Entry rates
and the risks of misalignment
in the EU8

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Abstract

New member states will join the EMU in the coming years. Setting the central parity has been and will be a challenging task, as there is a considerable amount of uncertainty, both from a theoretical and an empirical perspective, surrounding the determination of the optimal exchange rate. In effect, the probability of misalignment of the entry rate can be a non-zero one. Given the possible - if not inevitable - misspecification of the equilibrium rate it is thus advisable to focus on the effects of a misalignment of the entry rate for the economy, as it has implications for countries' both real and nominal convergence. An overvalued exchange rate would have an adverse impact on a country's competitiveness and its growth, while an undervalued currency would contribute to an overheating of the economy and an excessive inflation. The objective of this paper is to better understand the role of the entry rates for short run inflation and GDP developments and their implications for the inflation criterion and the real convergence process. Having estimated equilibrium exchange rates for the eight out of ten countries that entered the EU in May 2004: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia and Slovakia we conduct simulations showing what their adjustments to equilibrium would be if their entry rates deviated from the optimal ones.

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1. Introduction

In recent years equilibrium exchange rates and exchange rate misalignments have been the subject of much academic interest and policy debate. This is especially the case for the economies of Central and Eastern Europe, which having entered the European Union in May 2004 are committed to participate in the ERM II mechanism. After a period of operating in a stable exchange rate environment they will join the Euro zone.

By the end of 2005 seven out of ten new member states had entered the ERM II system, setting their central and compulsory intervention rates. The Estonian kroon, the Cyprus pound, the Latvian lats, the Lithuanian litas, the Maltese lira, the Slovenian tolar and the Slovak koruna should remain within bands of +/-15% from their central parities established by the European Central Bank and the national banks. The Czech Republic, Hungary and Poland are expected to join the ERM II in the coming years.

Setting the central parity has been and will be a challenging task, as there is a considerable amount of uncertainty, both from a theoretical and an empirical perspective, surrounding the determination of the optimal exchange rate. Determining a figure for the equilibrium rate is subject to a set of assumptions related to the method and theoretical background behind the equilibrium rate – e.g. BEER, FEER, NATREX - and to the set of fundamentals chosen. Moreover, precise computations are complicated by data measurement difficulties and sensitivity of the estimates to exogenous economic assumptions that have to be made throughout the exercise (see also Egert et al. [2005]).

In such an uncertain environment the probability of misalignment of the entry rate can be a non-zero one. Given the possible, if not inevitable, misspecification of the equilibrium rate it is thus advisable to focus on the effects of a misalignment of the entry rate for the economy, as it has implications for countries' both real and nominal convergence. An overvalued exchange rate would have an adverse impact on a country's competitiveness and, consequently, could hamper its - export-supported - process of real convergence. An undervalued currency would contribute to an overheating of the economy and as such might endanger the nominal convergence and the inflation Maastricht criterion in particular.

The objective of this paper is to better understand the role of the entry rates for short run inflation and GDP developments and their implications for the inflation criterion and the real convergence process.

Focusing on the EMU enlargement, this paper considers macroeconomic and exchange rate developments in eight of the new member states: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia and Slovakia.

The structure of the paper is as follows. Section 2 presents econometric estimates of the eight new member states' trade equations, which form the starting point for computing equilibrium exchange rates for these economies. Section 3 describes the methodology adopted for calculating Fundamental Equilibrium Exchange Rates (FEERs) and produces estimates of FEERs for the eight countries. Section 4 assesses an impact of entry rates on inflation and output, and the speed of adjustment to equilibrium should the entry rate be misaligned. Section 5 concludes and gives policy recommendations.

2. Trade determinants in new member states (EU8)

In the last decade the economies of Central and Eastern Europe have experienced an increased integration into world markets. Enhanced trade linkages of the new member states with the old EU countries, as well as rest of the world, are clearly visible both on the export and import sides. This chapter deals with trade developments in 8 new members of the EU: Czech Republic (CR), Estonia (ES), Hungary (HU), Lithuania (LI), Latvia (LV), Poland (PO), Slovenia (SL) and Slovakia (SR), focusing on factors that drive imports and exports in these economies.

The trade theory used as the starting point for the empirical analysis is derived from the traditional framework (see Goldstein, Khan [1985], Grossman, Krugman [1995]), which assumes that under imperfect competition imported goods are imperfect substitutes for domestically produced goods and exported goods are imperfect substitutes of goods produced abroad. On a micro level, consumers optimize their consumption decisions regarding domestic and foreign goods based on relative prices. We extrapolate this relationship to the aggregate level, so that export and import competitiveness matter for aggregate volumes of exports and imports on the macro level. We also include a demand term in the trade equations, with exports depending on foreign demand and imports depending on domestic total final expenditure.

Globalisation and integration processes are among the most significant reasons for changing trade shares in the world economy, suggesting that our trade equations will require some additional explanatory factors that capture this process. Inclusion of the ratio of the stock of FDI to GDP allows us to capture the extent of the economies' openness and improved performance of the trade sector (see Pain, Wakelin [1999], Barrell, te Velde [1999], Smidkova et al [2002]). The FDI-stock-to-GDP indicator replaces a deterministic trend usually included in trade regressions for these economies to explain their growing share of world trade and the rising share of trade relative to GDP. As such, this relaxes the implicit implication of trade rising without bound as a proportion of GDP (see Barrell, Dees [2005]).

Empirical models for the 8 countries are estimated within a common framework of an equilibrium correction model. While previous literature has focused on panel approaches to estimation, this paper distinguishes idiosyncratic trade patterns in the new member states in a single-country framework. Parameters are allowed to vary across all countries, including the smaller Baltic states, and this permits a deeper analysis of their trade characteristics.

The dataset includes quarterly data from 1995 to 2005. Samples differ in length across countries due to a lack of early data for some countries (or their poorer quality in the initial periods). All the data come from the NIGEM model database.

The country-specific export equations are estimated in the following form:

$$\Delta \log(X_{i,t}) = ect_i(\log(X_{t-1} - \alpha_{0,i} - \alpha_{1,i}\log(S_{i,t-1}) - \alpha_{2,i}\log(PC_{i,t-1}) - \alpha_{3,i}FDI_{i,t-1}) + \sum_j \beta_{i,j} dynamics_{i,t-j} + \xi_{i,t} \qquad \text{Eq.1}$$

where X is real exports of country i, S is its foreign demand (equaling to the sum of imports in main trade partners of country i), PC denotes export competitiveness (a ratio of export prices to a weighted average of competitors' prices) and FDI is a ratio of the stock of FDI to GDP. Parameters α_k are long run export elasticities in respect to foreign demand, export competitiveness and the ratio of FDI to GDP, plus a constant term; β_i denote coefficients relative to short run dynamics terms, ect reflects the speed of return to the equilibrium (error correction term) and ξ is the error term.

