FX Interventions and Inflation Targeting

The Czech Experience

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CZECH CNB NATIONAL BANK

Outline

- Motivation
  - FX interventions in the IT literature
  - FX interventions in the IT countries
  - Importance of the exchange rate shocks under the Czech IT
- FX interventions in the Czech Republic
- Effectiveness of interventions
- Consistency of interventions with the inflation targeting
- Agreement with the government
- Conclusions

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IT Theory and FX Interventions

- Standard IT theory assumes (and often recommends) pure floating, no role for ER management (e.g. Svensson, NZ);
- Monetary policy effects the ER through IR;
- IR changes in response to changes in inflation forecast;
- But “fear of floating” in open economies (Calvo, Reinhart, 2000);
- Suggestions of managed floating:
  - Managed floating (Bofinger, Wollmershaeuser, 2001-02);
  - Managed floating plus (Goldstein, 2002), etc.

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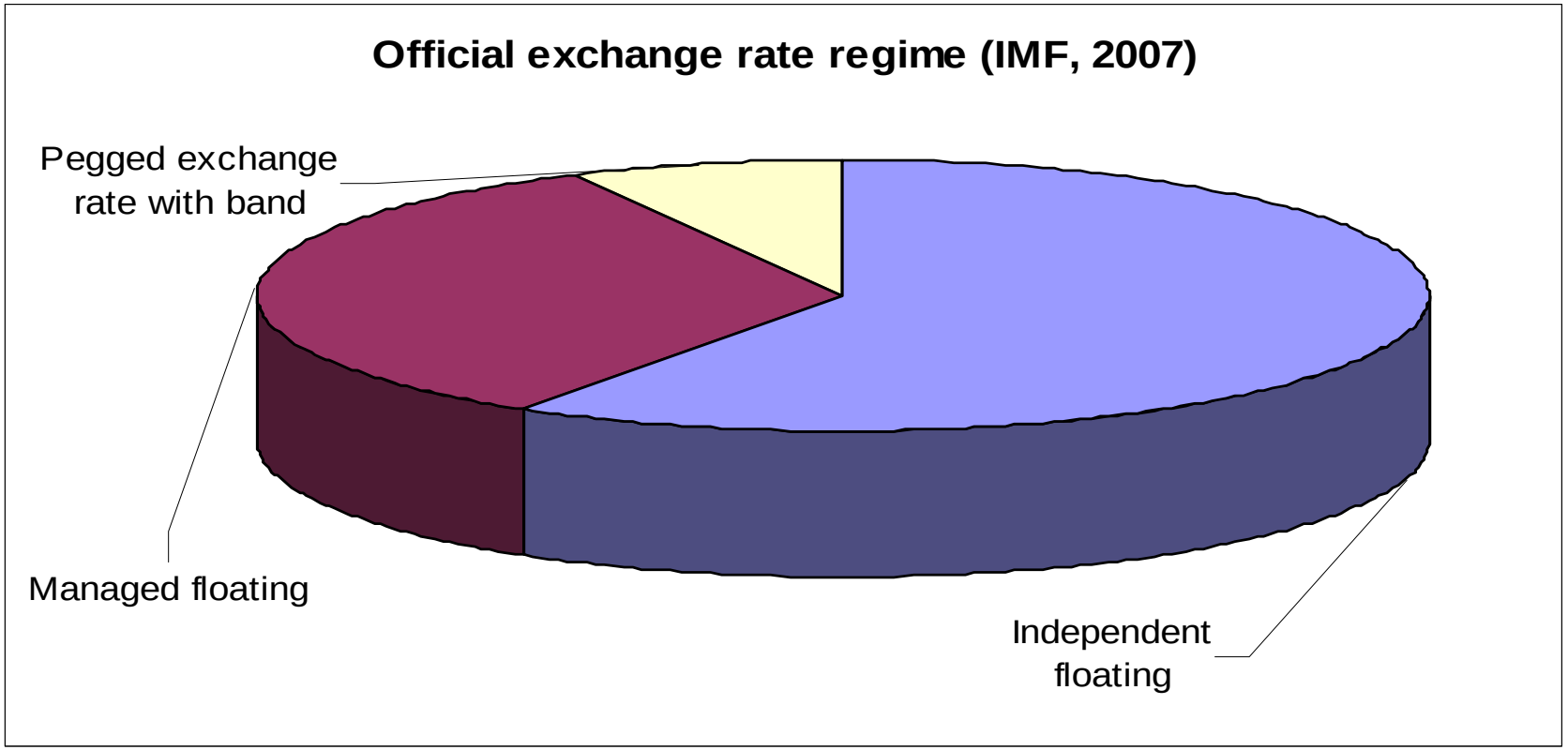
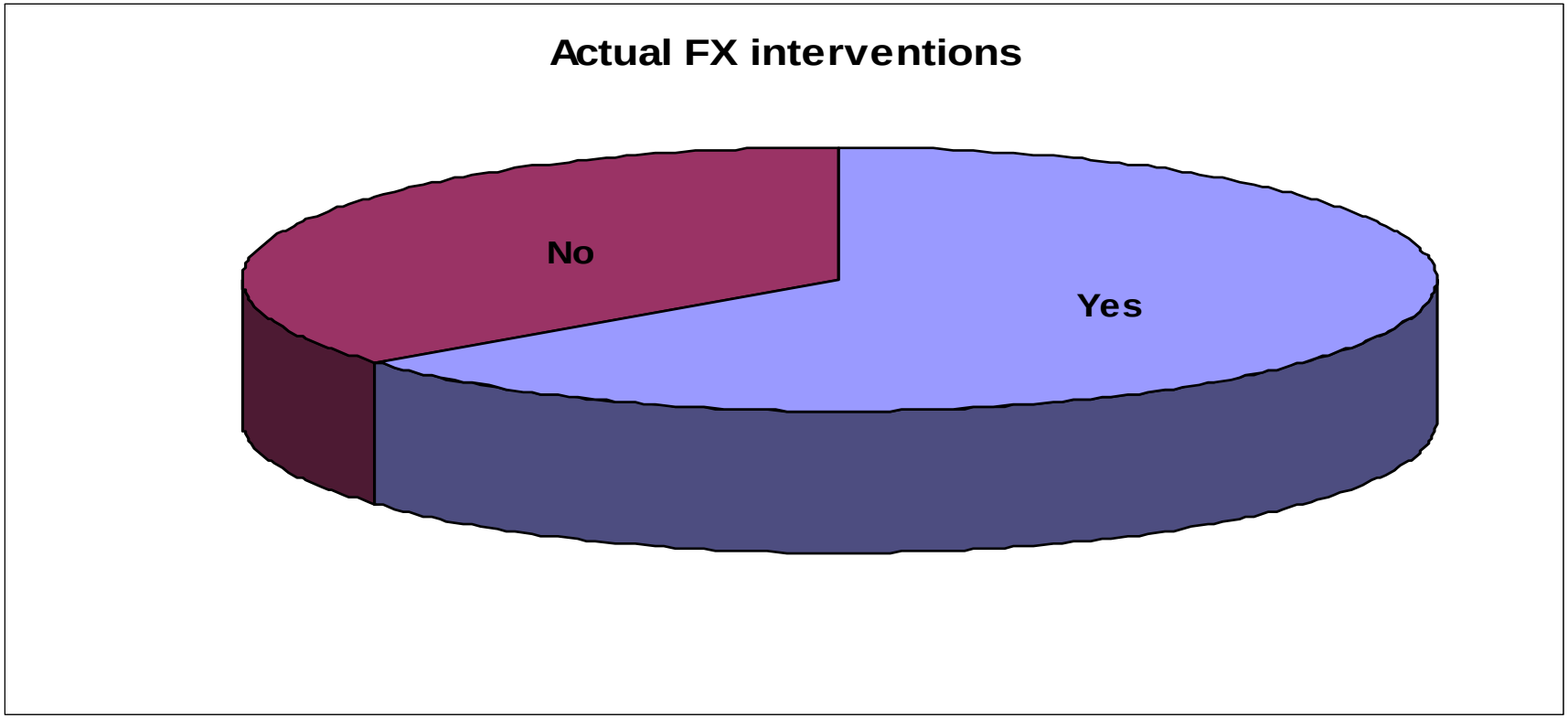
FX Interventions in IT Practice (i)



