L9. Choice of the Exchange Rate Regime and the Optimum Currency Area

Jarek Hurník

Choice of the Exchange Rate Regime

- Existence of price rigidities cause a purely monetary (exchange rate) shocks to spill over into the real economy (consequence of the Dornbusch model)

- This prediction started an enormous literature that argues that fixed exchange rate are superior to floating rates when the shocks that hit the economy are caused by nominal factors such a money demand instability (MP = constant money supply) or exchange rate itself

- Indeed, in 1980s there was strong tendency to use sort of 'fixed' exchange rate regime to stabilize the economy

Choice of the Exchange Rate Regime

- However, if the shocks are primarily 'real' there is no reason to fix the exchange rate

- Exchange rate absorbs the shocks

- Moreover even 'credibly' fixed exchange rate may not be a viable long-run option for most countries, given the possibility of speculative attack
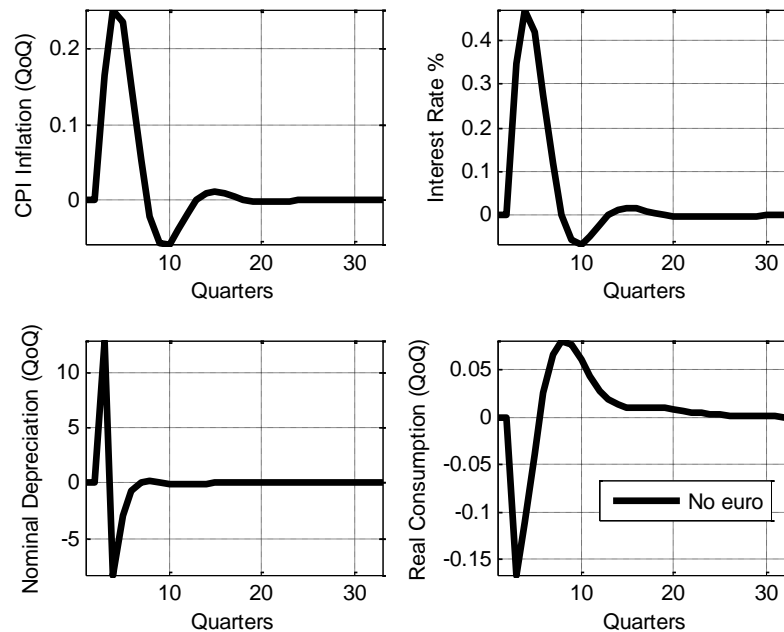
Choice of the Exchange Rate Regime

- Assume a central bank minimising the social costs via minimising the volatility of inflation and output

$$\Lambda_t = \chi \pi_t^{\,2} + [y_t - y^*]^2$$

- The question to be answered is the relative magnitude of volatilities given the exchange rate regime
  - Fixing the exchange rate = no exchange rate shocks
    - *Ceteris paribus* lowers volatility in question
  - However, exchange rate serves also as absorber of 'other shocks'
    - *Ceteris paribus* increases volatility in question
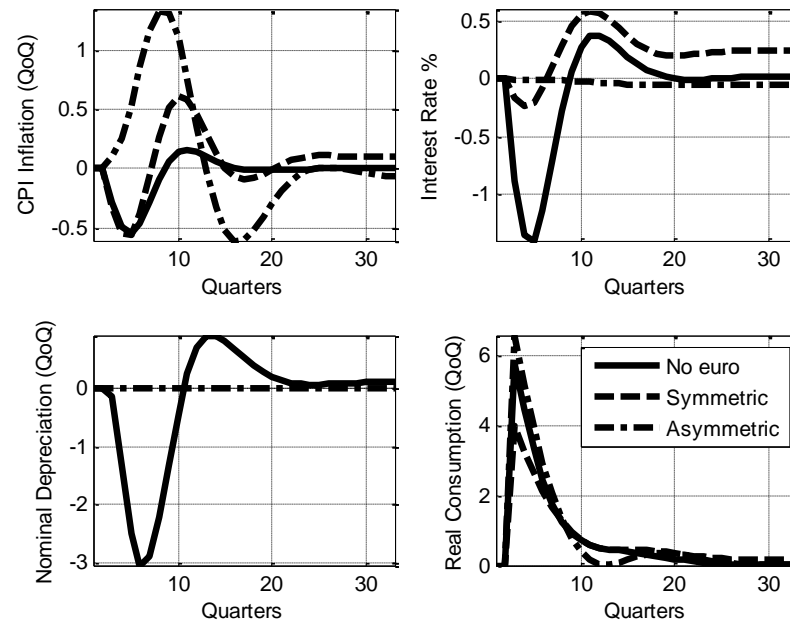
Choice of the Exchange Rate Regime

