

Nouvelles interdependances cycliques ?

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Outline

- **Motivation**
- **Estimation of Global Inflation**
- **What drives Global Inflation?**
- **Dynamics of Global and National Inflation**
- **Conclusion**

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Motivation

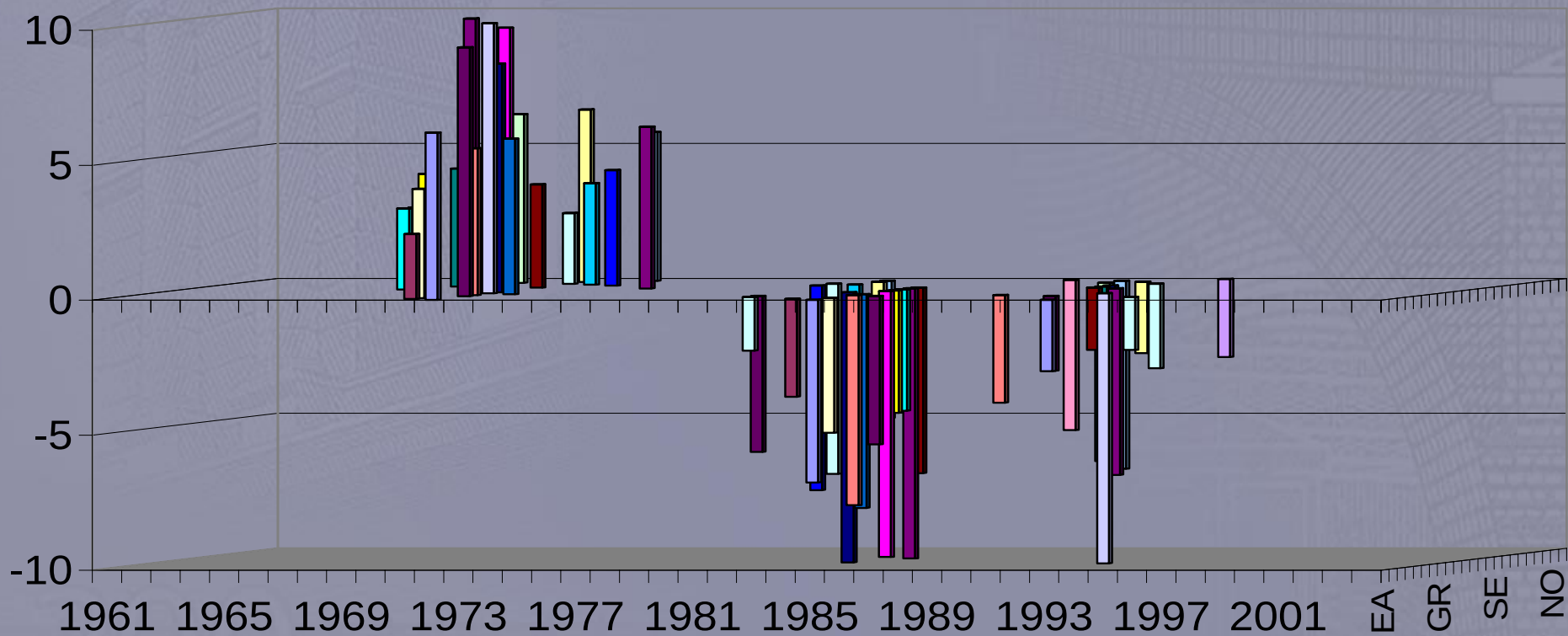
*“We are [...] very much dependent on the **global** evolution. We have an idea of the **global** evolution, but there are risks at the **global** level that we have to take into account.”*

(Jean-Claude Trichet, 2 December 2004, Frankfurt)

Motivation

- World/Regional “**common**” business cycle
 - Canova et al. (2004)
 - Kose, Otrok and Whiteman (2003); Forni and Reichlin (2001)
- There is also a lot of co-movement in inflation rates
 - Rogoff (2003) on global **disinflation**
 - Corvoisier and Mojon (2005): 3 waves of breaks in the mean of inflation

Breaks in the mean of inflation in 22 OECD countries



Motivation

- Co-movement comes either from common shocks or spill over across countries.
- If inflation is largely driven by common shocks, no wonder it should be “global”
- What common shocks are suspects?
 - Commodity prices
 - World Business cycle
 - Possibly, monetary policy concepts

Motivation

- Spill over: Inflationary shock do not spread across countries with flexible exchange rate
- However, hardly any true “floats”; Reinhart and Rogoff (2002), McKinnon (1982)
 - Spill over of (US) monetary policy stance even with flex ex rates with resistance to large fluctuations of the dollar and incapacity to sterilise full
 - e.g. mid 70's \$ collapse, early 80's \$ appreciation

Motivation

- Forecasting
- Decline in the forecastability of inflation (and other macroeconomic variables)
 - Atkenson and Ohanian (2001): RW of inflation forecast unbeatable since the mid 1980's
 - Agostino et al. (2005) show this holds for other macroeconomic variable; Green Book forecasting performance is all in the 1970's
- Is this related to Globalisation and if so, can international co-movement bail out forecasters?

Motivation overview

- **In the long run**, either spreading of the US monetary policy stance or the monetary policy concepts are spreading (also from the US) to the entire world
 - **In the short run**, some shocks are common to all countries (oil, BC,...)
- => How large is this co-movement in inflation and does it help forecast inflation?**

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Estimating Global Inflation

A very simple idea:

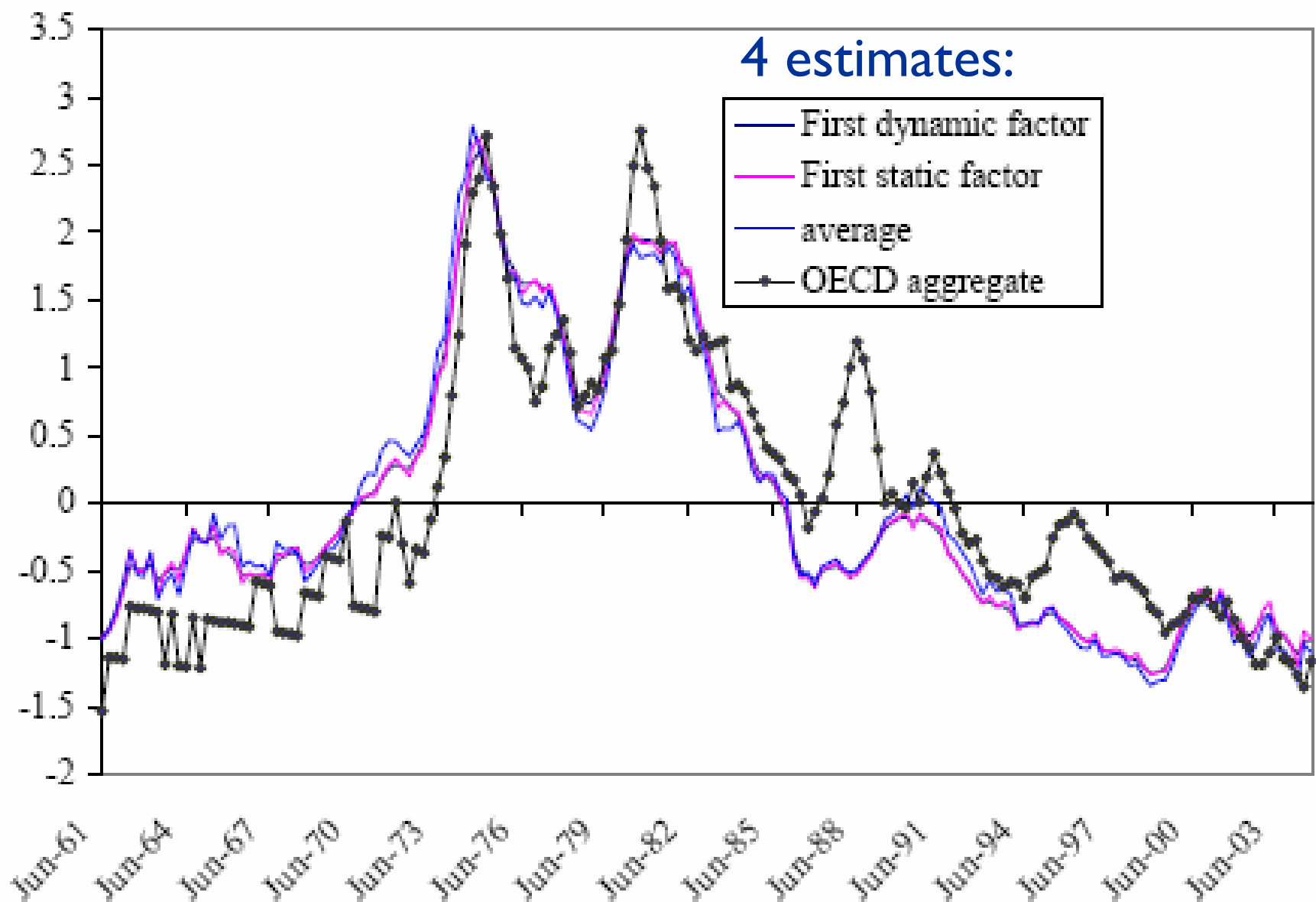
Country Inflations share a common component,
which possibly propagates differently, i.e.

$$\pi_{i,t} = \lambda_i f_t + \varepsilon_{i,t}$$

Estimating Global Inflation

- Data
 - Quarterly annualised CPI inflation rates from 1960 to 2003
 - 22 OECD countries: EU 15 + US, JP, CA, AU, NZ, NO, CH
- Methodology
 1. Extract common factors ~ PCA
 2. Simple un-weighted average
 3. Published OECD inflation rate

Estimated Global Inflation



Estimated Global Inflation

Share of variance explained by Global Inflation

	Average	OECD	Dynamic factors	
			first	second
Greece	0,39	0,60	0,37	0,05
Switzerland	0,43	0,15	0,34	0,12
Japan	0,53	0,20	0,47	0,03
Germany	0,59	0,27	0,52	0,01
New Zeland	0,60	0,59	0,62	0,02
United States	0,68	0,67	0,69	0,00
United Kindom	0,77	0,62	0,77	0,12
Canada	0,82	0,74	0,84	0,03
Italy	0,85	0,79	0,89	0,00
France	0,88	0,70	0,92	0,01
mean	0,69	0,52	0,69	0,08
median	0,72	0,57	0,71	0,03

Estimating Global Inflation

- Robustness / EU biased sample or the exchange rate regimes

	1961-2004	1975-2004	1983-2004
Australia	0,74	0,74	0,55
Canada	0,81	0,84	0,75
Germany	0,54	0,53	0,10
UK	0,88	0,92	0,77
Japan	0,60	0,82	0,50
US	0,77	0,77	0,68

Estimated Global Inflation

1. The 4 different measures are highly similar

- Common trends: 1960-1980 and 1981-2004
- Common cycles: 5 or 6 cycles along the way
- OECD slightly less correlated to three others
due to inclusion of Mexico, Korea,...

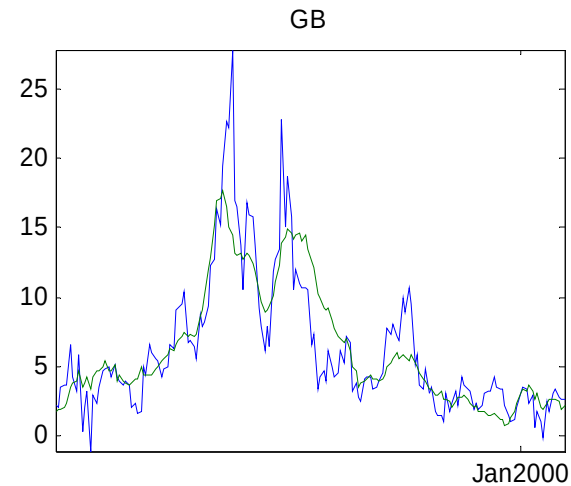
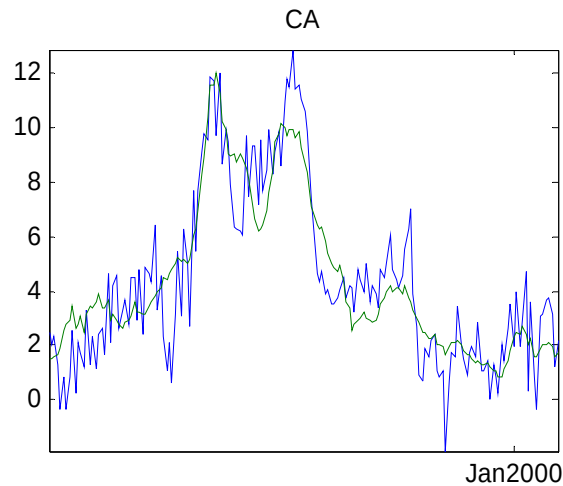
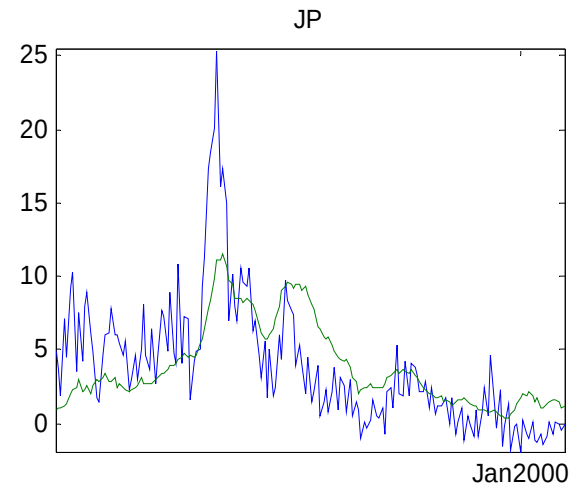
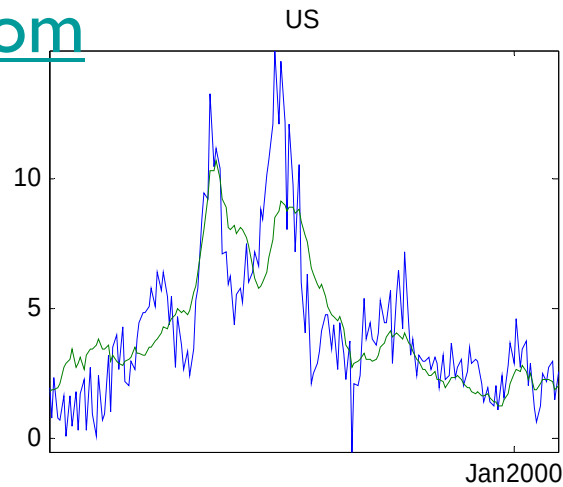
2. Paramount co-movement in inflation