- According to IMF's classification, independent floating dominates among IT countries, but some other exchange rate regimes co-exist with the IT, too;

FX Interventions in IT Practice (ii)



- Many independent floaters do actually intervene;
- Newcomers to the IT club often do manage the ER more than the established inflation targeters (but: New Zealand).

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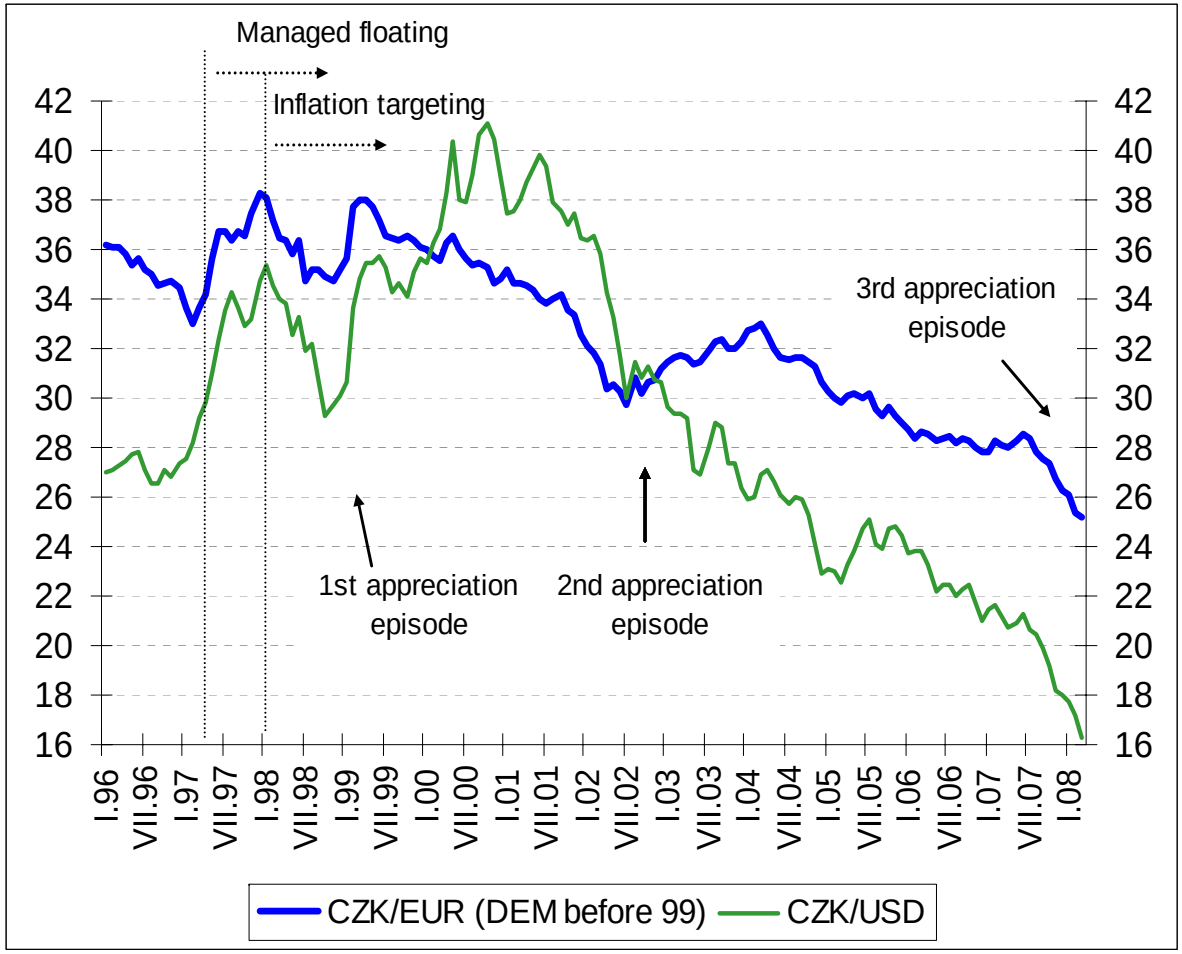
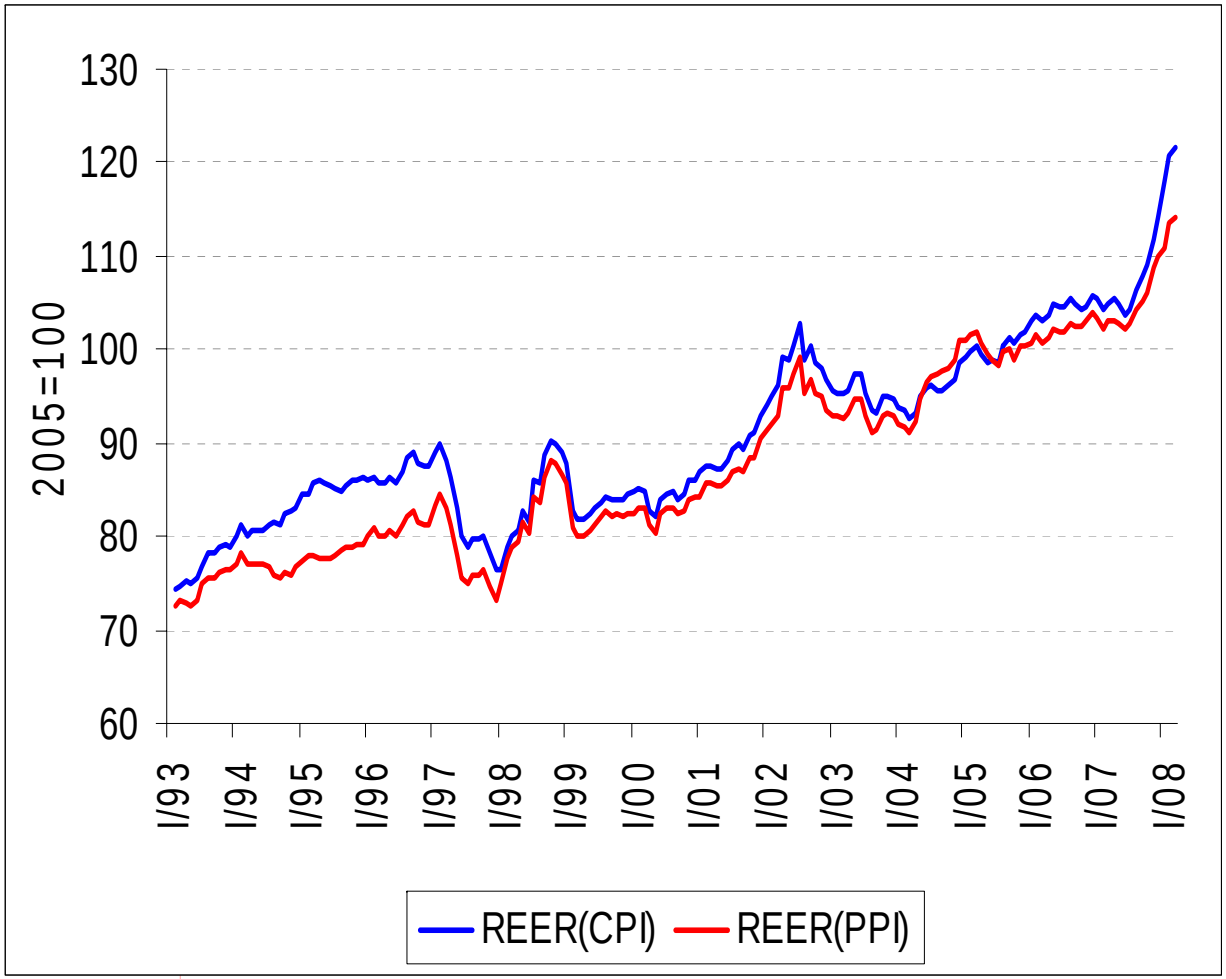
Nominal Exchange Rate (EUR; USD)