Estimated long run export elasticities used for FEER computation purposes are summarized in table 1 (standard error in parentheses). A unit elasticity is imposed on foreign demand (α_{1i}=1), which means that we may interpret this as a share equation (see Armington [1965]) to explain why trade shares change. It also ensures consistency in the NIGEM model, which will be used in chapter 4 to assess the impact of the misalignment of the entry exchange rate on inflation differentials. Short run dynamics and equation characteristics are collected in table 2.

Table 1. Long run export elasticities (standard errors in parentheses).

	CR	ES	HU	LI	LV	PO	SL	SR
constant	10.41	9.91	12.12	8.84	6.82	8.39	5.05	3.57
	0.10	0.01	0.06	0.03	0.02	0.02	0.01	0.01
Foreign demand	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Export competetiveness	-0.44	-0.13	-0.19	-0.12	-0.41	-0.59	-0.07	-0.11
	0.52	0.02	0.24	0.05	0.04	0.19	0.03	0.06
FDIstock-to-GDP	0.003	0.000	0.011	0.000	0.000	0.011	0.014	0.004
	0.029		0.001			0.002	0.001	0.001

Results reported above allow us to discern a few patterns driving exports in the new member states. In the period 1995-2005 the economies of Poland, Czech Republic, Hungary and Slovenia were characterised by a higher degree of elasticity of exports to price competitiveness than the other economies. The estimations also show FDI inflows were export-oriented in Poland, Hungary, Slovenia, and to a lesser extent Czech Republic and Slovakia. This supports the microevidence of Hunday, Electrolux and MAN factories located in these countries. In addition to acting as an export stimulus, FDI has also been shown to help move countries into higher value-added activities, contributing to an improvement in competitiveness (see Barrell et al. [2004]).

The smaller economies of Estonia, Latvia and Lithuania were not generally regarded as locations for production for foreign markets over the period 1995-2005. One possible reason is the smaller populations and, as a consequence, less access to adequate levels of a qualified work force (on the role of FDI in the Central and Eastern European countries see also Barrell, Holland [2001], Barrell, Holland, Pomerantz [2004] and references therein).

Joining the single market area, together with an improving business environment, provides more export opportunities and will probably further stimulate trade growth in the EU8 countries.

Table 2. Short run export dynamics (standard errors in parentheses; d - first difference).

	CR	ES	HU	LI	LV	PO	SL	SR
ect	-0.25	-0.27	-0.24	-0.24	-0.13	-0.29	-0.27	-0.29
	0.08	0.09	0.12	0.06	0.05	0.10	0.08	0.13
dcpx						-0.92	-0.04	-0.31
						0.09	0.03	0.13
ds	0.83	1.28	0.71	1.63	0.78		0.57	1.29
	0.16	0.20	0.15	0.23	0.15		0.18	0.19
ds(-1)						1.28		
						0.31		
R^2 adjusted	0.57	0.51	0.61	0.60	0.56	0.76	0.55	0.54
DW	1.87	2.61	1.48	2.23	2.32	1.98	2.00	1.84

Import models are of the analogous form:

$$\Delta \log(M_{i,t}) = ect_i(\log(M_{t-1} - \alpha_{0,i} - \alpha_{1,i}\log(TFE_{i,t-1}) - \alpha_{2,i}\log(RPM_{i,t-1}) - \alpha_{3,i}FDI_{i,t-1} - \alpha_{4,i}TAR_{i,t-1}) + \sum_j \beta_{i,j}dynamics_{i,t-j} + \xi_{i,t} \qquad \text{Eq.2}$$

where M_i denotes real imports of country i, *TFE* is total final expenditures, *RPM* corresponds to relative price (ratio of import deflator to GDP deflator), *FDI* is the stock of FDI relative to GDP and *TAR* is a measure of import tariffs. Tables 3 and 4 give the long-, and short-run estimates, respectively (standard errors in parentheses).

Table 3.Long run import elasticities.

	CR	ES	HU	LI	LV	PO	SL	SR
constant	-4.22	-3.36	-4.85	-3.37	-2.88	-4.37	-3.03	-11.41
	0.02	0.005	0.04	0.01	0.01	0.05	0.02	0.05
Total final expenditures	1.24	1.24	1.24	1.24	1.24	1.24	1.24	1.24
Relative import prices	-0.30	-0.20	-0.33	-0.27	-0.36	-0.44	-0.35	-0.55
	0.09	0.07	0.08	0.05	0.15	0.10	0.05	0.16
FDIstock-to-GDP	0.003	0.0	0.006	0.0	0.0	0.003	0.002	0.007
	0.001		0.001			0.002	0.002	0.001
Tariffs	-0.006	0.0	-0.011	0.0	0.0	-0.032	0.0	0.0
	0.003		0.002			0.006		

A common long run demand elasticity of 1.24 was imposed across all countries, based on panel estimates reported in Barrell and Dees [2004]. In the period 1995-2005 Poland and Slovakia were more sensitive to price competitiveness than the other economies. The empirical evidence supports our assumption on the importance of globalization and trade liberalization for import developments. FDI drives imports in Hungary, Slovenia and to a lesser extent Poland, Czech Republic and Slovakia. In general, the FDI parameters are smaller in the import equations than the export equations (see above), suggesting that FDI improves net exports. Over the sample 1995-2005 FDI did not have a significant impact on imports in Estonia, Lithuania and Latvia. Tariffs hampered imports in the biggest countries: Poland, Hungary and Czech Republic. Tariffs in those countries were also highest. (A lack of data prevented an assessment of the role of tariffs for Slovakian imports.)

Table 4. Short run import dynamics (standard errors in parentheses; d – first difference).

