Exchange Rate Fluctuations in EU Accession Countries

By

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Introduction

- There is a continuing debate on the timing of euro adoption in accession countries.
- Most countries want to move quickly to the euro after a minimum amount of time in ERM II. They view euro adoption as strengthening policy discipline and reducing uncertainty.
- Stressing possible volatility in capital flows, academics tend to agree.
- OCA literature emphasizes the use of exchange rates as shock absorbers in the face of asymmetric shocks. This implies there is a cost to early adoption.
- Key question: Are exchange rates in accession countries shock absorbers or propagators?
- Second issue regarding the size of the nominal component in real exchange rates. Could imply role for independent monetary policy.

What does the literature say?

- Pelkman, et. al. (2000) finds exchange rates are poor shock absorbers. Coricelli (2002) and others point to *future* volatile capital flows that will cause excessive exchange rate volatility.
- SVAR analysis of REER & NEER by Kutan and Dibooglu (2000) finds sizable nominal component in Polish real exchange rates. Little evidence of nominal component in Hungarian data.
- They link this nominal component to commodity price sluggishness, and conclude that an independent monetary policy has a role to play in Poland by affecting competitiveness.

- In industrial countries, research using the 2 variable BQ-SVAR model (e.g., Enders and Lee (1997)) has found very small nominal components in real exchange rates.

- 3 variable BQ-SVAR models, which include relative output, REERs, and relative prices have also been estimated. Offers the added ability to see how shocks to exchange rates affect output volatility.

- These models are closer to traditional structural models (Obstfeld (1985) and Dornbusch (1976)). They have been applied to U.S., U.K., and Japanese bilateral exchange rates. To our knowledge, these 3 variable models have not been applied to accession country data.

Main Objectives, Data and Methodology

- Examine shock absorption and size of the nominal component in REERs in accession countries using BQ-SVAR methodology.
- Traditional innovation accounting, including impulse response functions (IRF), forecast error variance (FEVD) and historical decompositions (HD) are used.
- Start with the 2 variable model and move on to a 3 variable model by adding relative output (each accession country to euro area aggregate). This allows an identification of real and nominal shocks first. Then aggregate supply (AS), real goods shocks (IS) and nominal money and financial market shocks (LM). Identification is by BQ restrictions on the long-run impact matrix.
- Monthly data on real (CPI based) and nominal effective exchange rates, and industrial production are used. Samples periods depend on each country; later dummies are inserted to test the sensitivity of the results. Typical preliminary data analysis—UR and CI tests—is undertaken.

Restrictions on Long-Run Impact Matrix

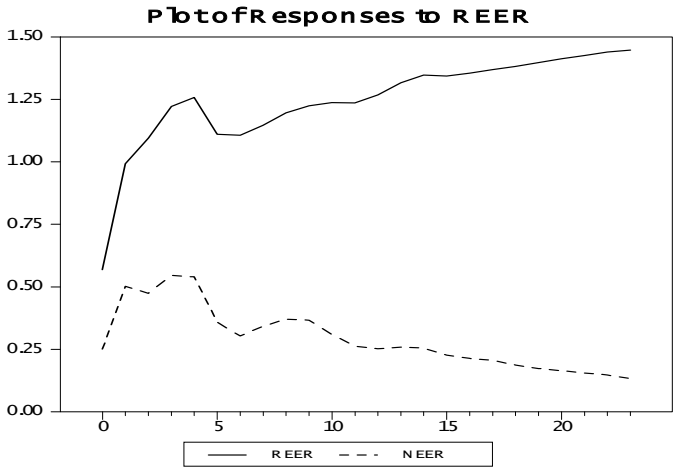
- With 2 variable (REER, NEER) SVAR, nominal shocks are restricted to have a temporary effect on real exchange rates. No other long-run restrictions.
- With the 3 variable SVAR (relative output, REER, NEER), IS and LM shocks to relative output are restricted to be temporary in nature, while only AS shocks are allowed to have permanent effects.
- Regarding real effective exchange rates, only AS and IS shocks are allowed to have a permanent impact. Nominal shocks are restricted to have a temporary effect.
- Shocks to nominal effective exchange rates are left completely unrestricted; i.e., all disturbances are assumed to be permanent.