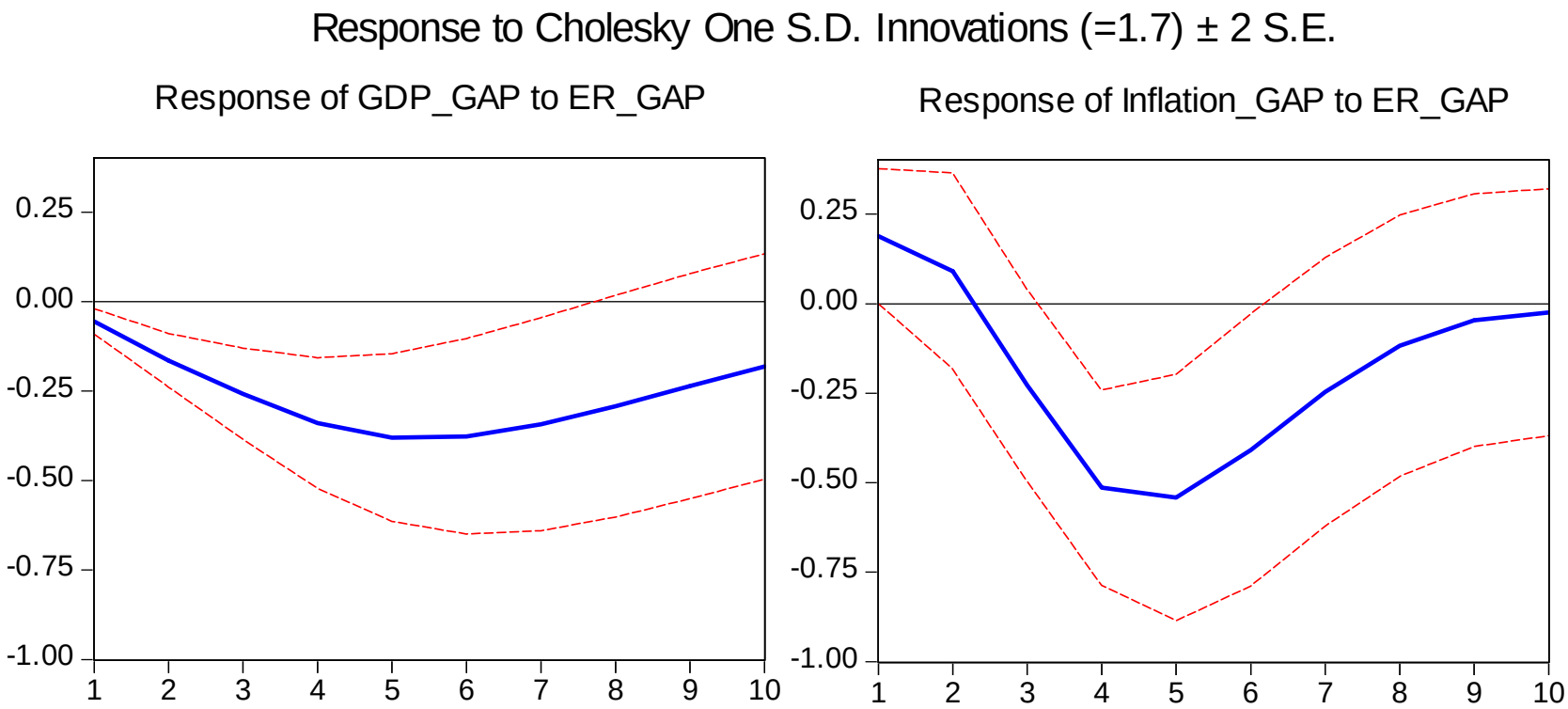
- Increased volatility since 1996 (band widened in Feb.06; abandoned in May 1997);
- Periods of fast appreciation in 1998, 2001-02 and 2007-08;
- Some depreciation corrections as well, but only short-lived.