- First factor: 70 % on average across 22 countries
- Second factor: only 7 %

Why?

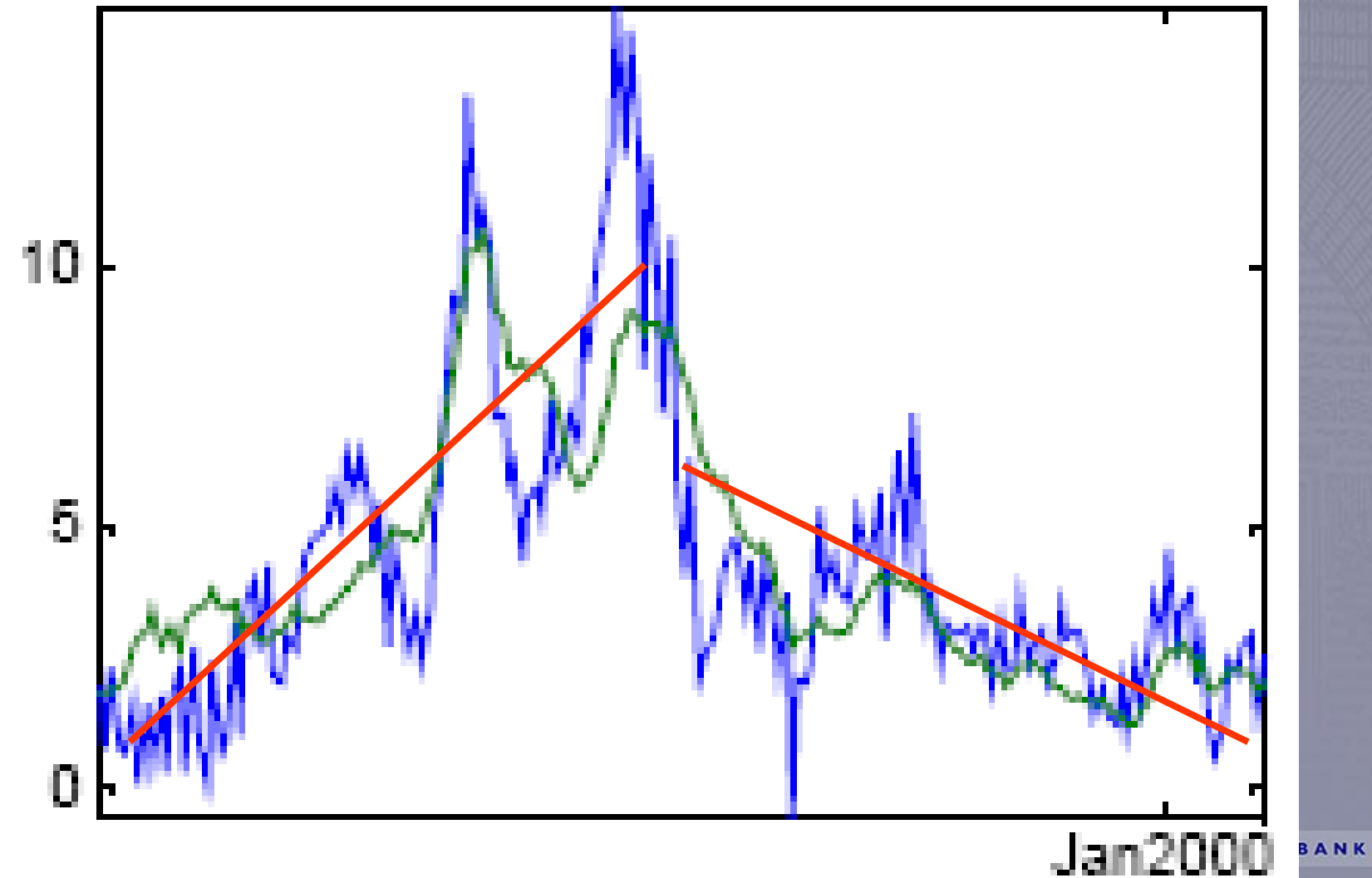
Estimated Global Inflation

Zoom



Estimated Global Inflation

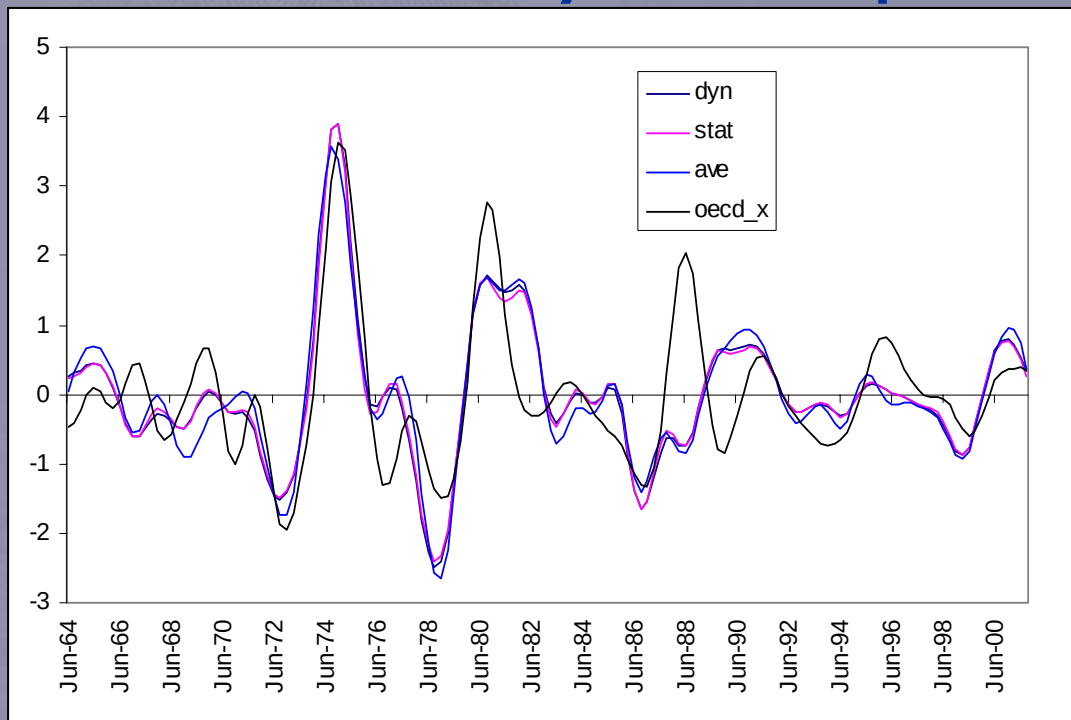
.... and down



Estimating Global Inflation

Because Global Inflation picks up

- Common trends **and**
- Business cycle freq.



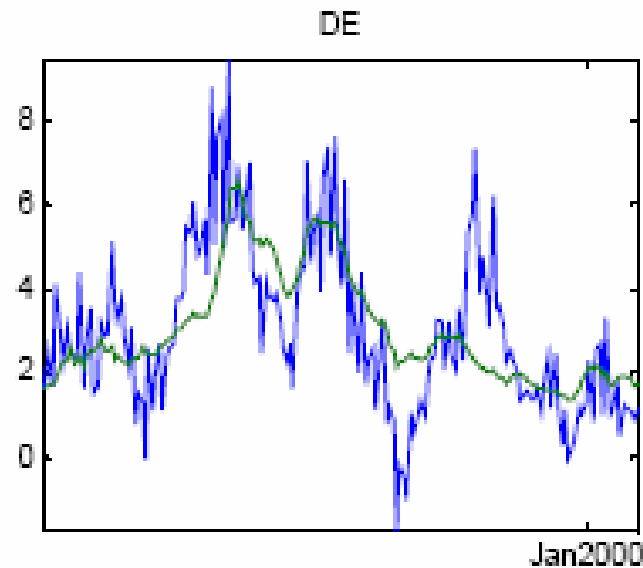
Actually, GI estimated with the BC frequencies of inflation still explains 36% of countries inflation

Estimated Global Inflation

Main results (continued)

3. Some heterogeneity across countries in GI explanatory power
 - ~ 40 % in Switzerland/Germany, but also Greece
 - ~ 85 % in Italy, France

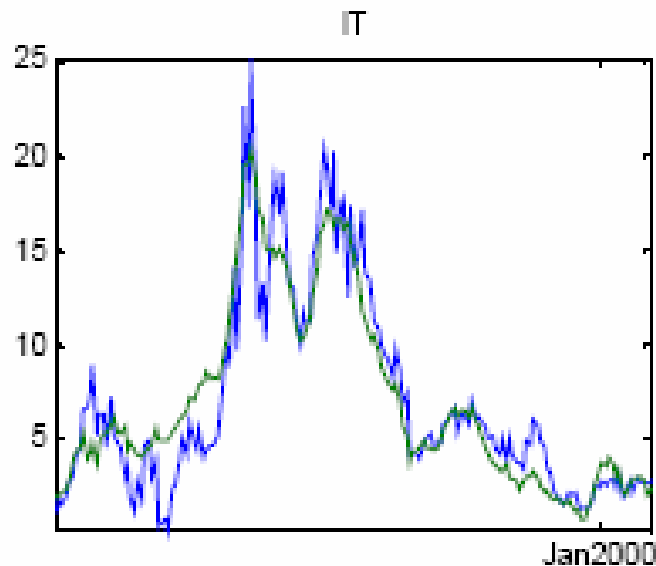
Estimating Global Inflation



Remark: Global Inflation is about
the **co-movement** of inflation

not about the **levels of**
inflation

=> **Could also help for**
countries with high average
inflation!



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What drives Global Inflation?