	CR	ES	HU	LI	LV	PO	SL	SR
ect	-0.17	-0.18	-0.12	-0.20	-0.24	-0.18	-0.25	-0.22
	0.09	0.09	0.04	0.08	0.09	0.10	0.14	0.06
dmvol				0.17				
				0.07				
drpm	-0.21					-0.41		
	0.09					0.09		
dtfe	1.80	1.53	1.82	1.22	1.90	2.08	1.92	2.07
	0.08	0.08	0.05	0.12	0.15	0.21	0.13	0.68
dtar			-0.002					
			0.001					
R^2 adjusted	0.93	0.87	0.94	0.83	0.79	0.81	0.91	0.52
DW	1.19	2.37	1.16	1.99	1.65	2.05	1.64	1.79

3. FEERs in the EU8

There are various approaches to the assessment of the sustainability of a certain path of the real exchange rate. In a seminal FEER approach proposed by Faruqee [1995], equilibrium exchange rates are derived on the basis of a targeted current account position and estimated trade equations relating exports and imports to their fundamentals, i.e. real exchange rate, terms of trade, domestic and foreign demand and FDI stock to GDP ratio. The equilibrium real effective exchange rate is calculated so that the current account, adjusted for internal balances, moves to its target value (see also Egert, Halpern, McDonald [2005]).

The starting point for the FEER computation methodology used in this paper is the approach proposed by Smidkova et al (2002), in which inclusion of a long run external debt target allows for widening of the horizon of the FEER model from the medium to the long run (Egert et al [2005]). Thus, in comparison to the Faruqee approach there are two distinctive features of the FEER methodology used in this paper. First, as in Smidkova et al [2002],

instead of deriving an equilibrium path for the exchange rate from a sustainable current account level, a target is formulated in terms of external debt that should not exceed a certain safe country-specific limit. Second, equilibrium rates are calculated on the basis of the steady-state condition (see e.g. Faruqee [1995]) for the current account balance, net foreign debt and nominal potential growth:

$$\frac{CAB_{i,t}}{Y_{i,t}} = \frac{-NFA_{i,t}}{Y_{i,t}}\left(\frac{\partial Y_{i,t}}{\partial t} + \frac{\partial P_{i,t}}{\partial t}\right) \qquad \text{Eq.3}$$

Introduction of the long term external debt target, at which authorities want the debt-to-GDP ratio to settle, ensures that the external debt will not exceed a certain safe limit. At the same time the current account is allowed to be relatively high in the initial period when the catch-up process is fastest. Analytically this condition can be formulated as:

$$D^* = f(D_0, D_T) \qquad \text{Eq.4}$$

where D* is a targeted ratio of net foreign debt to GDP, D_0 is the initial condition, given by the data, reflecting the initial stock of external debt to GDP and D_T is the terminal condition, which is the level at which that authorities want the debt-to-GDP to settle after time T.

Rearranging the long-run relationships embedded in the export and import equations estimated in section 2 (Eq.1 and Eq.2), we obtain the trade balance of the current account:

$$TB = e^{\alpha_{0,X}} PC^{\alpha_{1,X}} S^{\alpha_{1,X}} (e^{FDI})^{\alpha_{3,X}} - e^{\alpha_{0,M}} RPM^{\alpha_{1,M}} TFE^{\alpha_{1,M}} (e^{FDI})^{\alpha_{3,M}} (e^{TAR})^{\alpha_{4,M}} \qquad \text{Eq.5}$$

Substituting equations Eq.4 and Eq.5 into the steady-state equation Eq.3 and rearranging the last one gives:

$$\frac{\partial ER}{\partial t} = \frac{\overline{TB} + \overline{TRB} \;\&\; \overline{INCB}}{\overline{Y}} / \frac{\overline{NFA}}{\overline{Y}} - \frac{\partial \overline{Y}}{\partial t} - \frac{\partial \overline{P}^*}{\partial t} \qquad \text{Eq.6}$$

As the equilibrium exchange rate is designed to abstract from the business cycle effects, all the variables used are adjusted for short run movements. This implied calculating the "trend" current account that would have occurred if the domestic and foreign economies had been removed of business cycle and other short run effects (see Wren-Lewis [2003]).

Table 5 presents the speed of real appreciation of the equilibrium rates calculated on the basis of Eq.6.

Table 5. Annual appreciation in the equilibrium rate.

	1999	2002	2005 (e/f)
Czech Republic	11.6	6.7	1.8
Estonia	16.7	6.3	2.0
Hungary	11.6	5.7	1.6
Lithuania	21.4	8.7	3.6
Latvia	19.6	6.3	1.8
Poland	11.7	5.2	1.6
Slovenia	7.4	3.1	1.2
Slovakia	13.1	5.0	4.1

At the "edge" of the sample and the forecast the rate of equilibrium appreciation in the Baltic states and Slovakia is higher than the rate of appreciation of currencies of the Czech Republic, Hungary, Poland and Slovenia. The results confirm that the rate of real appreciation is inversely proportional to the level of productivity expressed as a percentage of the EU level productivity (see table 6).

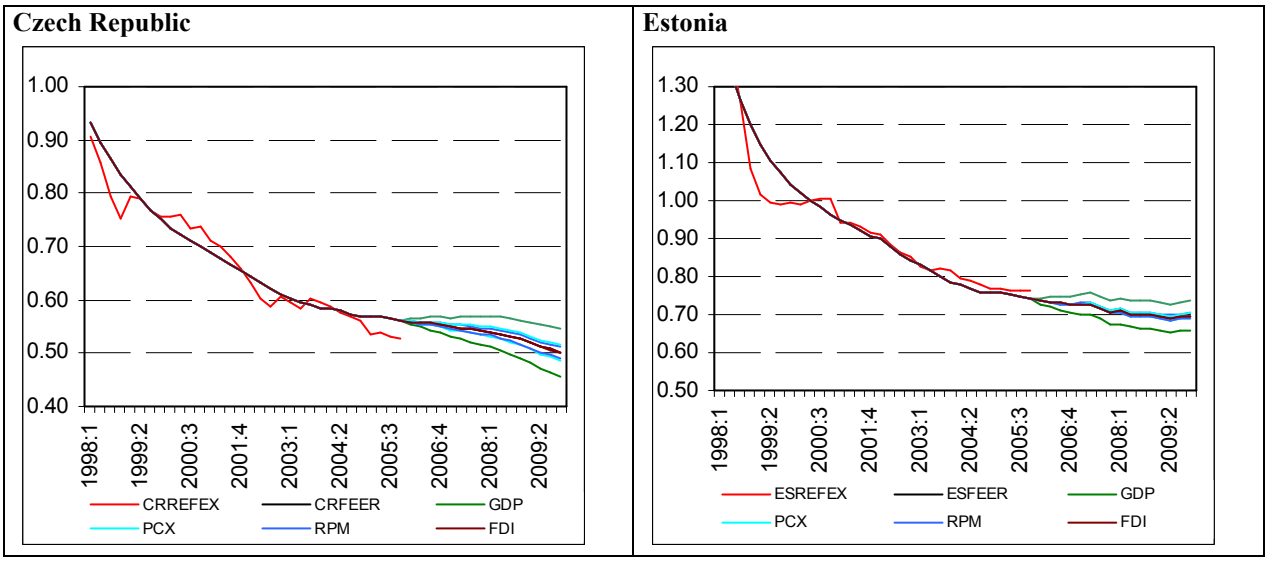
Table 6. Productivities in EU8. EU25=100.