Nominal and Real Effective Exchange Rate



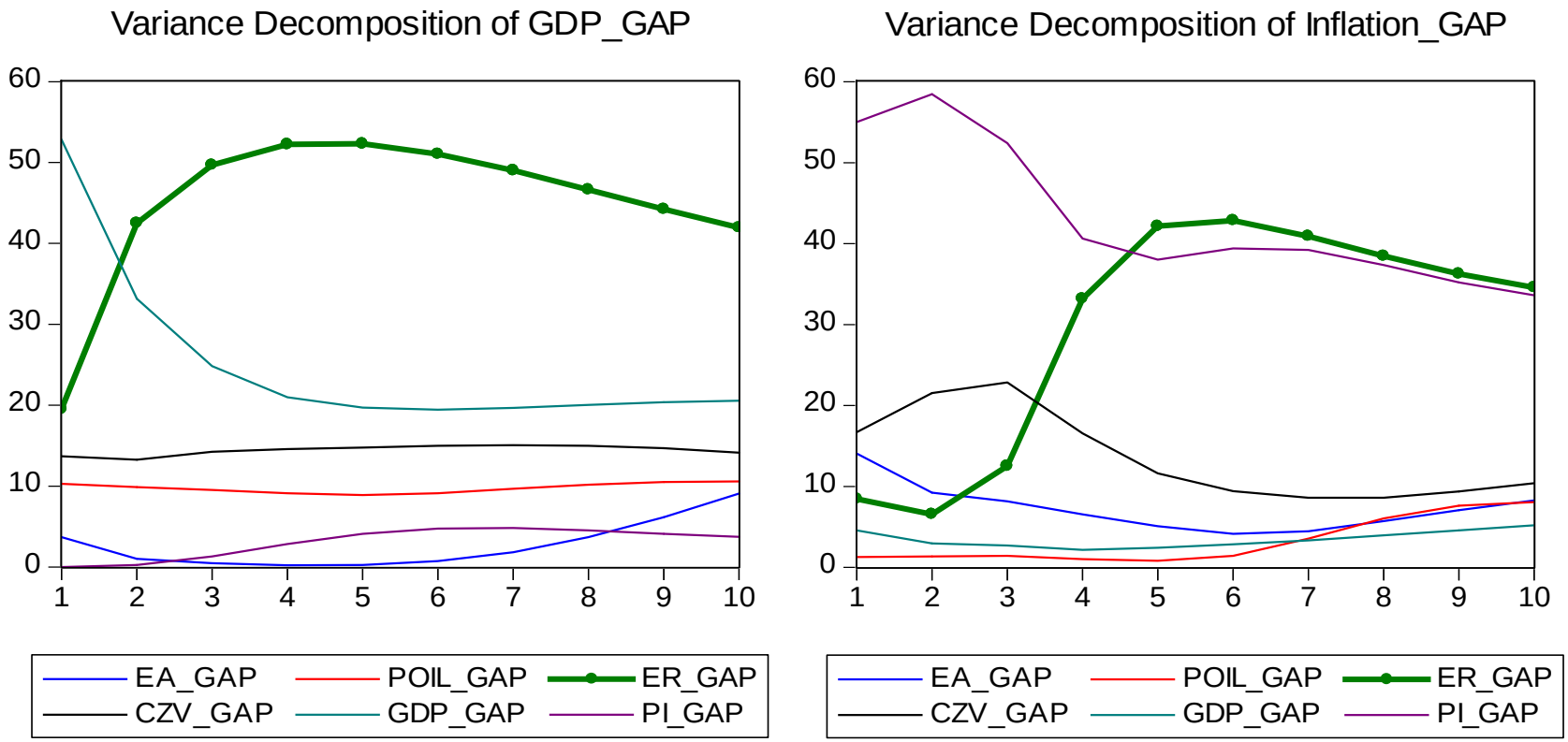
- Real appreciation trend ≈3-4 % (may support one-way expectations);
- Volatility around the trend quite important, not always fundamentally justified;
- Appreciation episodes associated with problems for Czech IT.

