. A relaxation of either of them would lead to a real depreciation of lek that would be reflected in higher domestic prices and/or depreciation of nominal exchange rate. The same impact could result from a drop in remittances and, perhaps, a deterioration of the terms of trade.

REFERENCES:

Astrov, V. (2005), "Sectoral productivity, demand, and terms of trade: what drives the real appreciation of East European currencies?" Wiener Institut für Internationale Wirtschaftsvergleiche, Working papers no. 34.

Alberola, E., S. G. Cervero, H. Lopez and A. Ubide (1999), "Global equilibrium exchange rates: euro, dollar, "ins", "outs", and other major currencies in a panel cointegration framework," IMF Working Papers 99/175.

Alberola, Enrique & Daniel Navia (2007), "Equilibrium exchange rates in the new EU members: external imbalances vs. real convergence," Banco de Espana, Documentos de Trabajo No. 0708.

Burgess, R., Fabrizio, S. and Y. Xiao (2003), "Competitiveness in the Baltics in the Run-Up to EU Accession", IMF Country Report No. 114.

Driver, Rebecca L. & Peter F. Westaway (2004), "Concepts of equilibrium exchange rates," Bank of England, Working Paper no. 248.

Égert, Balázs, László Halpern and Ronald MacDonald (2006), "Equilibrium exchange rates in transition economies: Taking stock of the issues," Journal of Economic Surveys Vol. 20, No. 2.

Égert, B., A. Lahrèche-Révil and K. Lommatzsch (2004), "The stock-flow approach to the real exchange rate of CEE transition economies," Centre D'Etudes Prospectives et D'Informations Internationales (CEPII), No 2004 – 15 Novermber.

Égert, Balázs & Kirsten Lommatzsch (2003), "Equilibrium exchange rates in acceding countries: how large is our confidence (interval)?" Oesterreichische Nationalbank, Focus on Transition 2: 107-37.

Faruqee, H. (1995), "Long-run determinants of the real exchange rate: a stock-flow perspective," IMF Staff Papers, Vol. 42 (March), 80-107.

Granger, C. W. J. (1986), "Development in the study of cointegrated economic variables", Oxford Bulletin of Economic and Statistics, Vol 48, pp 213-228.

Komarek, L. & M. Melecky (2005), "The behavioural equilibrium exchange rate of the Czech Koruna", Czech National Bank,

Working Paper Series 5.

Kutan, A. & S. Dibooglu (2003), "Sources of real and nominal exchange rate fluctuations in transition economies", Federal Reserve Bank of St. Louis, Working paper 1998-022A.

Lommatzsch, K. & S. Tober (2002), "What is behind the real appreciation of the accession countries' currencies? An investigation of the PPI-based real exchange rate". Presented at "Exchange Rate Strategies during the EU Enlargement." Budapest. 27 – 30 November.

Maeso-Fernandez, F. & C. Osbat, B. Schnatz (2001), "Determinants of the euro real effective exchange rate: A BEER/ PEER approach", European Central Bank, Working paper no. 85.

Mongardini, J. & B. Rayner (2009), "Grants, remittances, and the equilibrium real exchange rate in Sub-Saharan African countries," IMF Working Paper WP/09/75.

Narayan, P. K. (2004), "Reformulating critical values for the bounds F-statistics approach to cointegration: an application to the tourism demand model for Fiji," Monash University, Department of Economics, Discussion Papers No. 02/04.

Pattichis, C. & M. Maratheftis, S. Zenios (2007), "Is the Cyprus pound real effective exchange rate misaligned? A BEER approach", International Economic Journal, Vol. 21, No. 1, 133-154, March 2007.

Pesaran, M. H. & B. Pesaran (1997), Working with Microfit 4.0: Interactive Econometric Analysis, Oxford University Press.

Pesaran, M. H. & Y. Shin (1999), "An autoregressive distributed lag modeling approach to cointegration analysis," Chapter 11 in: Storm, S. (ed.), Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium (Cambridge: Cambridge University Press).

Rahn, J. (2003), "Bilateral Equilibrium Exchange Rates of the EU Accession Countries Against the Euro", BOFIT Discussion Paper No. 11.

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