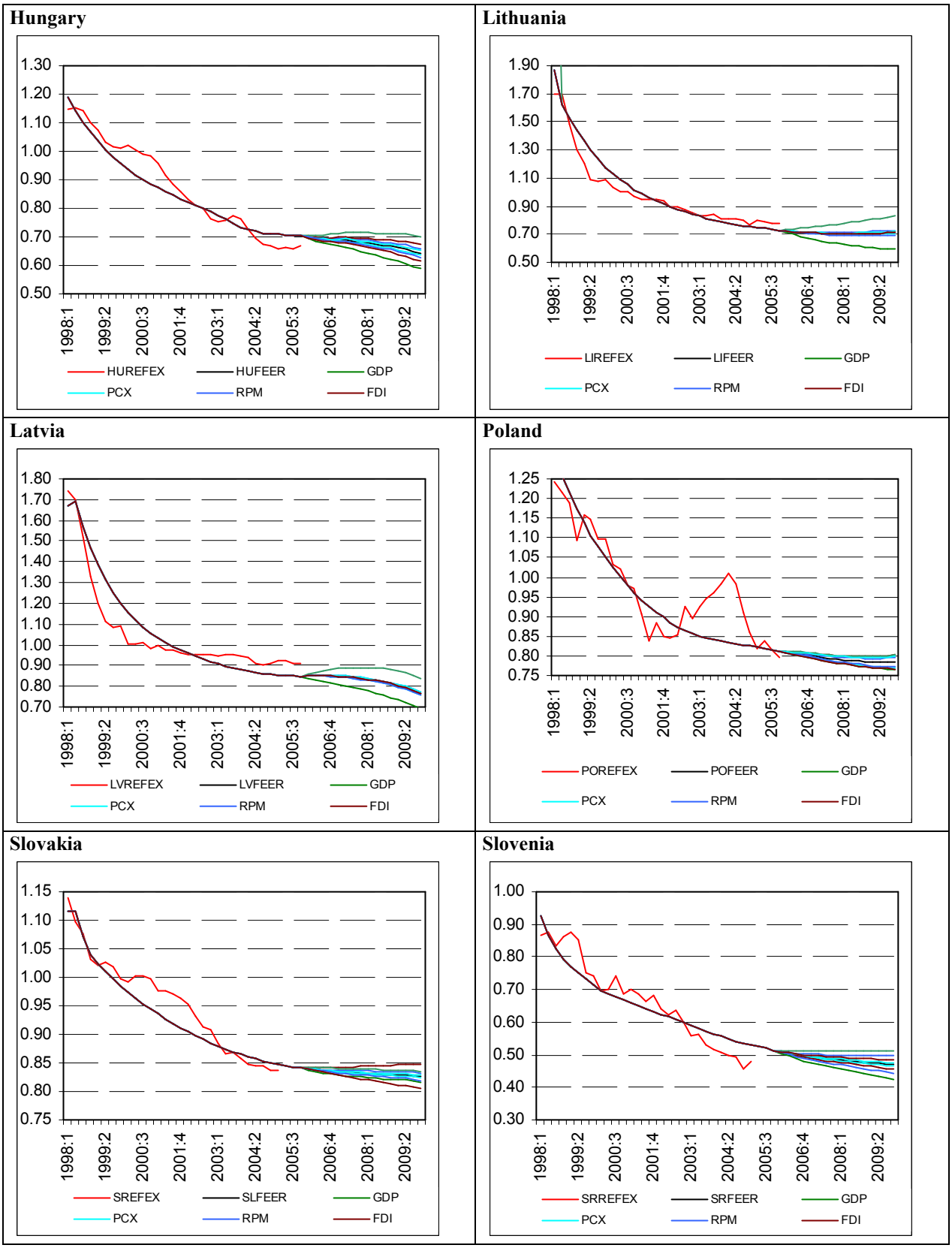
	1999	2002	2005
Czech Republic	58.5	60.1	66.7 (f)
Estonia	39.2	45.8	54.2 (f)
Hungary	59.4	66.7	70.0 (f)
Lithuania	33.8	44.9	51.9 (f)
Latvia	35.3	39.8	46.0 (f)
Poland	49.1	51.6	63.2 (f)
Slovenia	70.1	71	77.3 (f)
Slovakia	51.8	58.4	60.6 (f)

Source: Eurostat (February 2006)

Specifying an initial condition for the equilibrium exchange rate and given the equilibrium growth rates, we calculate the FEERs for the new member states - see chart 1. The red line denotes values of the actual real effective exchange rate observed in the sample (country prefix_refex) whilst the brown line corresponds to the theoretical FEER values (country prefix_feer). Our projections after 2005 rely on our forecast projections for key variables. The series are defined as national currency units per foreign currency unit, so a decline indicates an appreciation.

Chart 1. FEERS for the EU8 countries (a downward movement denotes appreciation).





In the sample period 1998-2005 all the analysed countries experienced a real appreciation of their currencies. It can be seen from the charts above that the speed of the appreciation has been declining. Since 2002/2003 many countries have witnessed a

stabilization of their equilibrium exchange rates. This would imply that much of the catching-up in terms of the real appreciation has already materialised.

The charts above show that the speed of real appreciation in Slovenia, Poland, Czech Republic and Hungary is slower than that of the Baltic countries and Slovakia. Countries such as Estonia that have had fixed exchange rates for the last decade, could have had their real exchange rates slightly undervalued, due to the "rigidity" of their nominal exchange rate as the catching up process was progressing. This could have triggered the rapid growth of these economies that has been recorded in recent years. Over time, however, these economies should and probably have adjusted to their exchange rates.