Figure 1a: Impulse responses to an one period exchange rate shock – 'no euro'
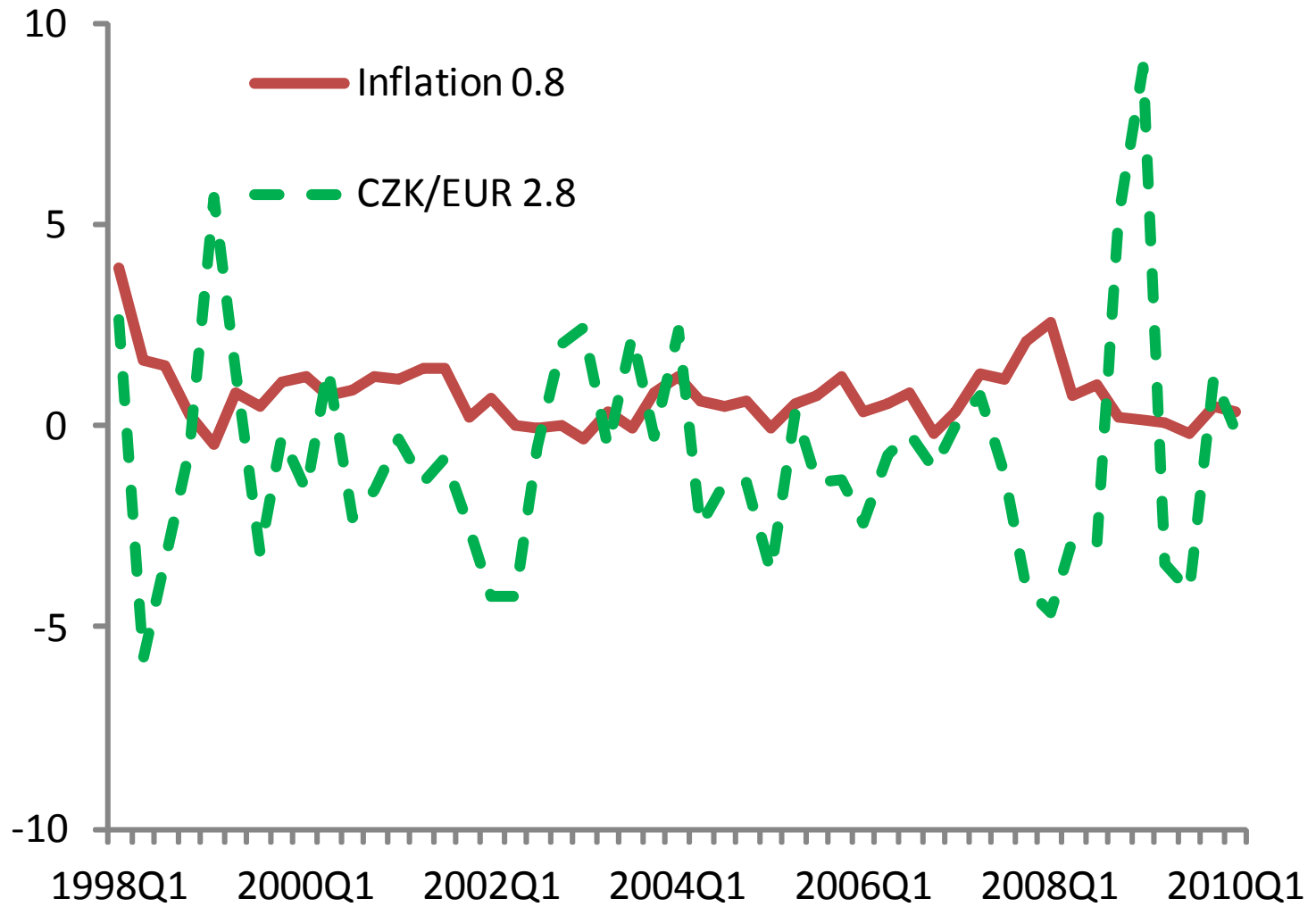

Source: Authors' computations.

Choice of the Exchange Rate Regime

Figure 1b: Impulse responses to unexpected one period labour technology shock – 'no euro', 'euro with symmetric shocks' and 'euro with asymmetric shocks'

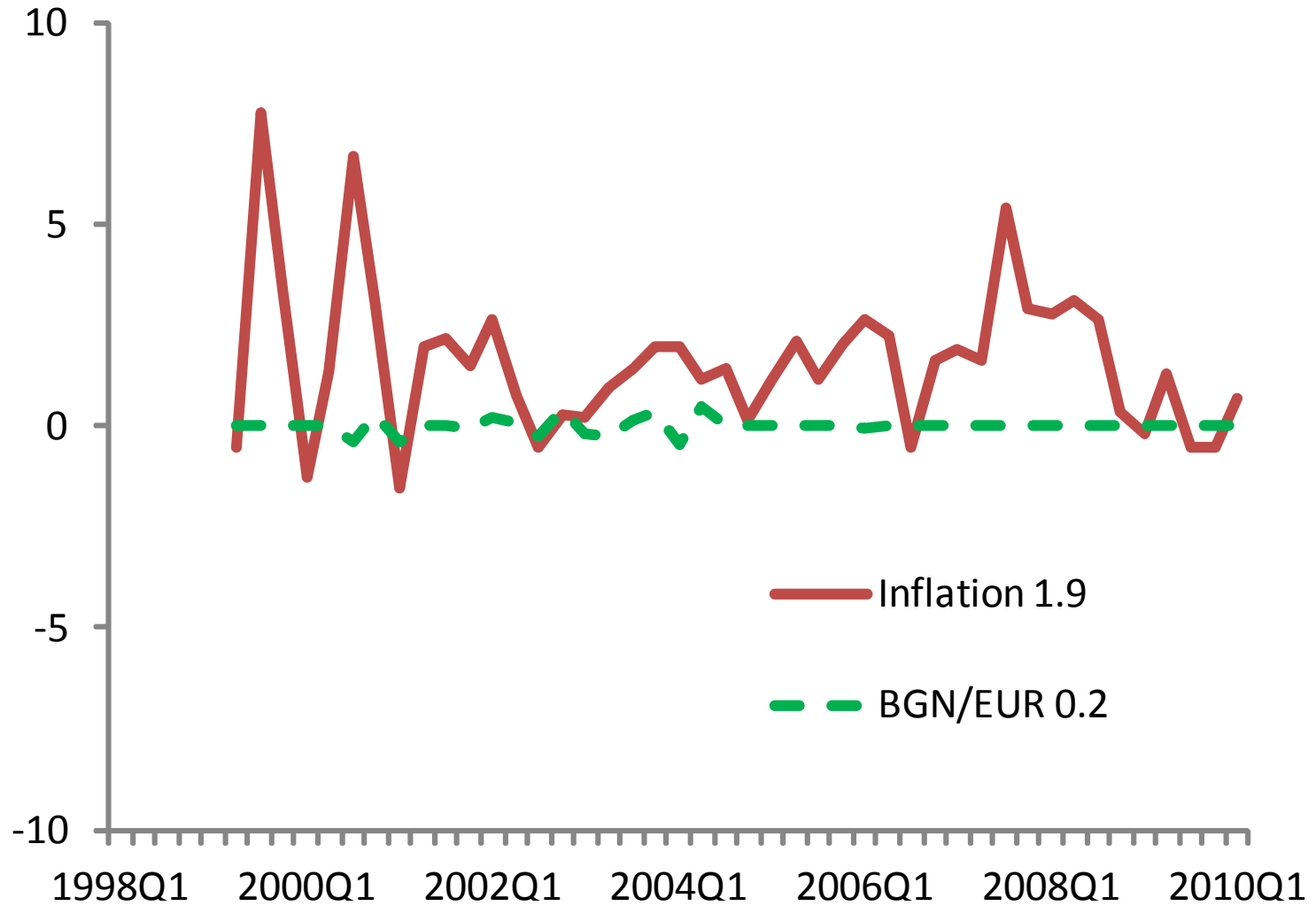Source: Authors' computations.

Source: Hurník J, Tůma Z, Vávra D, 2010. "The Euro Adoption Debate Revisited: The Czech Case", *Czech Journal of Economics and Finance*, 60 (3), pp. 194-212.