Impulse Response to Exchange Rate Shocks



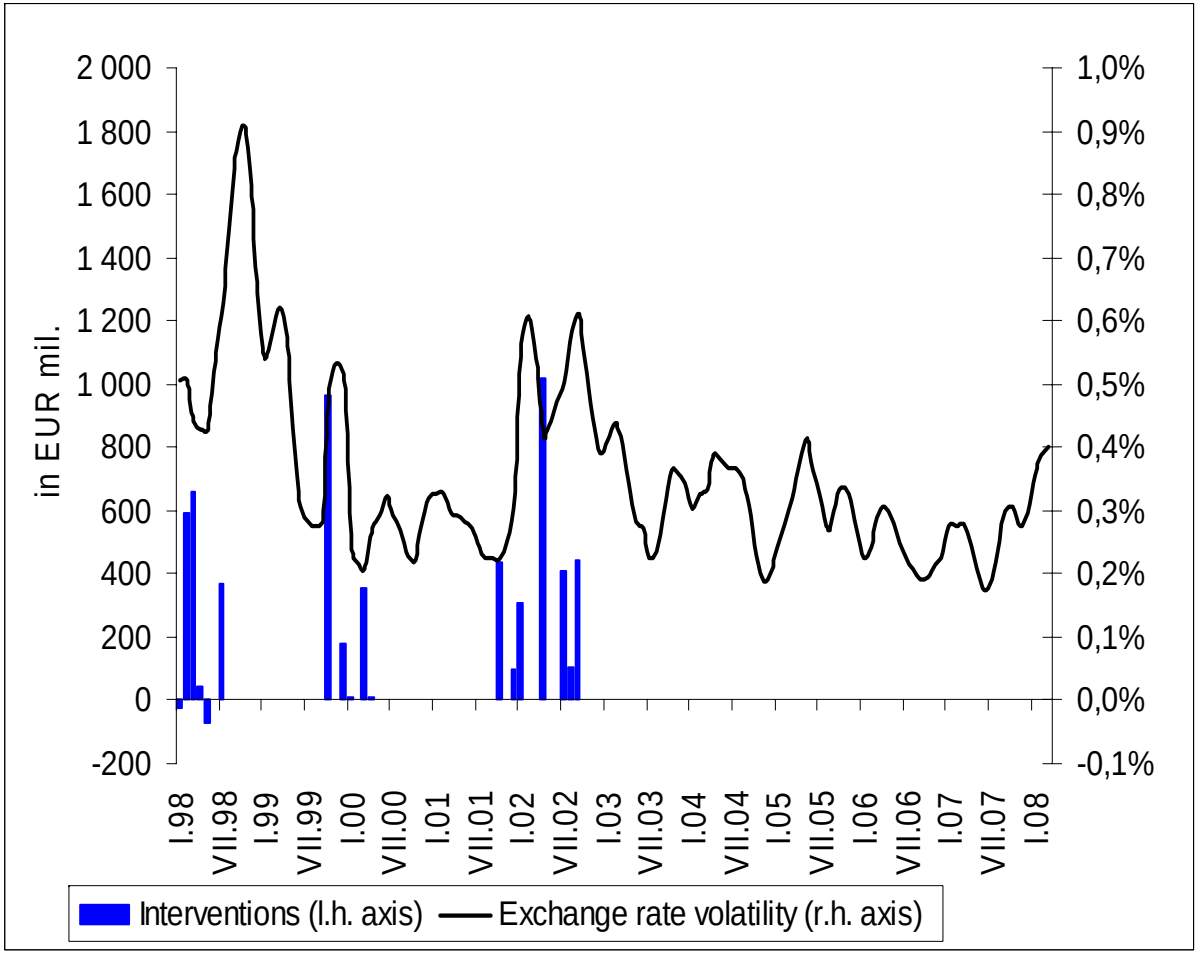
- Maximal impact after 5 quarters;
- Pass-through about 30 % to inflation and 22 % to output gap (of shocks to the real exchange rate).