Czech Republic, Hungary, Poland and Slovenia are closer to the end of the real appreciation period. In the nearest future (2006-2009) the annual rate of real appreciation should be close to 1-2%, with Slovenia appreciating slowest, whilst in the Baltic countries and Slovakia the appreciation is likely to amount to 2-3% per annum (see table 5).

A sensitivity check was conducted to evaluate robustness of the results presented above. The sensitivity analysis involved adjusting the exogenous forecast projections that underly our central estimates in chart 1. We tested what the level of the FEER (Eq.6) in particular economies would be if, given the realization of FEER determinants in the sample 1998-2005, values for the period 2006-2009 deviated from the baseline forecast scenario. The baseline forecast scenario was constructed by extrapolating exogenous time series entering the FEER equation. We raise our estimate of potential growth by 1 percentage point (green line); adjust import and export competitiveness by 1% (light blue and dark blue lines); raise the FDI to GDP ratio by 1 percentage point (purple line), and adjust the terminal debt condition. Fancharts showing the uncertainty related to the assumptions made are presented in chart 1 and the sensitivity matrix is given in table 8.

Table 8. Sensitivity matrix. Deviations in percent from the baseline.

	GDP	PCX	RPM	FDI	DT	
2007	1.7	1.2	0.9	1.4	0.1	**Poland**
2008	2.6	2.1	1.6	2.5	0.3	
2009	3.7	3.0	2.3	3.7	0.6	
2007	6.9	0.6	0.6	0.0	0.2	**Estonia**
2008	9.3	1.1	1.2	0.0	0.7	
2009	10.4	1.5	1.6	0.0	1.3	
2007	6.4	0.8	1.5	2.5	0.1	**Hungary**
2008	10.5	1.5	2.7	4.7	0.3	
2009	14.5	2.2	3.9	7.0	0.6	
2007	6.5	1.9	1.3	0.1	0.1	**Czech**
2008	10.7	3.4	1.6	0.1	0.3	**Republic**
2009	14.8	4.9	1.9	0.2	0.6	
2007	6.8	0.7	3.5	1.8	0.3	**Slovakia**
2008	11.3	1.2	6.3	3.3	0.9	
2009	15.5	1.8	9.3	4.7	1.7	
2007	1.4	0.1	0.5	1.6	0.1	**Slovenia**
2008	1.8	0.3	0.9	2.9	0.3	
2009	2.1	0.4	1.3	4.2	0.5	
2007	12.8	0.7	1.5	0.0	0.1	**Lithuania**
2008	21.4	1.4	2.7	0.0	0.2	
2009	28.5	2.0	4.1	0.0	0.2	
2007	8.7	0.5	0.6	0.0	0.1	**Latvia**
2008	13.8	1.0	1.1	0.0	0.4	
2009	17.4	1.4	1.6	0.0	1.0	

4. Entry rates, speed of convergence and inflation differentials

It seems that there is a general agreement on the absence of a long run trade off between prices and activity. A long run trade off would imply money illusion or myopic behaviour of economic agents. In the absence of money illusion the long run rate of growth and the level of output are not affected by nominal factors. Thus, the choice of the entry rate does not influence the long run equilibrium value for the real exchange rate. What is affected is the short run adjustment to equilibrium – and in particular the rate of inflation and the growth rate of GDP, which are essential from the Maastricht criteria viewpoint.

If the entry rate is misaligned downwards, that is the entry rate is undervalued, this would boost net exports and raise inflation. If nominal interest rates are unchanged, lower real interest rates would stimulate investment and consumption, leading to an overheating of the economy. This could make the inflation target more difficult to meet. If the entry rate is misaligned upwards, meaning that the set central parity is overvalued in respect to the equilibrium rate, real growth is hampered. Despite the fact that the inflation target is not endangered, weaker growth may worsen the government deficit and put this criteria in jeopardy. In addition, lower GDP growth may temporarily diminish foreign investment. Under a floating exchange rate regime, there would be a depreciation of the nominal exchange rate as a response to the changed perception of macroeconomic prospects by foreign investors. As the nominal exchange rate is fixed, adjustment to equilibrium will run through domestic prices and will be more time consuming.