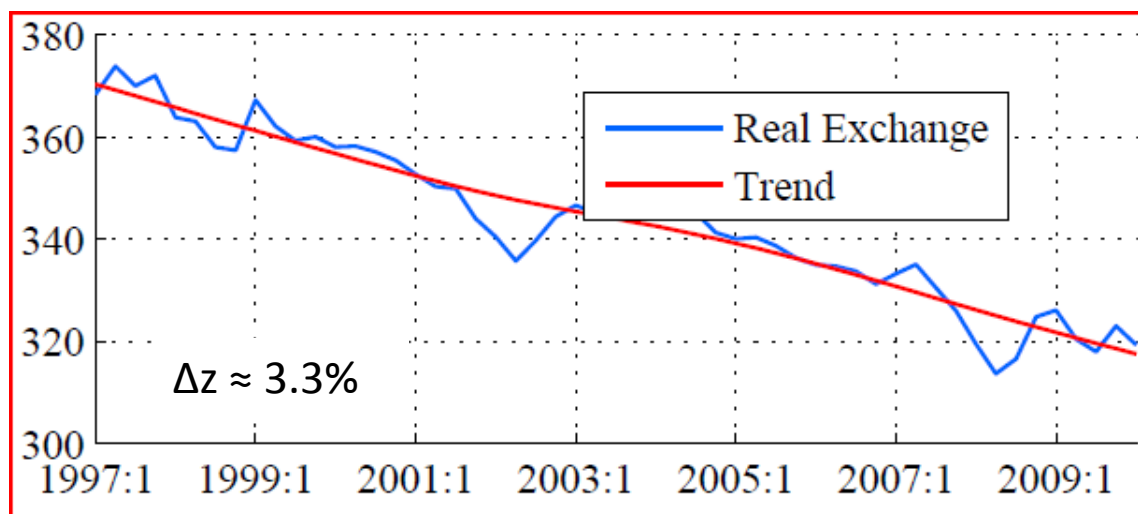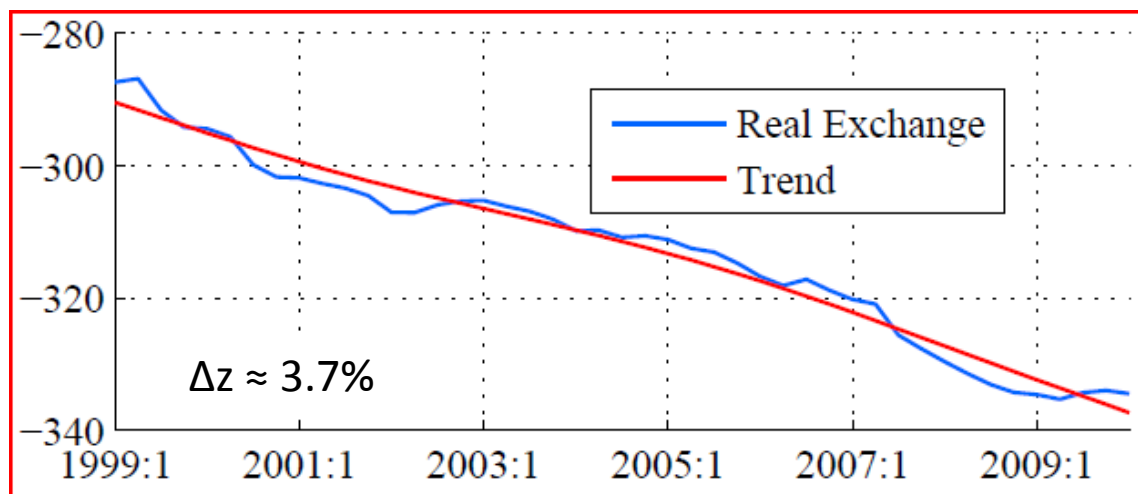# Float and volatility – CZK

Fix and volatility – BGN

Real variables matter in the end

- Both koruna and lev appreciated in *real* terms

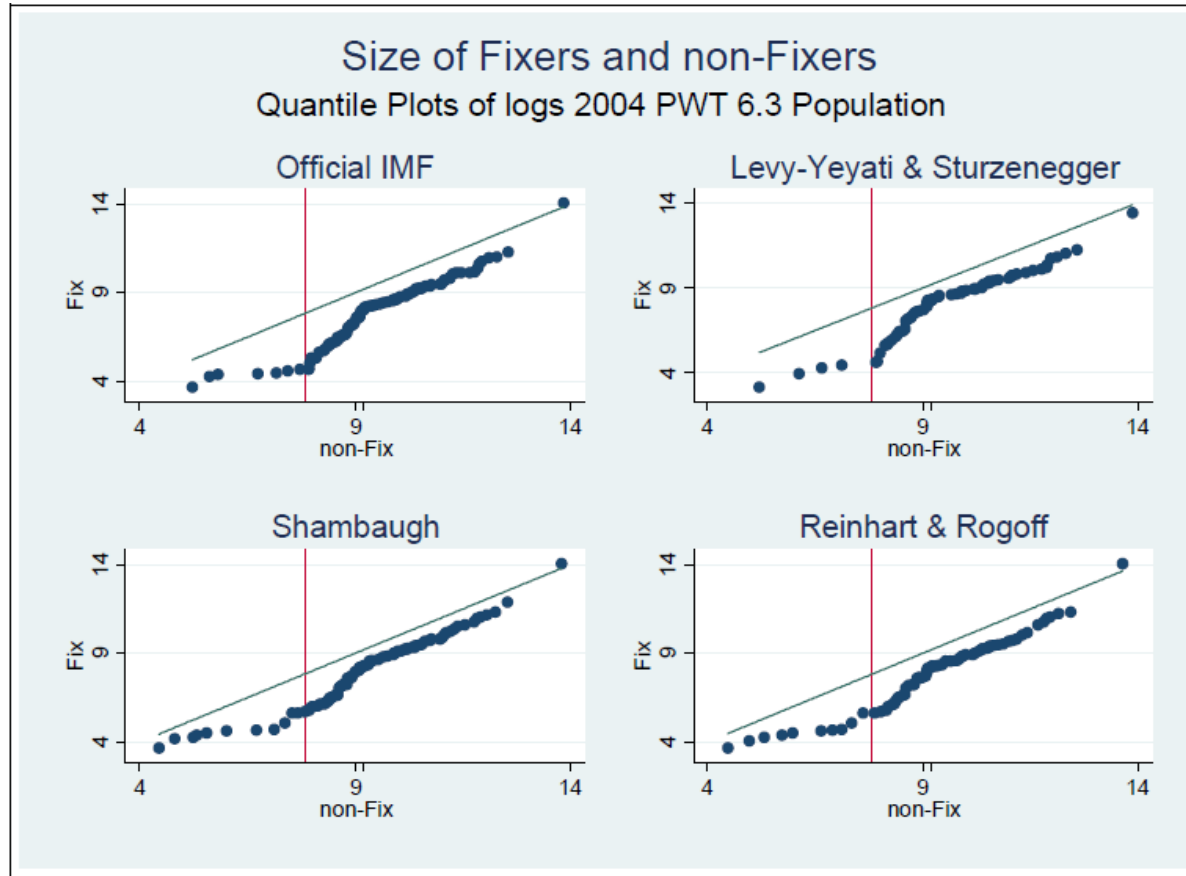- Can you guess which currency is which?