- Methodology: Bayesian search for optimal combination of predictors (BMA)
- Vector of explanatory variables :
 - Global BC, M3, market rates, asset prices (all estimated as un-weighted averages)
 - Genuine common shocks: Com. prices, US fiscal policy

$$\pi_{t+h} = \alpha(L)\pi_t + \gamma(L)x_t + \varepsilon_{t+h}$$

What drives Global Inflation?

Table 4: BMA: dependent variable is Global Inflation

1971-2004	1 step ahead			4 steps ahead			8 steps ahead		
	prob.	b	std of b	prob.	b	std of b	prob.	b	std of b
own	1,00	0,90	0,07	1,00	0,55	0,16	0,72	0,35	0,25
Com. Price	0,32	0,00	0,00	0,62	0,01	0,01	0,13	0,00	0,00
Oil price	0,14	0,00	0,00	0,10	0,00	0,01	0,28	-0,01	0,02
W_GDP	1,00	0,19	0,05	1,00	0,39	0,10	0,15	0,02	0,07
W_Wages	0,74	0,07	0,06	0,69	0,17	0,14	0,39	0,12	0,17
W_STI	0,14	0,00	0,02	0,41	-0,07	0,10	0,72	-0,19	0,14
W_YC	0,99	-0,20	0,08	0,78	-0,30	0,22	0,11	0,00	0,08
W_M3	0,11	0,00	0,02	1,00	0,34	0,09	1,00	0,65	0,10

What drives Global Inflation?