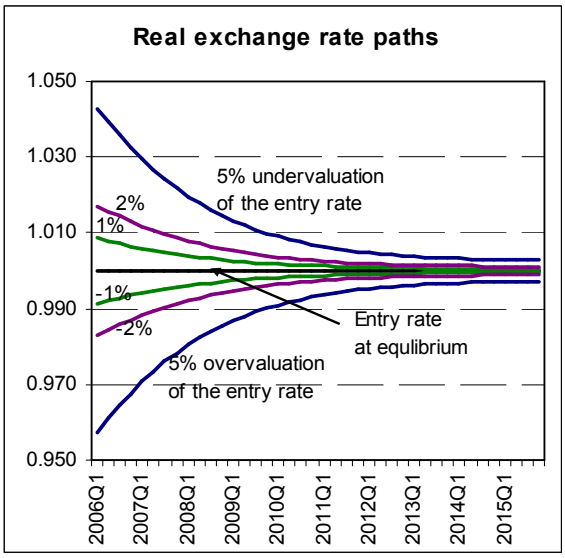
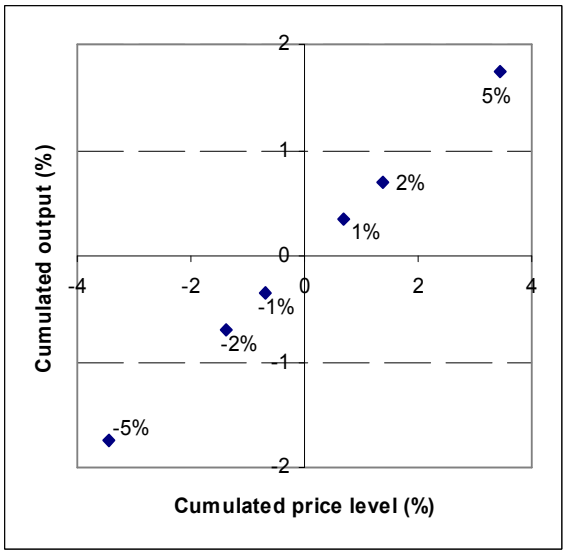
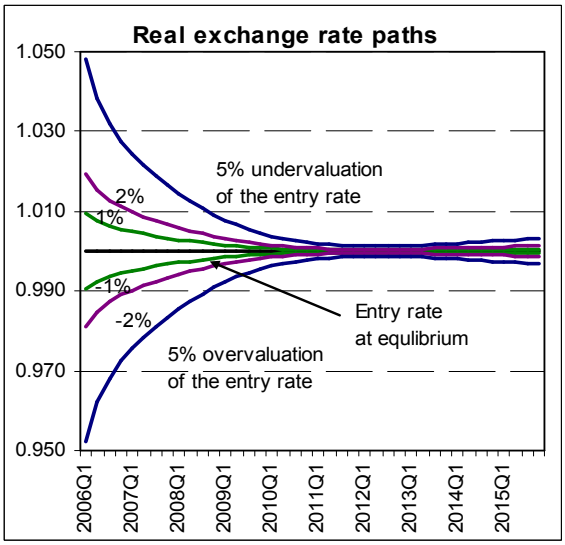
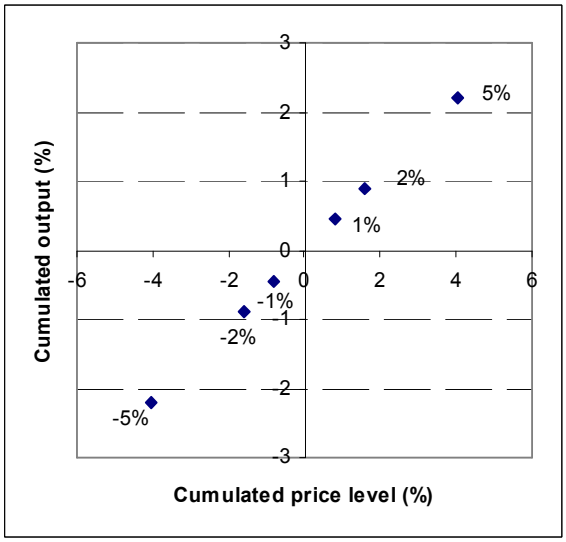
To assess the magnitude of the misalignment effects we conduct a series of country simulations. Given a certain equilibrium rate of the exchange rate we simulate the reaction of the economy to a shock to the nominal equilibrium rate. The scale of the misalignments analysed range between a 5% undervaluation and a 5% overvaluation.

The character of adjustment across countries is similar, although there are differences in the speed of adjustment and the GDP growth-inflation trade off resulting from country specific features. This reflects the level of rigidities in particular economies embedded in their wage-price systems, their institutional arrangements and structural policies conducted.

The charts below plot the trajectories for the real exchange rates implied by different entry rates. To generalize the discussion (and keeping in mind the uncertainty surrounding the level of the appropriate equilibrium rate as discussed in the previous sections) the sustainable level of the exchange rate is interpreted in terms of a reference value. We analyse paths of the real exchange rate that correspond to misaligned entry rates with the misalignment expressed as a percent deviation from the equilibrium rate. All entry rates produce the same real exchange rate in the long run and it corresponds to the equilibrium.

Results show that in case of a misalignment of the entry rate small and open Baltic economies would converge to their real long run equilibrium faster than the bigger economies, closing 80% of the gap after two to three years. The pace at which the Slovenian economy would come back to equilibrium is slightly slower, which results from the higher degree of inertia of the Slovenian economy that materialises in a centralised wage bargaining system. The level of inertia is the highest in case of the Polish, Hungarian and Czech economies. As their level of openness is lower a shock to the exchange rate will transmit to the real economy – and inflation – more gradually. This is due to the lower relative weight of the exchange rate channel in the transmission mechanism.

Chart 2. Entry rate misalignments and adjustments to equilibrium.

Real exchange rate paths given: **- entry rate at equilibrium** **- entry rate undervalued (1%, 2%, 5%)** **- entry rate overvalued (-1%, -2%, -5%)**	**The effect of the misaligned (-5%, -2%, -1%, 1%, 2%, 5%) entry rate on cumulated output and cumulated inflation - compared to target.** **The effect after the first three years**
Poland  	
Hungary  	

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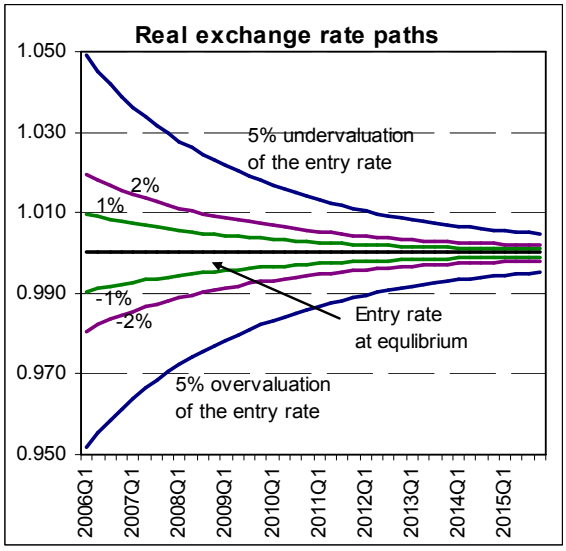
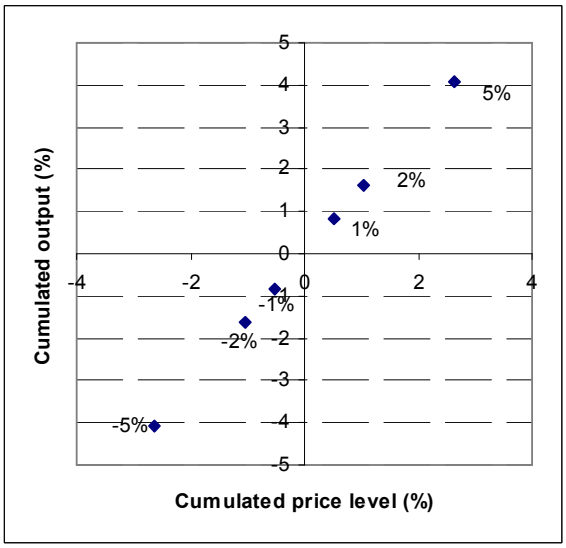
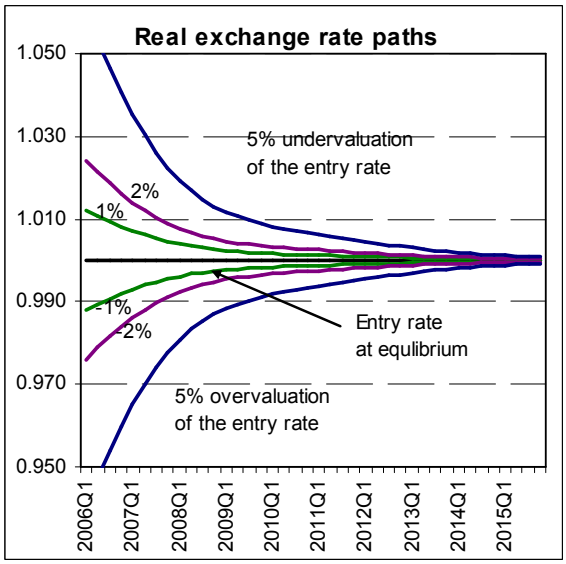
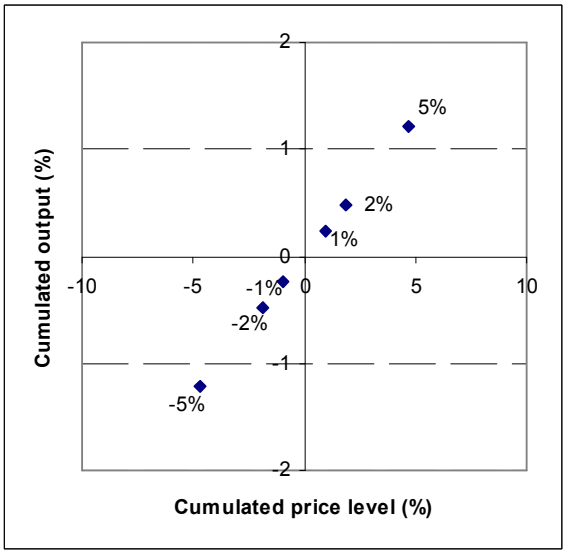