Choice of the Exchange Rate Regime

- Stockman (2000): "the evidence supporting the predictions of these models is only slightly better than the evidence for cold nuclear fusion"

- Any other reason why some countries choose to fix while other float?
  - Unbearable difficulty of independent monetary policy
  - Size
  - Income

Independent monetary policy

- Rose (2010)
  - "A fixed exchange rate policy is well-understood by bankers, practitioners, and academics around the world; one knows what the central bank does. But what's the alternative? Floating is not a well-defined monetary policy. If the central bank doesn't fix the exchange rate, it has to do something else … but what?"
- A fixed exchange rate is a transparent, easily monitored monetary anchor
- Tornell and Velasco (2000)
  - Fixed exchange rates induce fiscal indiscipline
  - Lax policy eventually leads to a costly collapse of the exchange rate

Size

Source: Rose, Andrew. 2010. "Exchange Rate Regimes in the Modern Era: Fixed, Floating, and Flaky,"
http://faculty.haas.berkeley.edu/arose/FFF.pdf

Income

Income of Fixers and non-Fixers
Quantile Plots of log 2004 PWT 6.3 Real GDP per capita

Source: Rose, Andrew. 2010. "Exchange Rate Regimes in the Modern Era: Fixed, Floating, and Flaky," http://faculty.haas.berkeley.edu/arose/FFF.pdf
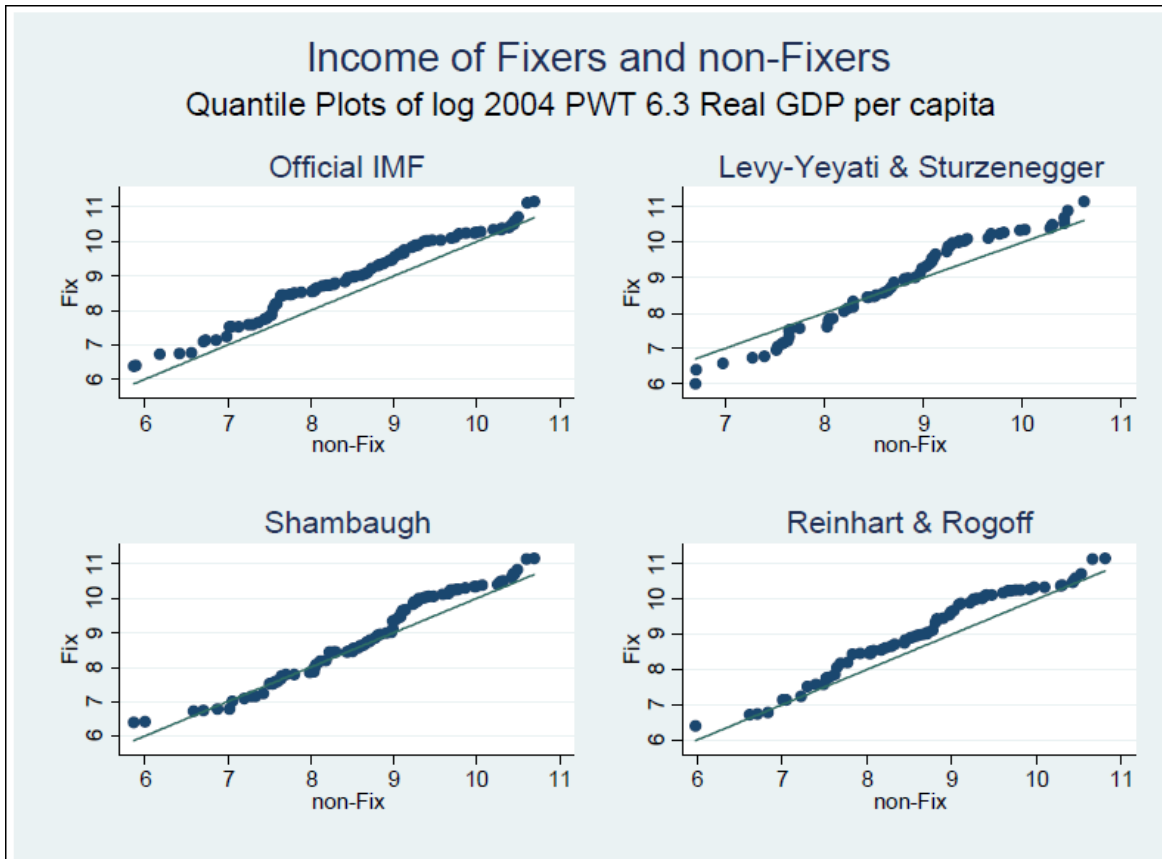
Optimum Currency Areas

- A further step beyond fixed exchange rates is to share a common currency
- A currency union is much harder to break
- But it also requires a higher degree of policy coordination
- The theory of Optimum Currency Areas is based on
  - Mundell (1961), McKinnon (1963), Kenen (1969)
    - Flexibility of labor market - internal mobility of labour (Mundell)
    - Openness (McKinnon)
    - Diversification (Kenen)

Expected benefits

- Higher GDP growth/level per se
  - No transaction costs
  - Increase in intra-union trade
- Import of better monetary policy
  - Price stability
  - Lower risk premium and lower interest rates
  - Both results in higher GDP growth
- Lower macroeconomic volatility: No exchange rate shocks
  - Prior: Exchange rate is main cause of economic disturbances
  - Lower volatility in inflation, consumption and GDP
  - Results in lower social costs

Expected benefits

- Quantifications usually focus on direct growth/level effects of
  - No transaction costs
  - Increase in intra-union trade
  - Lower risk premium and lower interest rates
- EC (1990)
  - Transaction costs associated with currency conversion alone accounted for 0.25 to 0.4 per cent of European community GDP at the time
  - Estimated the long-term output level to eventually increase by 5–10 per cent thanks to a decline of risk premiums by 0.5 percentage points
- Long-term growth effects in between 0.6-1 pp
  - Hungary, Slovakia
- Long-term output level up by 4 – 7 %
  - Poland

Eventual costs

- Costs
  - Exchange rate no more helps to deal with other than exchange rate shocks
  - Countries forgo the ability to use monetary policy to respond to country specific shocks
  - Countries give up the option to use inflation to reduce the real burden of public debt
  - Split of seignorage …
- Non-existence of common fiscal policy exacerbated the problem of country specific shocks …
- Need for common fiscal policy and political integration?