Importance of Exchange Rate Shocks in the Czech Republic



- Exchange rate shocks explain 40 - 50 % of variability in output gap and in the deviations of inflation from targets;
- E.g. periods 1998-99 and 2001-03.

FX Interventions and ER Volatility



- Relatively long periods of no interventions;
- Interventions against appreciation only;
- February-July 1998; October 1999-March 2000; 2001-02;
- Since 2002 no interventions.

Effectiveness of Interventions

Starting month	Final month	Overall volume	CZK/EUR (ECU prior to 1999)						
(t)	(T)	EUR million	t-3M average	t-1M average	Start of t	Low of [t;T]	End of T	T+1M average	T+3M average
02/1998	04/1998	1285	37,87	38,50	38,37	36,30	36,46	36,11	35,11
06/1998	07/1998	508	36,95	36,11	36,49	34,35	34,35	35,47	35,17
10/1999	10/1999	966	36,52	36,36	35,72	35,68	36,62	36,40	36,03
12/1999	12/1999	229	36,36	36,40	36,08	35,83	36,13	36,03	35,60
03/2000	03/2000	394	36,05	35,71	35,65	35,53	35,63	36,31	36,02
10/2001	01/2002	643	33,86	34,19	33,91	31,46	31,92	31,79	30,36
04/2002	04/2002	1 009	32,08	31,39	30,62	30,06	30,63	30,56	29,75
07/2002	09/2002	954	30,36	30,3	29,25	28,97	30,30	30,65	31,19

- Sometimes a visible immediate impact, lasting up to 3Ms;
- But in other cases the effect less clear, weak and non-lasting;
- The last intervention episode eventually successful, but…;
- Hard to know the counterfactual.

Effectiveness of Interventions (Geršl, Holub)

Variable		Regression I Δs_t	Regression II Δs_t	Regression III $s_t - s_{t-2}$	Regression IV $s_t - s_{t-3}$
Intercept	d_0	0.00	0.00		
Int_t	a_0	0.001	0.003**	0.003**	-0.000
Int_{t-1}	a_1		-0.002*	-0.002	0.002
Int_{t-2}	a_2		-0.004***		-0.004*
Int_{t-3}	a_3		0.004***		
Int_{t-4}	a_4		-0.001		
3M money market spread	c_1	-0.015**	-0.015**	-0.032***	-0.046***
ΔHUF/EUR	c_2	0.015***	0.015***	0.008*	0.001
ΔSKK/EUR	c_3	0.309***	0.299***	0.314***	0.271***
Δ Dow Jones Euro Stoxx Broad Index	c_4	-0.003***	-0.004***	-0.004***	-0.004***
adjusted R^2		0.14	0.17	0.16	0.15

Estimated via instrumental variables
Sample: 1/1/2001 – 1/1/2003; 509 observations
*=significance at 10% level; **=significance at 5% level; ***=significance at 1% level
In regression II, the Wald test indicates that all intervention variables are jointly significant, while in the regressions III and IV the null hypothesis of no joint significance of intervention variables cannot be rejected.
Source of data: Bloomberg, Reuters, ECB, CNB.

$$\Delta s_t = d_0 + \sum_{i=0}^{4} a_i INT_{t-i} + \sum_{i=1}^{n} c_i X_{it} + \varepsilon_t$$

Effectiveness of Interventions (Geršl, Holub)

GARCH Model

		Coefficient	Standard error	Significance level
Mean equation				
3-month money market rate spread	C_1	-0.015	0.006	0.02
ΔHUF/EUR	C_2	0.012	0.004	0.00
ΔSKK/EUR	C_3	0.269	0.037	0.00
Δ Dow Jones Euro Stoxx Broad Index	C_4	-0.003	0.001	0.00
Variance equation				
Intercept	A_0	0.004	0.001	0.00
Arch(1)	A_1	0.122	0.048	0.01
Garch(1)	A_2	0.540	0.101	0.00
Int_t	A_3	0.0003	0.0001	0.01

Estimated via maximum likelihood; adjusted $R^2 = 0.13$

Sample: 15/1/2001 – 1/1/2003; 513 observations

$$\Delta s_t = d_0 + \sum_{i=1}^{n} c_i X_{it} + \varepsilon_t \qquad \varepsilon_t \mid \Omega_{t-1} \sim N(0, \sigma^2) \qquad \sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \alpha_2 \sigma_{t-1}^2 + \alpha_3 INT_t + u_t$$