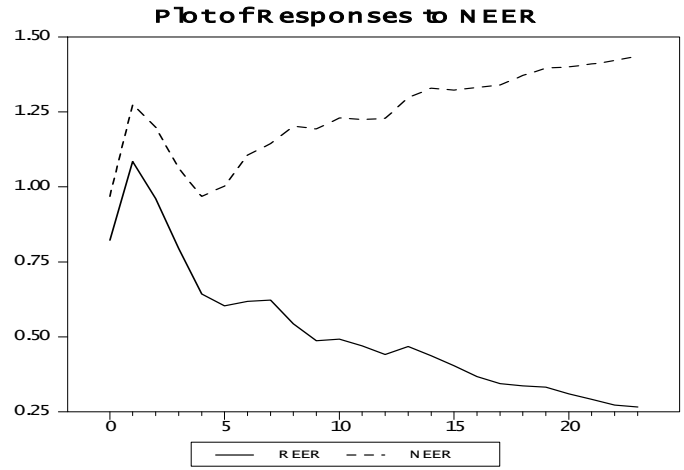
SVAR Models: Sample Periods and Dummy Variables

	Sample Period	Restricted Sample/ Dummies (D)
Cyprus	1988:1-2003:1	--
Slovenia	1992:1-2003:2	1993:1-2003:2
Slovakia	1990:1-2002:10	1991:1-2002:10
Poland	1985:6-2002:12	1990:1-2002:12
Hungary	1986:1-2003:2	--
Estonia	1994:1-2003:2	D:1994:1-D:1996:12
Lithuania	1993:1-2003:2	1994:1-2003:2, D:1999:8
Latvia	1992:12-2003:1	D:1993:1-D:1995:12
Czech Republic	1992:1-2003:2	--

Lithuania

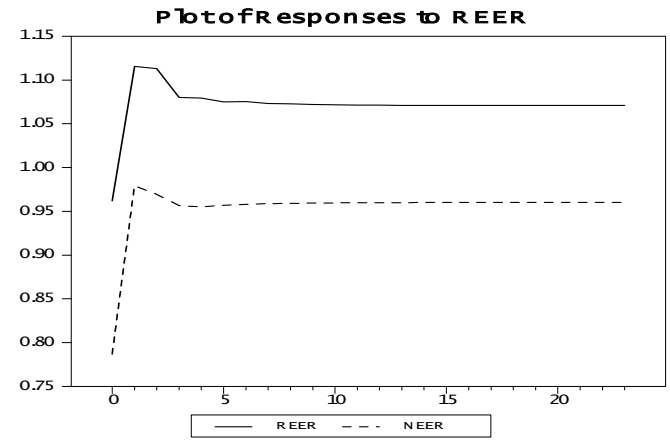
Impulse Response Functions (Cumulative)





Hungary

Impulse Response Functions (Cumulative)