Joining currency union …

- Traditional debate
  - Do we face country specific shocks?
  - If yes, can we rely on different channels for adjustment than is monetary policy?
  - CNB study on 'economic alignment'
    - Appropriateness of the common MP policy for the country
    - Similarity of economic processes, symmetry of economic shocks
    - Ability to respond to asymmetric shocks

Joining Currency Union

- Analyses partly limited by available data
- "Readiness" evaluated by comparison
  - With reference countries:
    - 3 "ins" (similarity, integration): AT, DE, PT
    - 2 "newly in": SI, SK
    - 2 "pre-ins" (often compared to CR): HU, PL
  - Development in time
- All the following graphs and tables come from the CNB analyses (CNB (2012))

Cyclical Alignment

Tabulka 5: Korelační koeficienty ekonomické aktivity

		2002Q1–2008Q2		2008Q3–2012Q1		2002M1–2008M6		2008M7–2012M6	
		HDP		HDP		IPP		IPP	
Metoda 1	CZ	0,70 **	(0,49 ; 0,84)	0,91 **	(0,79 ; 0,97)	0,67 **	(0,56 ; 0,77)	0,96 **	(0,94 ; 0,98)
	AT	0,82 **	(0,68 ; 0,91)	0,97 **	(0,91 ; 0,99)	0,76 **	(0,67 ; 0,83)	0,95 **	(0,91 ; 0,97)
	DE	0,93 **	(0,86 ; 0,96)	1,00 **	(0,99 ; 1,00)	0,92 **	(0,89 ; 0,95)	1,00 **	(0,99 ; 1,00)
	PT	0,62 **	(0,37 ; 0,79)	0,75 **	(0,47 ; 0,90)	0,37 **	(0,20 ; 0,52)	0,85 **	(0,76 ; 0,90)
	HU	-0,32	(-0,59 ; 0,02)	0,97 **	(0,91 ; 0,99)	0,54 **	(0,39 ; 0,66)	0,97 **	(0,94 ; 0,98)
	PL	0,68 **	(0,45 ; 0,82)	0,86 **	(0,66 ; 0,94)	0,54 **	(0,40 ; 0,66)	0,87 **	(0,79 ; 0,92)
	SI	0,81 **	(0,65 ; 0,90)	0,92 **	(0,80 ; 0,97)	0,58 **	(0,44 ; 0,69)	0,94 **	(0,90 ; 0,96)
	SK	0,61 **	(0,36 ; 0,79)	0,91 **	(0,79 ; 0,97)	0,40 **	(0,23 ; 0,55)	0,92 **	(0,86 ; 0,95)
Metoda 2	CZ	0,65 **	(0,41 ; 0,81)	0,83 **	(0,61 ; 0,93)	0,09	(-0,10 ; 0,28)	0,63 **	(0,46 ; 0,75)
	AT	0,50 **	(0,20 ; 0,71)	0,77 **	(0,49 ; 0,90)	0,23 **	(0,05 ; 0,40)	0,30 **	(0,06 ; 0,50)
	DE	0,82 **	(0,68 ; 0,91)	0,96 **	(0,90 ; 0,98)	0,51 **	(0,36 ; 0,64)	0,75 **	(0,63 ; 0,84)
	PT	0,77 **	(0,59 ; 0,88)	0,75 **	(0,46 ; 0,89)	0,43 **	(0,26 ; 0,57)	0,35 **	(0,12 ; 0,54)
	HU	0,11	(-0,23 ; 0,43)	0,83 **	(0,61 ; 0,93)	0,09	(-0,10 ; 0,27)	0,18	(-0,06 ; 0,40)
	PL	0,27	(-0,07 ; 0,55)	0,56 **	(0,16 ; 0,81)	0,46 **	(0,29 ; 0,59)	0,35 **	(0,12 ; 0,54)
	SI	0,49 **	(0,19 ; 0,71)	0,91 **	(0,79 ; 0,97)	0,15	(-0,04 ; 0,33)	0,36 **	(0,14 ; 0,56)
	SK	0,40 **	(0,08 ; 0,64)	0,81 **	(0,57 ; 0,92)	0,13	(-0,06 ; 0,31)	0,38 **	(0,15 ; 0,56)

Poznámka: Metoda 1 – meziroční diference; Metoda 2 – mezičtvrtletní (resp. meziměsíční) diference. Významnost korelačního koeficientu je označena ** a * pro 5% a 10% hladinu významnosti, v závorkách je uveden 90% interval spolehlivosti.