Table 4: BMA: dependent variable is Global Inflation

1991-2004	1 step ahead			4 steps ahead			8 steps ahead		
	prob.	b	std of b	prob.	b	std of b	prob.	b	std of b
own	1,00	0,70	0,18	0,08	0,00	0,04	0,20	0,02	0,08
Com. Price	0,46	0,00	0,00	1,00	-0,02	0,00	0,83	-0,01	0,00
Oil price	0,20	0,00	0,01	0,19	0,00	0,01	0,89	-0,04	0,02
W_GDP	0,27	0,02	0,05	0,89	0,17	0,09	0,16	0,01	0,04
W_ULC	0,29	-0,02	0,05	0,93	0,13	0,07	0,21	0,02	0,05
W_STI	0,69	0,14	0,12	1,00	0,25	0,05	0,46	0,06	0,08
W_YC	0,38	0,06	0,10	1,00	0,32	0,10	0,90	-0,31	0,16
W_M3	0,11	0,00	0,02	0,90	0,13	0,07	0,10	0,00	0,02

What drives Global Inflation?

Global inflation is very well educated!

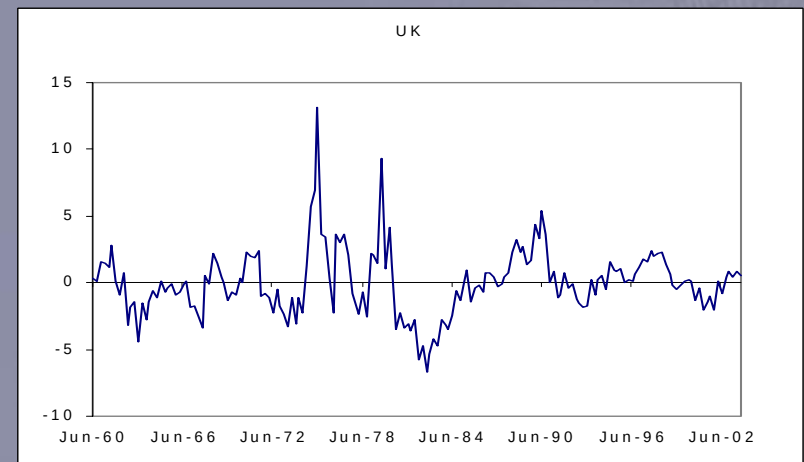
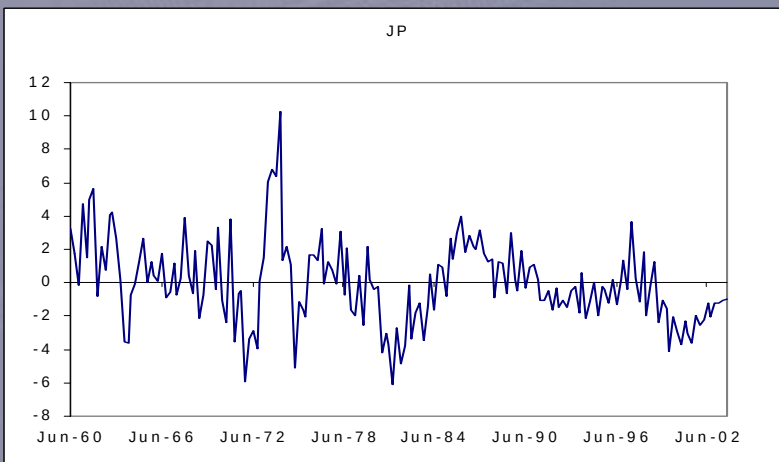
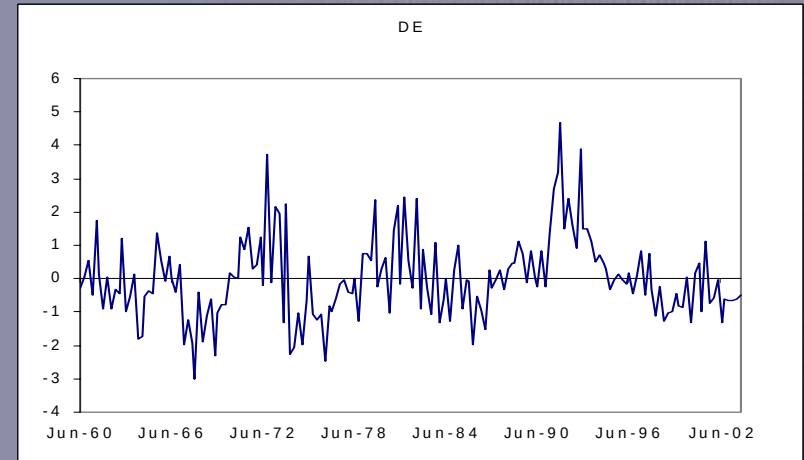
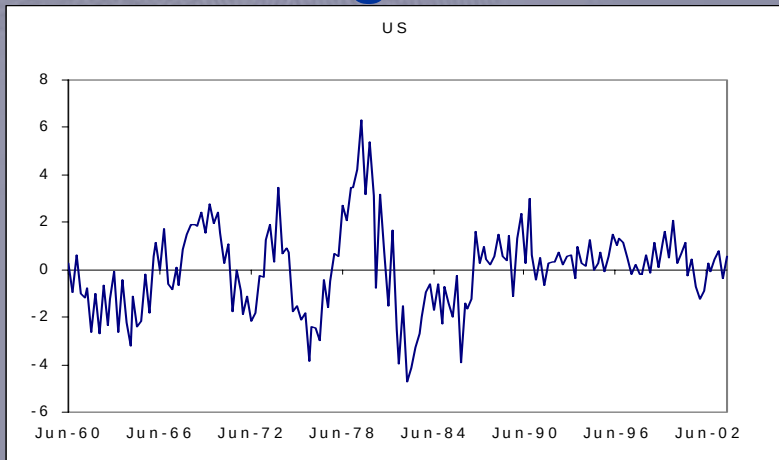
- In the full sample (1971-2004), it responds to
 - real development at short horizons
 - wages and short-term rates at all horizons
 - money at long horizons
- This is not so stable in the last 15 years
- However, a “Phillips” curve pattern remains (at the global level)
 - Possibly some value / Atkinson-Ohanian

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 - **Global inflation is attractive**
 - **A new benchmark for forecasting inflation?**
 - **Why Global inflation is an attractor?**
- **Conclusion**

Global inflation is attractive !