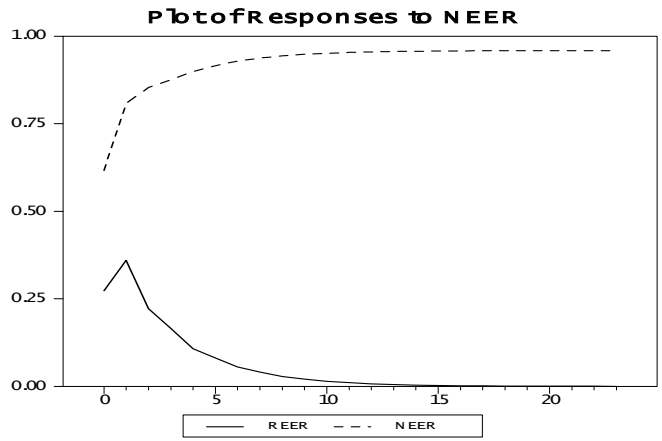


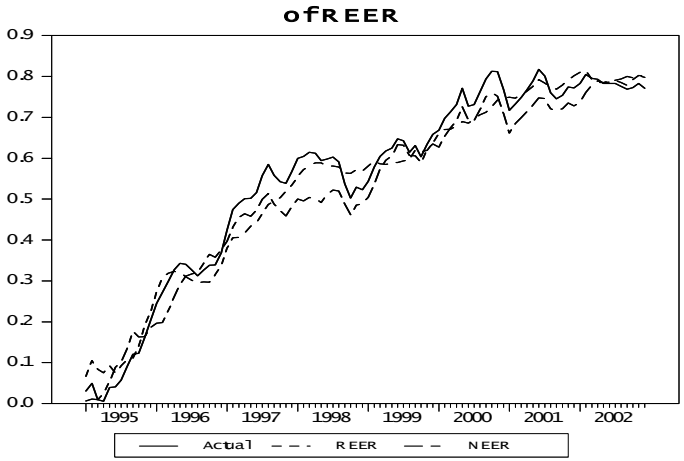
Table 1. Forecast Error Variance Decompositions
(Temporary Component in Real and Nominal Effective Exchange Rates) 1/

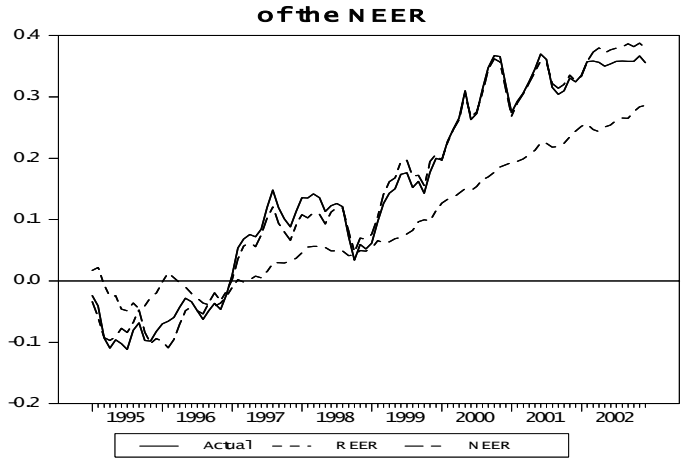
	Steps						
	1	4	8	12	16	20	24
				REER			
Hungary	7.4	9.9	10.3	10.3	10.3	10.3	10.3
Poland	21.6	26.3	26.7	26.8	26.8	26.8	26.8
Czech Republic	30.7	31.3	32.1	32.1	32.1	32.1	32.1
Slovak Republic	12.0	16.3	21.9	21.9	22.0	21.9	21.9
Slovenia	1.2	3.5	6.4	6.9	6.9	6.9	6.9
Cyprus	1.9	5.7	5.7	5.7	5.7	5.7	5.7
Estonia	35.4	41.8	41.7	41.7	41.7	41.7	41.7
Lativa	11.3	9.8	9.5	9.6	9.6	9.6	9.6
Lithuania	67.6	59.8	59.4	59.6	59.5	59.5	59.5
				NEER			
Hungary	38.1	39.0	39.1	39.1	39.1	39.1	39.1
Poland	12.6	25.0	30.0	30.9	31.1	31.2	31.2
Czech Republic	64.7	63.4	63.4	63.4	63.4	63.4	63.4
Slovak Republic	79.1	68.1	66.6	66.6	66.7	66.7	66.7
Slovenia	18.9	19.2	20.0	21.6	21.6	21.7	21.7
Cyprus	44.9	40.8	40.8	40.8	40.8	40.8	40.8
Estonia	97.0	96.8	96.8	96.8	96.8	96.8	96.8
Lativa	51.9	51.1	51.0	51.0	51.0	51.0	51.0
Lithuania	93.7	88.9	86.4	86.0	86.0	86.0	86.0

1/ The permanent component is 100 minus the temporary component.