Slovakia





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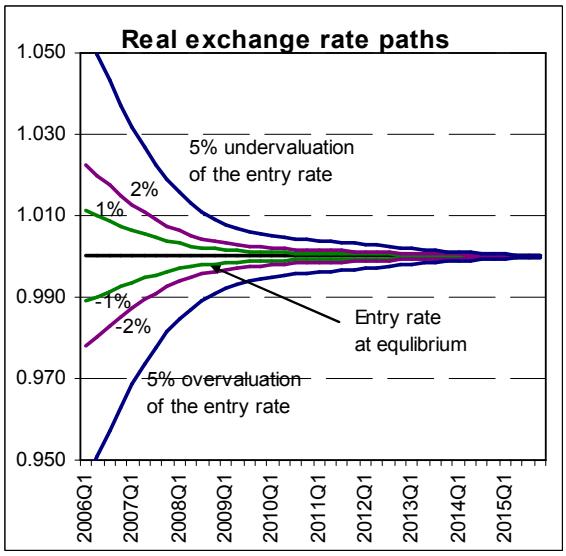

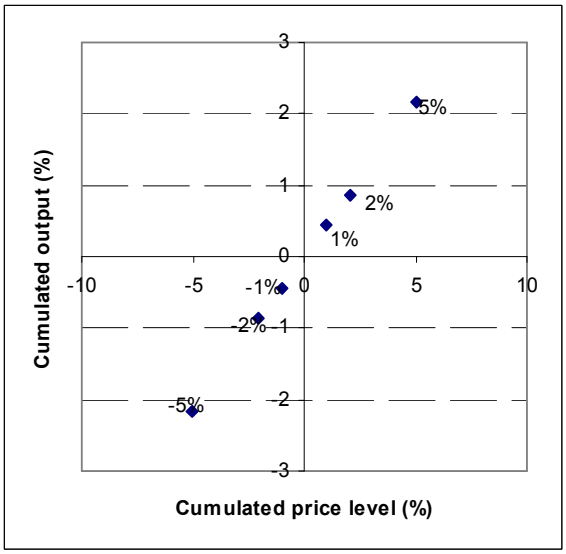

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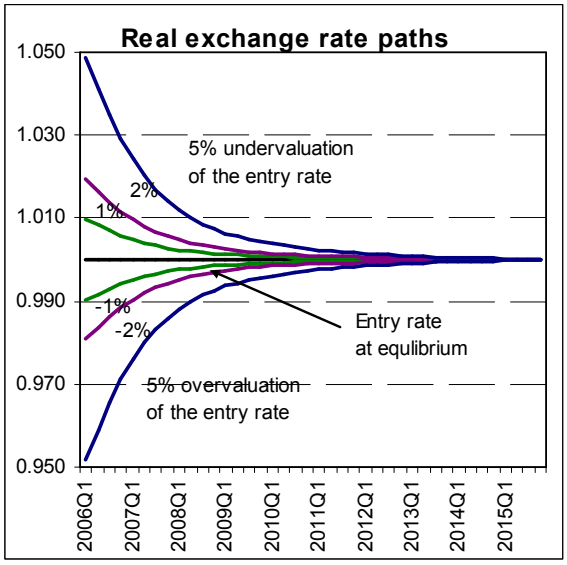
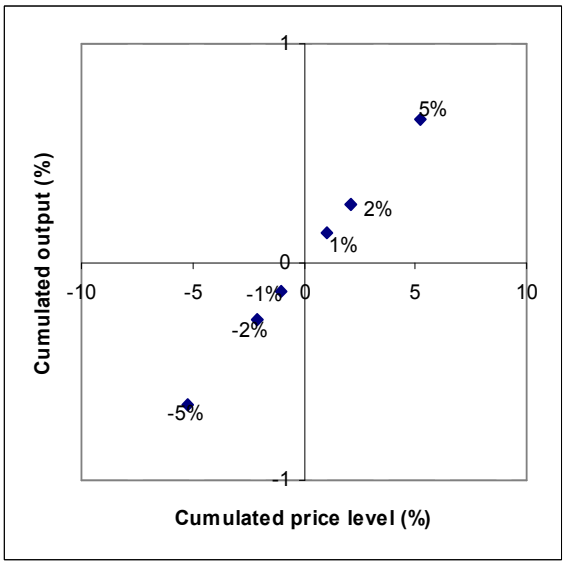
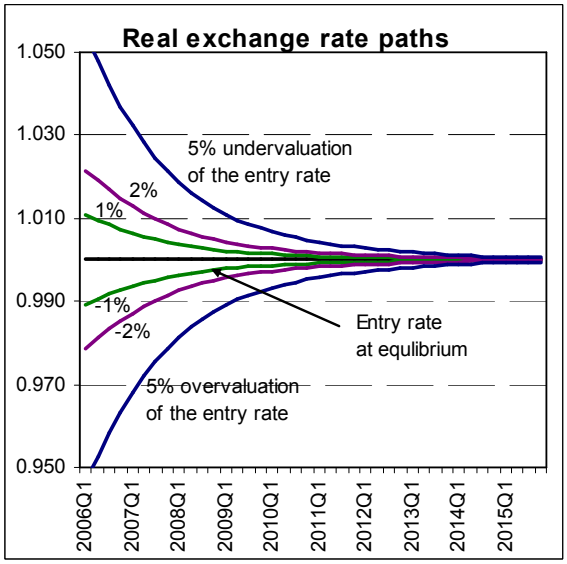
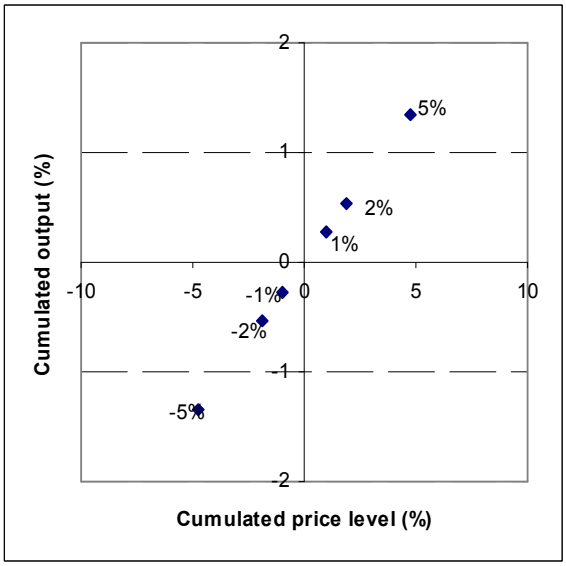


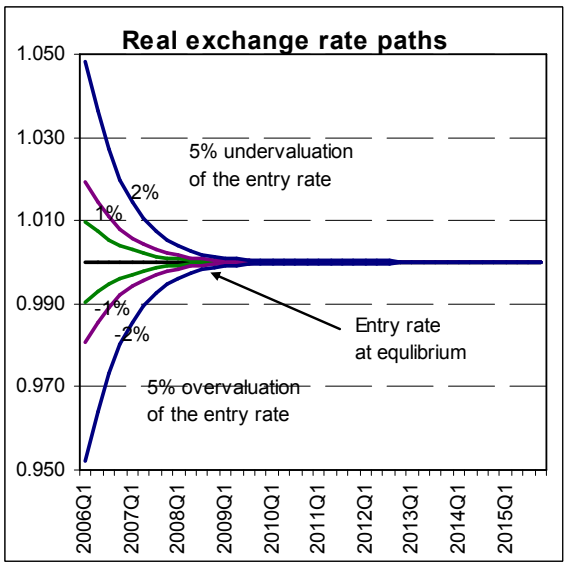


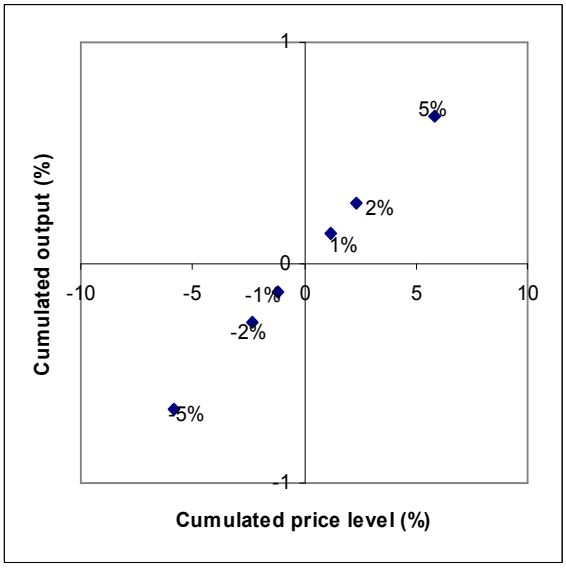
Lithuania





Latvia





The trade off between GDP growth and inflation is larger in the small economies. A 1% change in the cumulated GDP level in Slovakia, Estonia, Lithuania and Latvia is accompanied by a 3-8% change in the cumulated price level, whilst in Poland, Hungary, Czech Republic and Slovenia this trade off is just 1-2%. The cumulative impact on GDP of a misalignment is greatest in the Czech Republic, while it is smallest in the Baltic states.

5. Conclusions and policy implications

New member states will join the EMU in the coming years. The membership will positively affect the level of output in these countries and will contribute to a sustainable long run economic development.

The short run costs and benefits depend, among other things, on the set ERM II entry rates. The level of the real exchange rate is one of the significant determinants of the overall shape of macroeconomic developments driving the economy to the equilibrium. Due to the inevitable uncertainty related to determining a precise figure for the equilibrium exchange rate, the possibility of a misspecification of the entry rate may not be negligible. The focus on the response of the economy to a possible misalignment is of primary interest in this paper. Simulations for eight out of ten countries that entered the EU in May 2004: Czech Republic, Estonia, Hungary, Lithuania, Latvia, Poland, Slovenia and Slovakia show that if their entry rates deviate from the optimal ones, their economies nonetheless will converge to the long run equilibrium (unaffected by the nominal entry rate). The speed of this convergence differs across countries, and depends on the level of rigidities in particular economies, their institutional arrangements and structural policies. The wage price system, labour market and competitiveness policies will thus be factors influencing the speed of the adjustment to the equilibrium (structural policies are also instruments of managing the level of the real equilibrium). Simulations show that, given a misalignment of the entry rate, small and open Baltic economies would converge to their equilibrium faster than the bigger countries. The level of inertia in Poland, Hungary and the Czech Republic is higher, which will postpone the adjustment to the equilibrium. Most of the convergence process should, however, be completed within the first 5 years after adopting a fixed exchange rate on a misspecified level.

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