The national idiosyncratic components are mean reverting



Global inflation is attractive

Take

$$\pi_{i,t} = \lambda_i f_t + \varepsilon_{i,t}$$

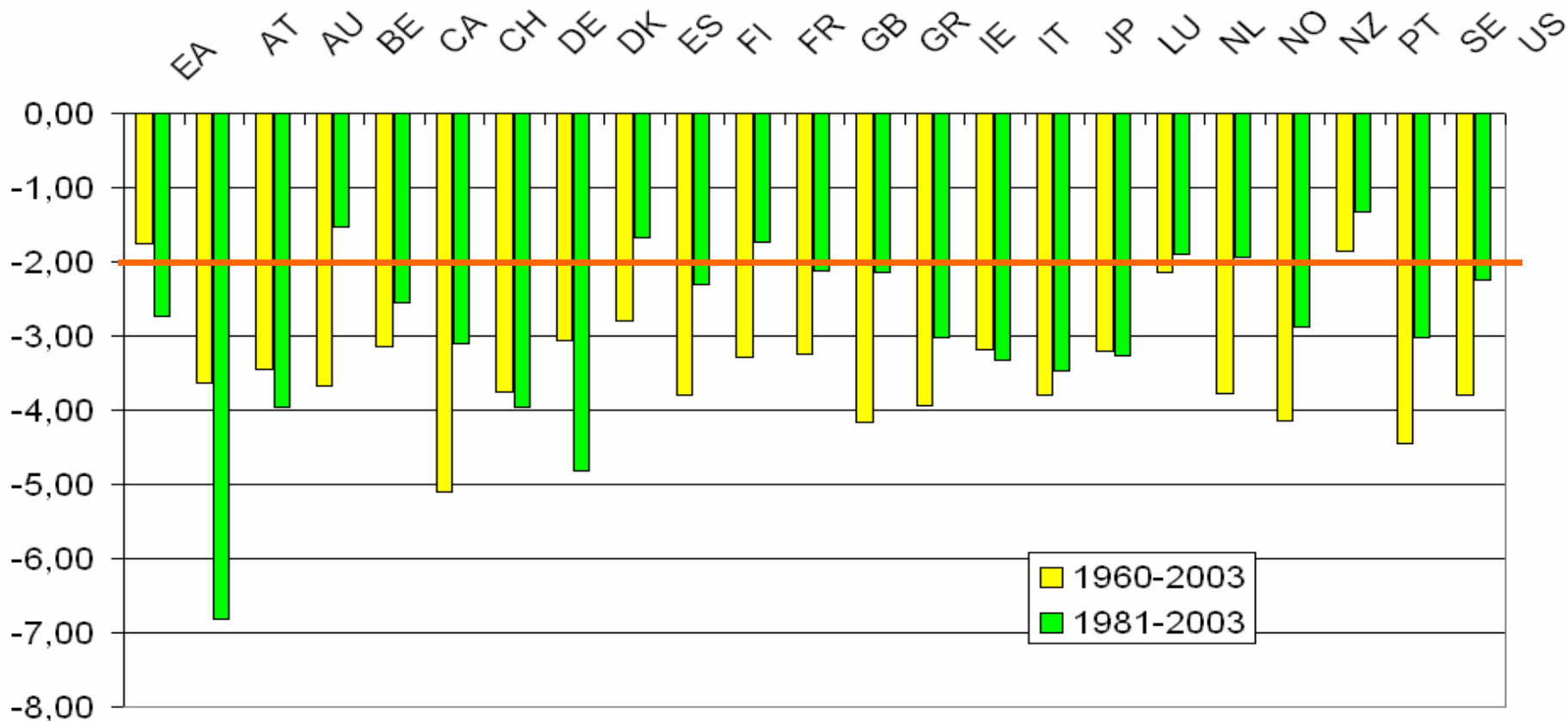
as a long-run relationship.

Derive the following ECM

$$\Delta\pi_{i,t} = \alpha_0 + \alpha_1(L)\Delta\pi_{i,t-1} + \alpha_2(\pi_{i,t-1} - \lambda_i f_{t-1}) + \alpha_3(L)\Delta f_t + \varepsilon_t$$

Global inflation is attractive

T-Stats on the ECM coefficient



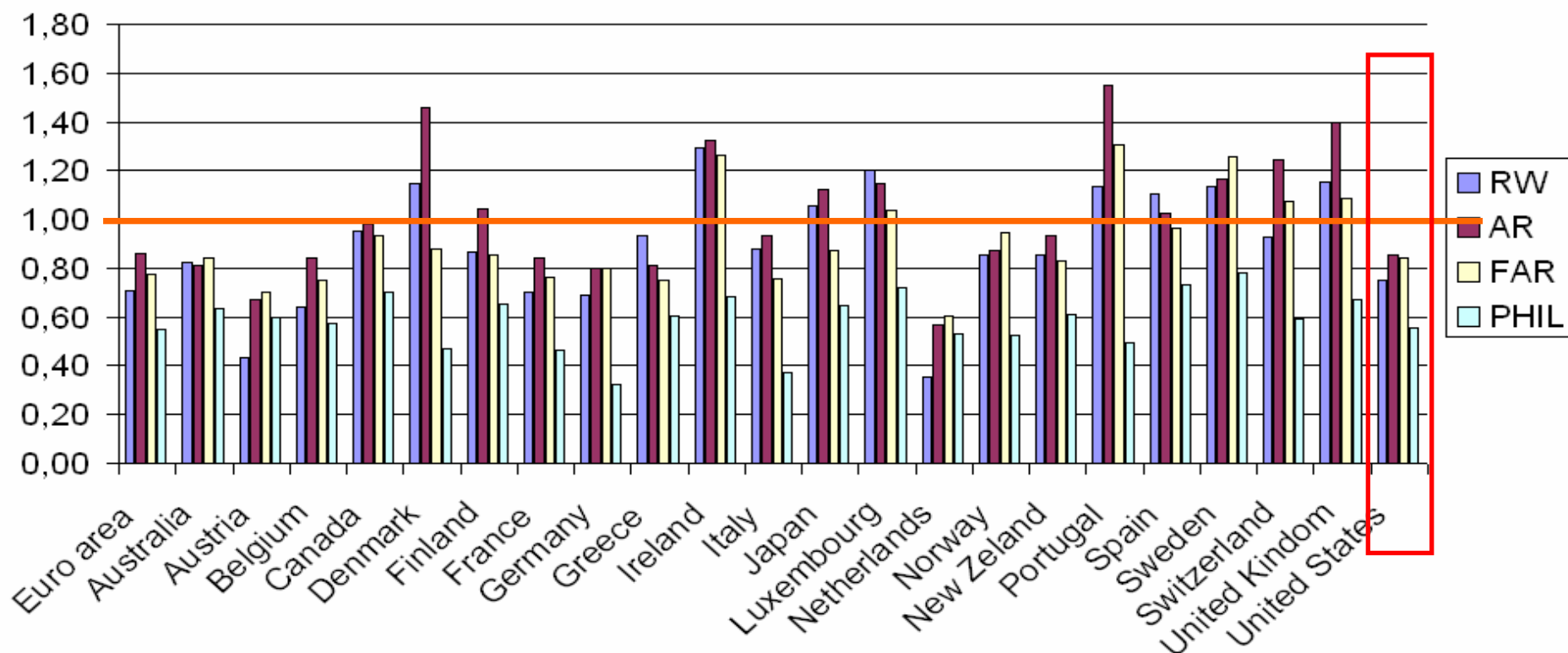
A new benchmark for forecasting inflation?

$$\Delta\pi_{i,t+h} = \alpha_0 + \alpha_1(L)\Delta\pi_{i,t} + \alpha_2(\pi_{i,t} - \lambda_i f_t) + \alpha_3(L)\Delta f_t + \varepsilon_{t+h}$$

- We use the above for a horse race with
 1. Random Walk (RW)
 2. AR(p)
 3. Factor AR(p)
 4. Augmented Phillips curve (Gerlach, 2003, Nicoletti-Altimari ECB WP)
- For robustness
 - 4 samples of forecast evaluations
 - 1 to 8 quarters horizon of forecast

A new benchmark for forecasting inflation?