Lithuania

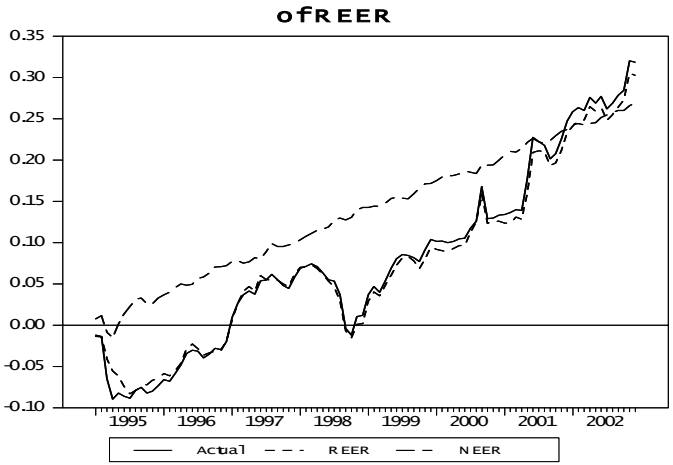
Historical Decompositions





Hungary

Historical Decompositions



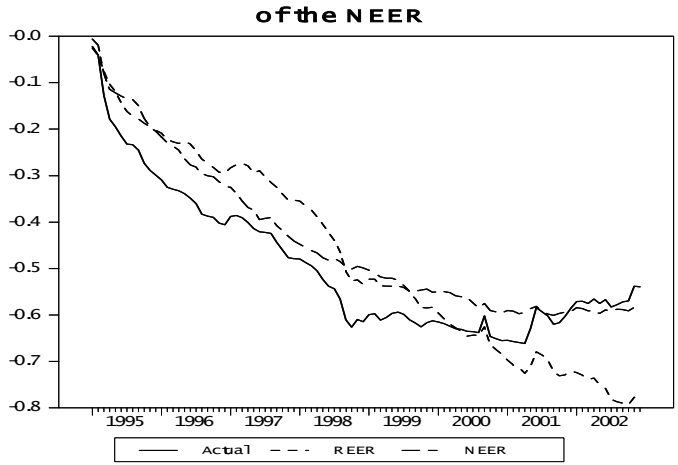


Table 2. Forecast Error Variance Decompositions
(Real Effective Exchange Rates)

	Steps						
	1	4	8	12	16	20	24
Hungary							
AS shock	0.5	1.0	1.1	1.1	1.1	1.1	1.1
IS shock	92.2	89.4	89.0	88.9	88.9	88.9	88.9
LM shock	7.3	9.6	10.0	10.0	10.0	10.0	10.0
Poland							
AS shock	30.1	43.3	44.8	45.3	45.2	45.2	45.2
IS shock	66.1	50.1	46.1	45.7	44.8	44.8	44.8
LM shock	3.8	6.6	9.1	9.0	10.0	10.0	10.0
Czech Republic							
AS shock	0.1	0.6	0.6	0.6	0.6	0.6	0.6
IS shock	68.6	67.8	67.1	67.0	67.0	67.0	67.0
LM shock	31.3	31.6	32.3	32.4	32.4	32.4	32.4
Slovak Republic							
AS shock	15.9	18.4	23.9	24.1	24.9	25.4	25.4
IS shock	65.4	61.5	54.4	53.7	53.2	52.8	52.8
LM shock	18.7	20.1	21.7	22.2	21.9	21.8	21.8
Slovenia							
AS shock	0.6	0.9	1.4	1.7	1.8	1.8	1.8
IS shock	98.3	92.4	87.4	86.5	86.4	86.3	86.3
LM shock	1.2	6.6	11.2	11.8	11.8	11.9	11.9
Cyprus							
AS shock	14.7	16.3	16.6	16.2	16.1	16.3	16.5
IS shock	85.2	80.1	79.6	78.4	78.0	77.8	77.5
LM shock	0.1	3.6	3.8	5.4	5.9	5.9	6.0
Estonia							
AS shock	23.0	18.3	16.8	16.6	16.6	16.6	16.6
IS shock	15.7	23.6	32.4	33.3	33.5	33.6	33.6
LM shock	61.3	58.1	50.8	50.1	49.9	49.8	49.8
Lativa							
AS shock	16.1	13.0	12.3	12.2	12.1	12.1	12.1
IS shock	72.9	77.7	78.6	78.7	78.7	78.7	78.7
LM shock	11.0	9.3	9.1	9.1	9.2	9.2	9.2
Lithuania							
AS shock	0.0	0.3	0.7	0.7	0.7	0.7	0.7
IS shock	60.7	54.5	55.2	55.2	55.2	55.2	55.2
LM shock	39.3	45.2	44.1	44.1	44.1	44.1	44.1

1/ The forecast error variance decompositions are for logged first differences.