Zdroj: Eurostat, výpočet ČNB

Cyclical Alignment

Tabulka 8: Korelace ekonomických šoků vůči eurozóně – poptávkové šoky

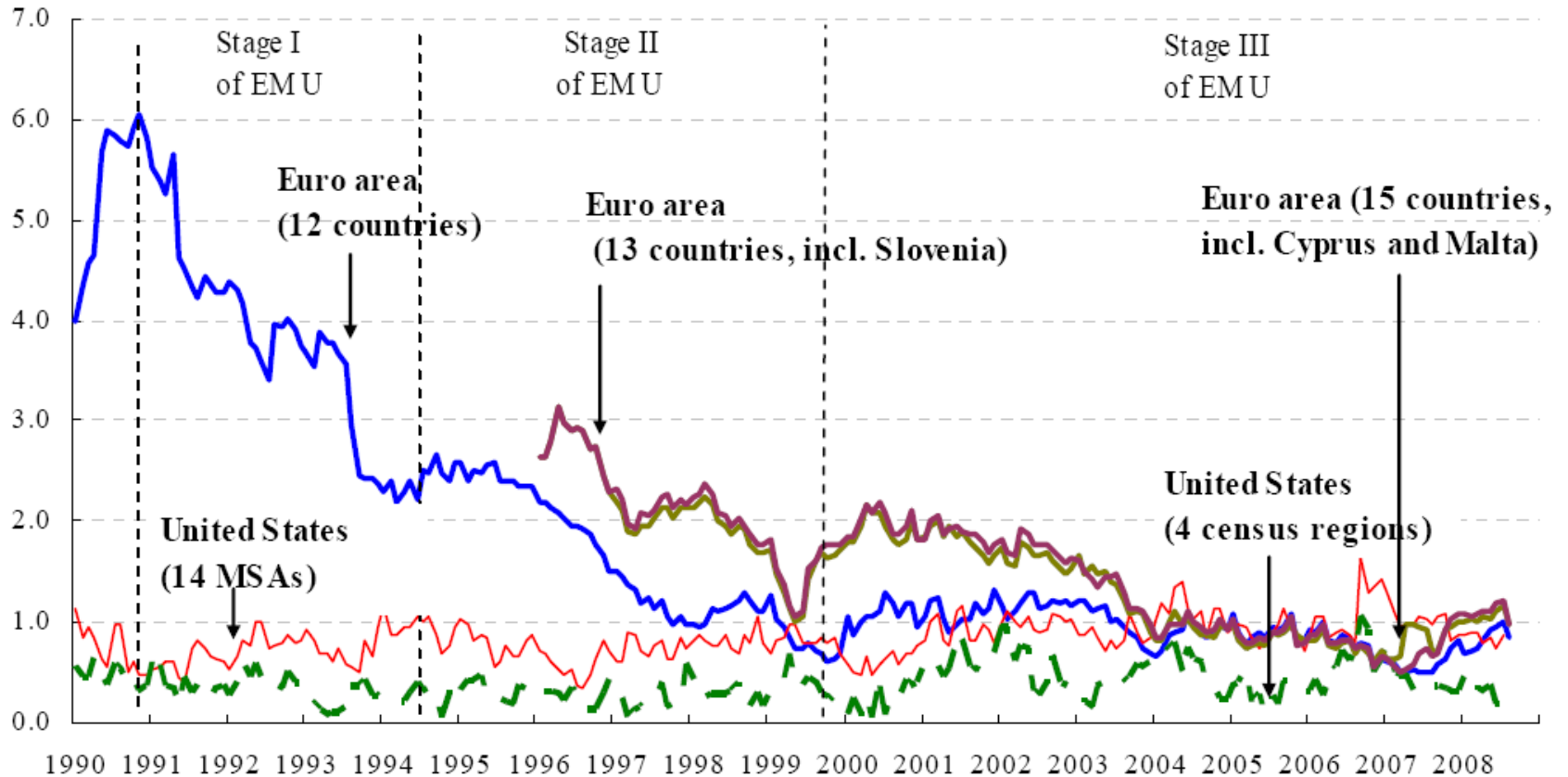|	2002–2008Q2	2008Q3–2012
CZ	-0,03	-0,05
AT	-0,01	0,02
DE	0,61 ***	-0,28
PT	0,10	-0,12
HU	-0,11	0,40
PL	-0,03	-0,30
SI	0,18	0,24
SK	0,03	0,40

Poznámka: Významnost korelačního koeficientu je označena *** pro 1% hladinu významnosti.

Zdroj: Eurostat, výpočet ČNB

Stylized facts … price stability

- With no doubts ECB has been able to maintain price stability on the euro area level
  - Over the first five post-war decades, with a few exceptions, inflation in all euro area countries was never as low as it was during the first ten years of the euro (Mongelli and Wyplosz, 2008).
  - Moreover, inflation dispersion has steadily declined since 1999

Stylized facts ... price stability

Stylized facts … price stability
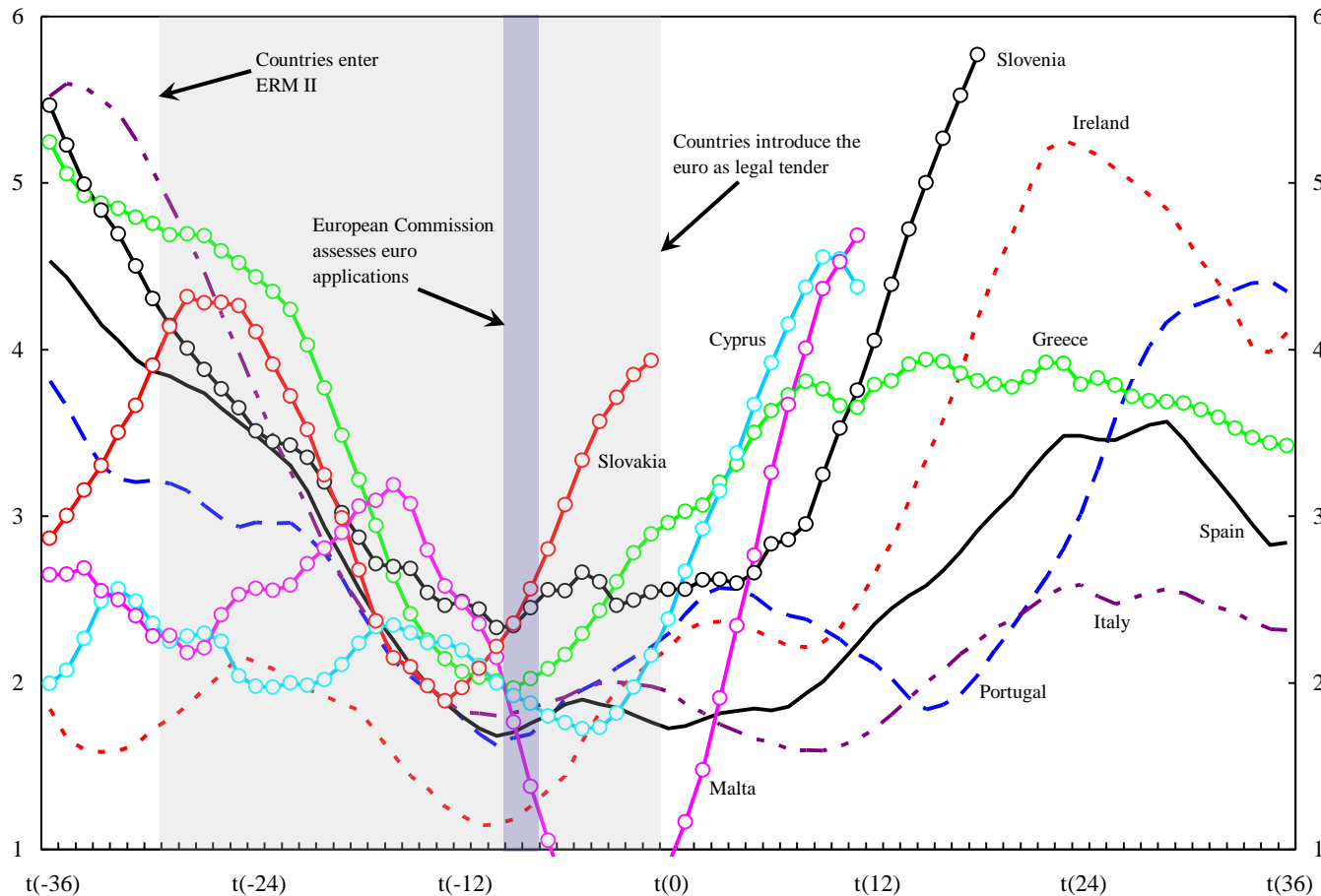
- Seems to work at first glance, but …
- In countries where the disinflation had been sharp and short-run inflation increased shortly after joining
- And the real exchange rate appreciated above the sustainable level