Relative RMSE of GI model to 4 benchmarks
4 steps ahead.1995-2004.



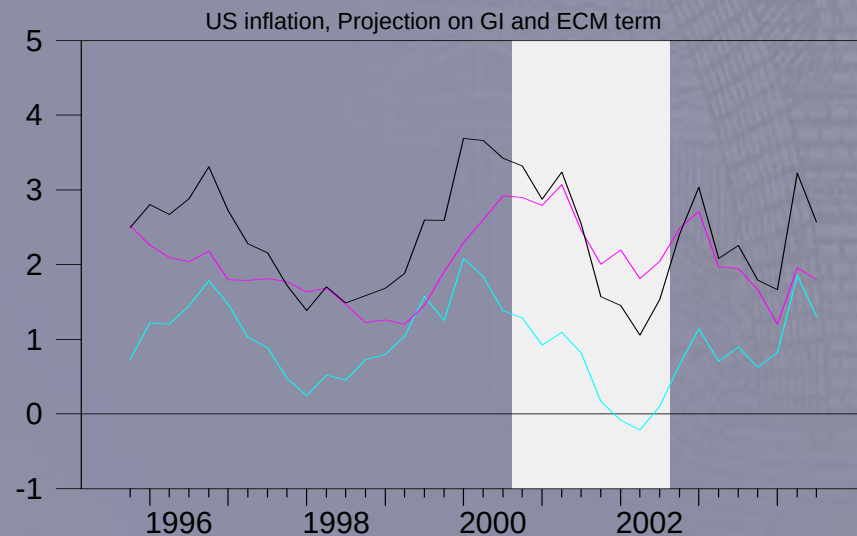
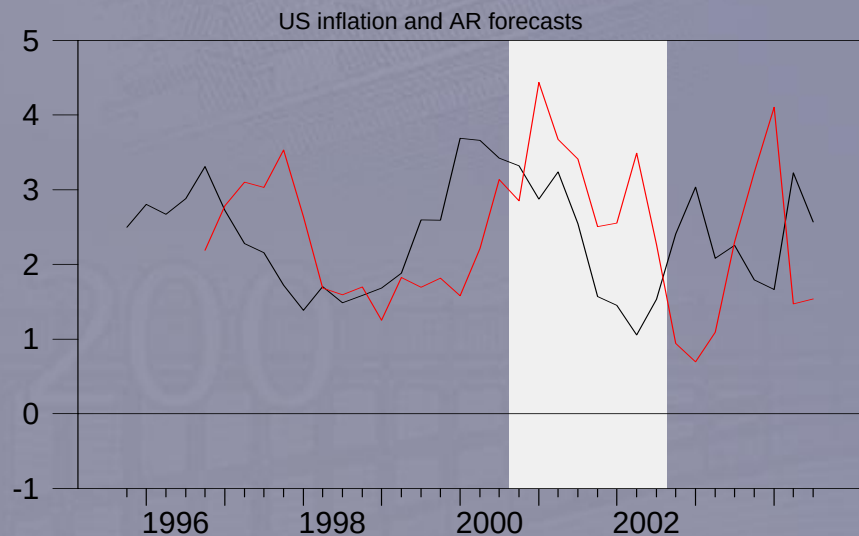
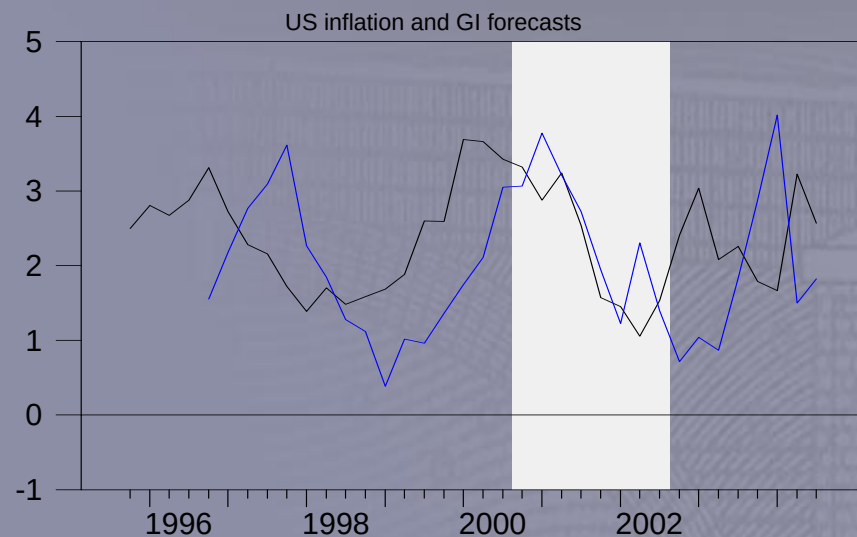
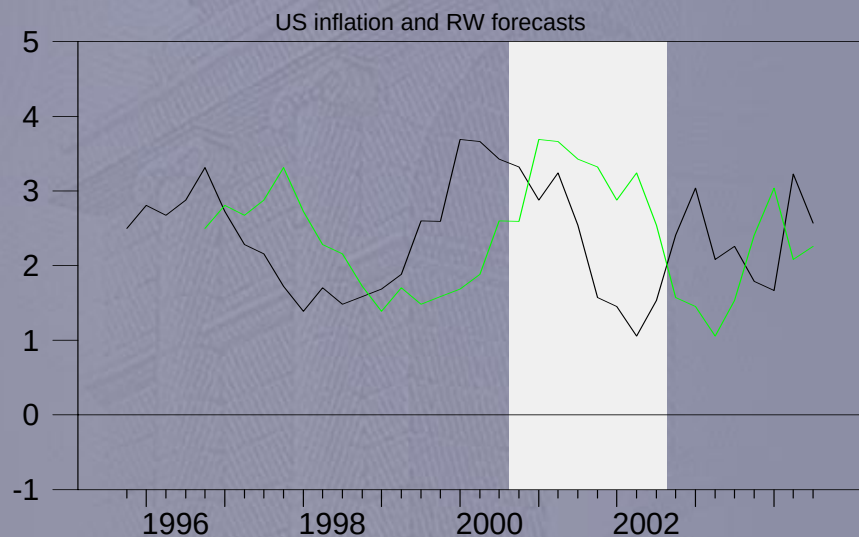
A new benchmark for forecasting inflation?