Table 3. Forecast Error Variance Decompositions 1/
(Relative Output)

	Steps						
	1	4	8	12	16	20	24
Hungary							
AS shock	98.9	97.4	97.3	97.3	97.3	97.3	97.3
IS shock	0.3	0.7	0.8	0.8	0.8	0.8	0.8
LM shock	0.8	1.9	1.9	1.9	1.9	1.9	1.9
Poland							
AS shock	24.5	26.1	28.2	27.9	27.2	27.3	27.2
IS shock	12.3	22.9	23.9	23.7	24.7	24.7	24.7
LM shock	63.2	51.0	47.9	48.4	48.1	48.0	48.1
Czech Republic							
AS shock	98.9	96.8	96.8	96.8	96.8	96.8	96.8
IS shock	0.2	0.4	0.4	0.4	0.4	0.4	0.4
LM shock	0.9	2.8	2.8	2.8	2.8	2.8	2.8
Slovak Republic							
AS shock	49.3	47.7	45.2	42.5	42.2	42.1	42.0
IS shock	4.3	7.9	13.0	18.3	21.0	21.0	21.6
LM shock	46.4	44.4	41.8	39.2	36.8	36.9	36.4
Slovenia							
AS shock	83.8	81.2	77.6	77.4	77.4	77.4	77.4
IS shock	4.3	4.9	4.6	4.6	4.6	4.6	4.6
LM shock	11.9	13.9	17.8	18.0	18.0	18.0	18.0
Cyprus							
AS shock	72.6	67.3	63.9	63.4	65.3	63.5	63.3
IS shock	15.3	17.1	16.8	16.9	18.5	18.5	18.5
LM shock	12.1	15.6	19.3	19.7	16.2	18.0	18.2
Estonia							
AS shock	63.0	55.1	45.6	44.5	44.4	44.3	44.3
IS shock	20.0	18.7	24.0	23.9	23.9	23.9	23.9
LM shock	17.0	26.2	30.4	31.6	31.7	31.8	31.8
Lativa							
AS shock	76.5	69.9	69.3	69.2	69.2	69.2	69.2
IS shock	21.2	26.7	27.1	27.1	27.1	27.1	27.1
LM shock	2.3	3.4	3.6	3.7	3.7	3.7	3.7
Lithuania							
AS shock	99.1	98.7	98.6	98.6	98.6	98.6	98.6
IS shock	0.0	0.1	0.1	0.1	0.1	0.1	0.1
LM shock	0.9	1.2	1.3	1.3	1.3	1.3	1.3

1/ The forecast error variance decompositions are for logged first differences.

Table 5. Forecast Error Variance Decompositions (with dummy variables) 1/ 2/
(Real Effective Exchange Rates)

	Steps						
	1	4	8	12	16	20	24
Hungary							
AS shock	...	...	...	...	...	...	...
IS shock	...	...	...	...	...	...	...
LM shock	...	...	...	...	...	...	...
Poland							
AS shock	24.2	22.9	22.6	22.6	22.6	22.6	22.6
IS shock	42.4	41.1	41.1	41.1	41.1	41.1	41.1
LM shock	33.4	36.0	36.3	36.3	36.3	36.3	36.3
Czech Republic							
AS shock	...	...	...	...	...	...	...
IS shock	...	...	...	...	...	...	...
LM shock	...	...	...	...	...	...	...
Slovak Republic							
AS shock	3.0	3.3	3.3	3.3	3.3	3.3	3.3
IS shock	92.5	91.2	91.2	91.2	91.2	91.2	91.2
LM shock	4.6	5.5	5.5	5.5	5.5	5.5	5.5
Slovenia							
AS shock	8.0	7.4	7.3	7.3	7.3	7.3	7.3
IS shock	92.0	86.8	85.6	85.6	85.6	85.6	85.6
LM shock	0.0	5.9	7.1	7.1	7.1	7.1	7.1
Cyprus							
AS shock	...	...	...	...	...	...	...
IS shock	...	...	...	...	...	...	...
LM shock	...	...	...	...	...	...	...
Estonia							
AS shock	25.4	21.4	20.1	20.2	20.2	20.2	20.2
IS shock	32.4	31.5	32.9	33.0	33.0	33.0	33.0
LM shock	42.2	47.1	47.0	46.8	46.8	46.8	46.8
Lativa							
AS shock	16.2	14.6	14.4	14.4	14.4	14.4	14.4
IS shock	83.8	85.1	85.1	85.1	85.1	85.1	85.1
LM shock	0.0	0.3	0.5	0.5	0.5	0.5	0.5
Lithuania							
AS shock	0.0	1.0	1.1	1.1	1.1	1.1	1.1
IS shock	66.3	68.4	68.3	68.3	68.3	68.3	68.3
LM shock	33.7	30.6	30.6	30.6	30.6	30.6	30.6

1/ The forecast error variance decompositions are for logged first differences.
2/ See text table for dummy variable or changed sample set dates.