Stylized facts … economic growth

- Eurozone effects on trade …
  - Rose (2000)
    - Membership in a currency union increases the trade among the members three times
  - Baldwin (2006)
    - The trade effect varies according to particular studies from around 6 to 25 % increase in trade
- … and income
  - Frankel and Rose (2002)
    - '… by raising overall trade, currency unions also increase income'
    - 'we test and find no support for the common argument that currency unions improve income through other channels, e.g., by enhancing the central bank's credibility or stabilising the macroeconomy. The effect appears to come via trade.'

Stylized facts … economic growth

- Rose (2010)
  - "… none finds a strong robust effect of the exchange rate regime on growth. This is unsurprising. Choosing an exchange rate regime is choosing a monetary policy. As such, the exchange rate regime should have little effect on real long-term growth, and it does not appear to."

Table 2: Growth Effects of Deviations from Fixed Exchange Rate Regimes

Classification	Narrow Crawl	Wide Crawl/Managed	Float	Falling
Official IMF	.8* (.3)	.5 (.4)	.2 (.5)	
Reinhart and Rogoff	-.3 (.4)	-1.0* (.5)	.5 (1.2)	-4.3** (.6)

	Intermediate	Float
Levy-Yeyati and Sturzenegger	-1.5** (.4)	-.5 (.4)

	Non-Peg
Shambaugh	.3 (.3)

Robust standard errors in parentheses; coefficients significantly different from zero at .05 (.01) level marked by one (two) asterisk(s). Country and time fixed effects included in all regressions but not recorded. Dependent variable is annual real GDP growth from the PWT 6.3. Each row represents a different OLS regression; each coefficient represents the difference between the exchange rate regime tabulated in the column head and a fixed exchange rate.

Stylized facts … economic growth

Figure 10: Euro area GDP growth and its conditional expectations

The figure reports GDP growth observed in the US and the euro area. In addition we report upper and lower bounds (dark red for the 68% and light red for the 95% confidence bands) for the GDP growth in the euro area conditional to the observation of the US GDP. The conditional distributions are computed using the parameters estimated using the sample 1970-1998. Data source: OECD, National Accounts.

- Eurozone effects on GDP growth
  - Giannone, Lenza and Reichlin (2008)

# Stabilisation role of monetary policy revisited

- What is missing when it comes to the euro is the debate about volatilities implied by the fixed exchange rate
  - Fixing the exchange rate = no exchange rate shocks
    - *Ceteris paribus* lowers volatility in question
  - However, exchange rate serves also as absorber of 'other shocks'
    - *Ceteris paribus* increases volatility in question
  - There is the common monetary policy in place
    - 'Other shocks' are symmetric – c*eteris paribus* no impact on volatility in question
    - 'Other shocks' are asymmetric – c*eteris paribus* increases volatility in question
- How to measure?

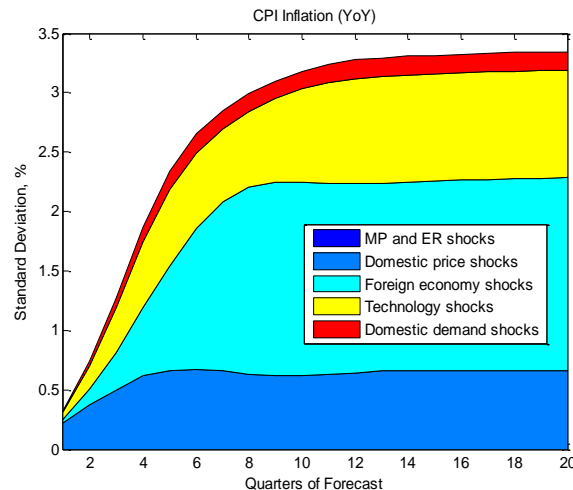# Measuring volatilities … methodology

- Identify all the shocks over the history using a well designed country specific DGE model
  - CNB 'g3' forecasting model
- Simulate the model using the identified shocks and calculate volatility in inflation and consumption under three scenarios:
  - No euro
  - Euro: common monetary policy in place (symmetric shocks)
  - Euro: no policy reaction (asymmetric shocks)
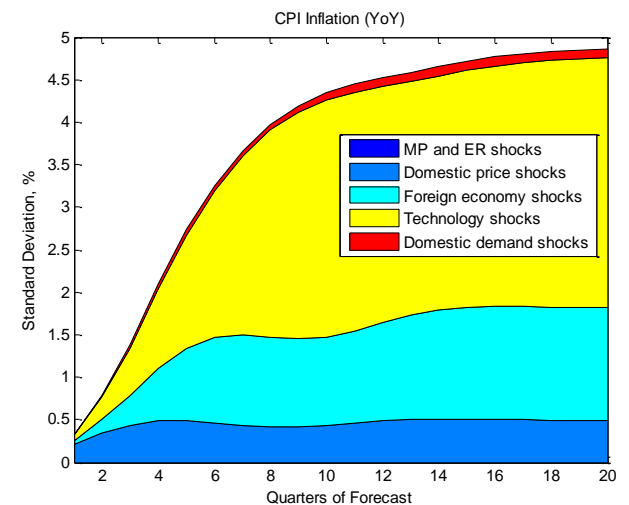
Measuring volatilities …results for inflation