Effectiveness – Summary of Results

- Geršl, Holub (2006): Interventions have probably played a minor role in influencing the short-run ER development at best. They contributed to an increased volatility of the ER, but only to a limited extent.
- Geršl (2005): The results indicate that interventions by the CNB had only small short-term effect on exchange rate level and to a certain extent contributed to the increased conditional and implied volatility.
- Disyatat, Galati (2005): Intervention had some (weakly) statistically significant impact on the spot rate and the risk reversal but that this impact was small. No evidence that intervention had an influence on short-term exchange rate volatility.
- Égert, Komárek (2006): From mid-1998 to 2002, interventions turn out to be (more) successful in reversing the appreciation trend in the short run and in smoothing the exchange rate at longer horizons up to 60 days. The econometric evidence indicates that koruna sales have a positive relationship with the exchange rate from mid-1998 to 2002.

Consistency with the Inflation Targeting

- **Target consistency**
  - Are interventions not running against the goals of inflation targeting?
- **Regime consistency**
  - Are IRs used as the main MP tool, interventions only supplementary?
  - Are the goals of ER management not in conflict with IR policy (UIP condition – trying to „restore“ it, not work against it)?
- **Procedural consistency**
  - Do interventions follow clear procedural rules and communication standards?

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Consistency with the Inflation Targeting

Period	Month	Deviation from IT[a]	Ex post deviation[b]	Output gap[c]	Exchange rate gap[c,d]	Interest rate gap[c,e]	Interest rate trend
I	02-03/1998	+0.5 %	-4.3 %	-3.1 %	0.5 %	3.7 %	→;↑
	06/1998	+0.2 %	-4.3 %	-3.5 %	2.6 %	1.2 %	→
	07/1998	-0.2 %	-4.3 %	-3.9 %	6.5 %	-0,1 %	↓
II	10/1999	-0.9 %	-1.5 %	-2.7 %	-1.9 %	2.1 %	↓
	12/1999	-1.4 %	-1.5 %	-2.7 %	-1.9 %	2.1 %	↓
	03/2000	-1.2 %	-1.5 %	-2.0 %	-0.3 %	1.4 %	→
III	10-12/2001	-0.1%	-3.2 %	-0.3 %	2.0 %	-1.5 %	→;↓
	01/2002	-0.9 %	-4.1 %	-0.7 %	5.4 %	-1.0 %	↓
	04/2002	-1.0 %	-3.8 %	-1.0 %	8.3 %	-0.8 %	↓
	07-09/2002	-1.3 %	-3.7 %	-1.5 %	6.1 %	-0.7 %	↓

[a]Deviation of the CNB's inflation forecast from centre of the inflation target twelve months ahead (for net inflation targeting the announced targets closest to the twelve months horizon were used).
[b]Deviation of the actual inflation after one year (or closest to that) from centre of the inflation target.
[c]Ex post assessment in April 2005 (ex ante assessment for July-September 2002, the only case in which it is available).
[d]A positive/negative number means exchange rate overvaluation/undervaluation.
[e]Measured by real one-year money market interest rate. A positive/negative number means tight/loose interest rate conditions.

Source: Czech National Bank; own computations.

Other Related Measures

- A mechanism of co-operation with the government since early-2000;
- Strengthened by an agreement of the CNB with government in January 2002:
  - Purchase of state FX revenues to CNB's reserves (so far over EUR 5 bn.), participation of the gov't on sterilization costs;
  - Postponed issue of state eurobonds (later on hedged);
  - Matching state's FX liabilities and incomes;
  - Communication of CNB with gov't on ER issues, etc.
- New agreement in 2008:
  - Cover EU funds in addition to privatisations and eurobonds.

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Summary

- Standard IT literature gives little guidance on interventions;
- Some proposals to combine IT with managed float;
- In practice, many inflation targeters do use interventions;
- IT regime in CZ since 1998 combined with managed float;
- Experience with the role of ER developments is challenging;
- Three periods od FX interventions against CZK;
- Empirical evidence on their effectiveness mixed at best;
- Not easy to combined IT with managed float in a consistent manner;
- Agreement with the government on its FX revenues.

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Policy Conclusions

- Larger economies probably better of with freely floating exchange rate under the inflation targeting regime;
- Even in small open economies, interventions should be relatively rare under the inflation targeting regime, and be viewed at best as a supplementary monetary policy tool;
- Interventions should be avoided especially in those circumstances, when they would go against future fulfillment of the inflation targets, would push the exchange rate away from equilibrium, and when interest rates could be adjusted in the first instance;
- Procedural and communication aspects of the interventions could be brought closer to the inflation targeting standards.

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Thank you
for your attention.