Table 6. Forecast Error Variance Decompositions (with dummy variables) 1/ 2/
(Relative Output)

	Steps						
	1	4	8	12	16	20	24
Hungary							
AS shock	...	...	...	...	...	...	...
IS shock	...	...	...	...	...	...	...
LM shock	...	...	...	...	...	...	...
Poland							
AS shock	78.6	67.4	67.1	67.1	67.1	67.1	67.1
IS shock	21.2	29.2	29.4	29.4	29.4	29.4	29.4
LM shock	0.2	3.5	3.5	3.5	3.5	3.5	3.5
Czech Republic							
AS shock	...	...	...	...	...	...	...
IS shock	...	...	...	...	...	...	...
LM shock	...	...	...	...	...	...	...
Slovak Republic							
AS shock	98.0	94.5	94.5	94.5	94.5	94.5	94.5
IS shock	1.6	3.7	3.7	3.7	3.7	3.7	3.7
LM shock	0.4	1.8	1.8	1.8	1.8	1.8	1.8
Slovenia							
AS shock	91.3	90.0	89.8	89.8	89.8	89.8	89.8
IS shock	0.1	0.3	0.3	0.3	0.3	0.3	0.3
LM shock	8.6	9.8	10.0	10.0	10.0	10.0	10.0
Cyprus							
AS shock	...	...	...	...	...	...	...
IS shock	...	...	...	...	...	...	...
LM shock	...	...	...	...	...	...	...
Estonia							
AS shock	50.9	44.4	35.6	34.6	34.5	34.5	34.5
IS shock	46.1	48.3	53.3	53.1	53.0	53.0	53.0
LM shock	3.0	7.3	11.1	12.3	12.5	12.5	12.5
Lativa							
AS shock	78.6	70.1	69.7	69.7	69.7	69.7	69.7
IS shock	12.6	20.2	20.6	20.6	20.6	20.6	20.6
LM shock	8.8	9.7	9.7	9.7	9.7	9.7	9.7
Lithuania							
AS shock	99.4	98.9	98.9	98.9	98.9	98.9	98.9
IS shock	0.0	0.1	0.1	0.1	0.1	0.1	0.1
LM shock	0.6	1.0	1.0	1.0	1.0	1.0	1.0

1/ The forecast error variance decompositions are for logged first differences.
2/ See text table for dummy variable or changed sample set dates.

Preliminary Conclusions

- Results from the 2 variable model indicate a sizable nominal component in real effective exchange rates in a number of countries (Lithuania, Estonia, Poland, Czech and Slovak Republics).
- Results from the 3 variable model also find sizable nominal components. However, the use of dummy variables or shorter sample sizes indicate a reduction in the number of countries and in the size of the nominal component.
- Nonetheless, this provides some support to the view that an independent monetary policy in these countries could affect competitiveness.
- Regarding shock absorption, the FEVDs on relative output using the full sample indicate that exchange rates may caused output disturbances in a few countries (Poland, Estonia and the Slovak Republic).
- However, dummy variables or shorter sample periods dramatically reduce the FEV contribution stemming from nominal exchange rates.

Caveats on this type of analysis

- Limited time frame and sharp movements in output and exchange rates associated with the transition process makes an analysis of this type difficult.
- Thus any conclusions should be considered exploratory at best.
- We do not take into consideration explicitly the variety of exchange rate regimes now in existence in accession countries.
- To fully understand shock dynamics, the real and nominal components should be lined up with possible sources from the data. For example, one should look at interest rate differentials (uncovered interest parity relationships) or money aggregates to see what lies behind the nominal components.
- Understanding the type of shocks that confront accession countries will be only one factor that determines regime decisions.