No euro
Max std dev: 2 pp
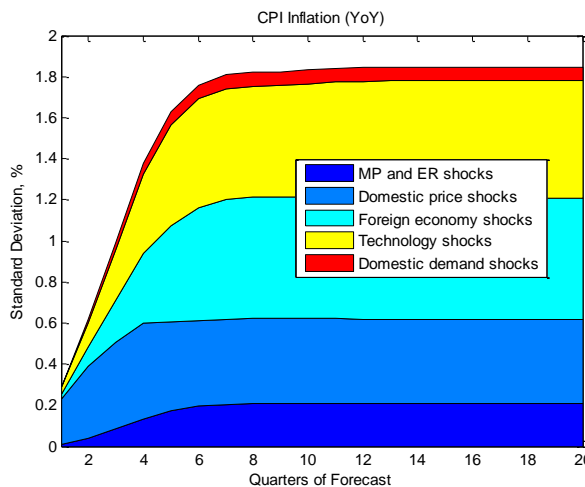
Euro with symmetric shocks
Max std dev: 3.5 pp

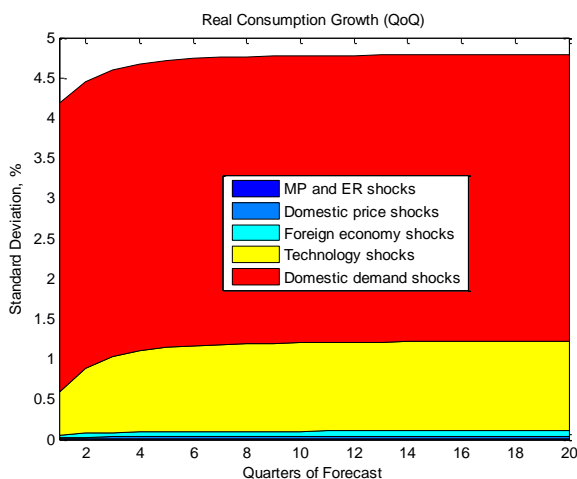**Euro with asymmetric shocks**
Max std dev: 5 pp

CPI Inflation (YoY) — No euro

Legend:
- MP and ER shocks
- Domestic price shocks
- Foreign economy shocks
- Technology shocks
- Domestic demand shocks

CPI Inflation (YoY) — Euro with symmetric shocks

Legend:
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- Domestic demand shocks

CPI Inflation (YoY) — Euro with asymmetric shocks

Legend:
- MP and ER shocks
- Domestic price shocks
- Foreign economy shocks
- Technology shocks
- Domestic demand shocks

Vertical axis: Standard deviations of CPI inflation forecasts and contributions of individual shocks

Horizontal axis: quarters of forecasts

Source: Hurník J, Tůma Z, Vávra D, 2010. "The Euro Adoption Debate Revisited: The Czech Case", *Czech Journal of Economics and Finance*, 60 (3), pp. 194-212.

Measuring volatilities …results for consumption growth

No euro
Max std dev: 4.5 pp

Euro with symmetric shocks
Max std dev: 4.5 pp

Euro with asymmetric shocks
Max std dev: 5 pp

Vertical axis: Standard deviations of Consumption growth forecasts and contributions of individual shocks
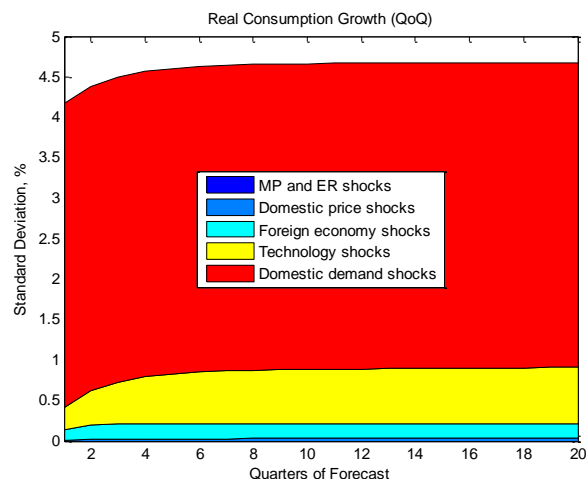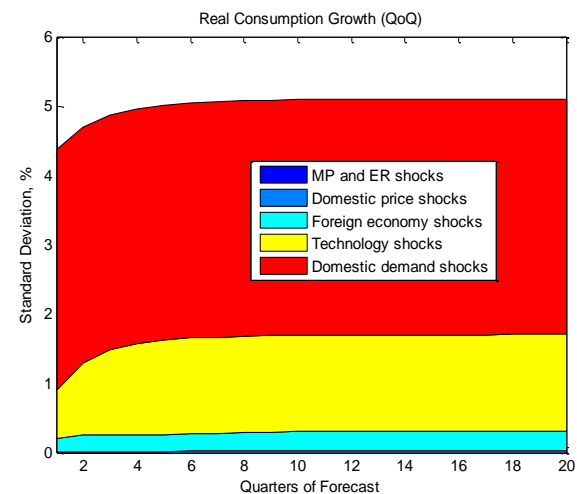
Horizontal axis: quarters of forecasts

Source: Hurník J, Tůma Z, Vávra D, 2010. "The Euro Adoption Debate Revisited: The Czech Case", *Czech Journal of Economics and Finance*, 60 (3), pp. 194-212.

Measuring volatilities … data

- Two countries with sound and independent monetary policies before the EMU membership
  - Germany and Finland
- Control country
  - Sweden

Countries	Germany (volatility, s.d.)			Finland (volatility, s.d.)		
Time	1994Q1-1998Q4	1999Q1-2008Q2	Diff. (%)	1994Q1-1998Q4	1999Q1-2008Q2	Diff. (%)
Inflation (q-o-q)	1.53	1.44	-5.9	1.09*	1.52	+39.4
Consumption (q-o-q)	2.41	2.97	+23.1	1.10	1.81	+64.5
GDP (q-o-q)	2.55	2.25	-11.8	2.39	2.52	+5.4

*1995Q2-1998Q4

Source: IMF database and own calculations

Control country	Sweden (volatility, s.d.)		
Time	1994Q1-1998Q4	1999Q1-2008Q2	Diff. (%)
Inflation (q-o-q)	1.49*	1.55	+4.0
Consumption (q-o-q)	2.07	2.28	+10.1
GDP (q-o-q)	2.11	2.07	-1.9

*1995Q2-1998Q4

Source: Sweden Statistics and own calculations

Source: Hurník J, Tůma Z, Vávra D, 2010. "The Euro Adoption Debate Revisited: The Czech Case", *Czech Journal of Economics and Finance*, 60 (3), pp. 194-212.