RMSE of the Global Inflation model relative to RW and AR

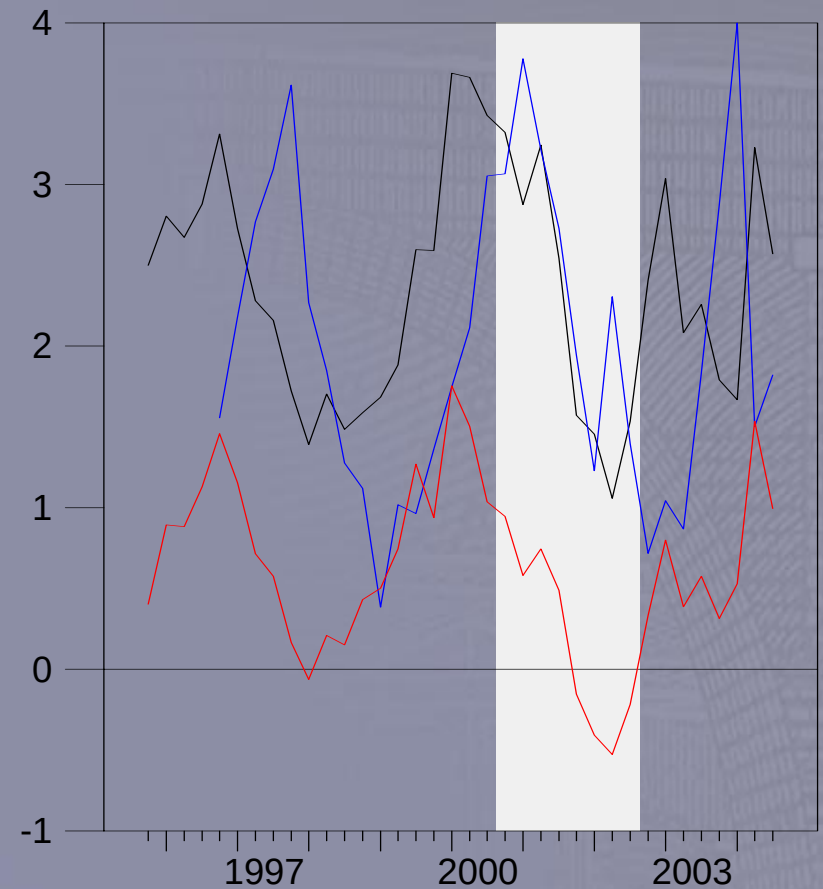
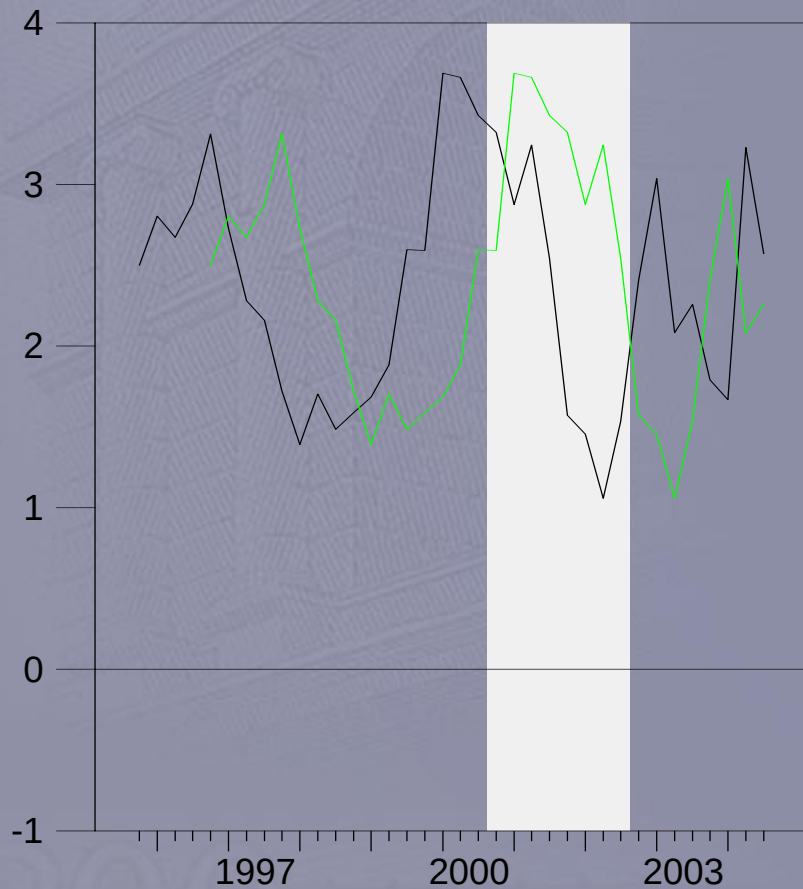
	1 step ahead		4 steps ahead		8 steps ahead	
	RW	AR	RW	AR	RW	AR
1980-2004						
US	0,74	0,98	1,05	0,91	0,96	0,87
Median OECD	0,80	1,02	0,94	0,91	0,88	0,87
1980-1995						
US	0,79	0,96	1,04	0,90	0,94	0,86
Median OECD	0,82	1,01	0,93	0,90	0,87	0,86
1995-2004						
US	0,68	1,00	0,75	0,85	0,74	0,88
Median OECD	0,73	1,05	0,88	0,94	0,77	0,82

Explaining the better performance for the US

4 steps ahead, 1995 to 2004, RW (green), AR (red) and GI (blue)



When and why a better forecast of US inflation?



US inflation (black), RW forecast (green), Global inflation forecast (blue) and ECM term (red)

A new benchmark for forecasting inflation?

$$\Delta\pi_{i,t+h} = \alpha_0 + \alpha_1(L)\Delta\pi_{i,t} + \alpha_2(\pi_{i,t} - \lambda_i f_t) + \alpha_3(L)\Delta f_t + \varepsilon_{t+h}$$

- Across the board the simple structure of the National/Global inflation model beats the benchmarks
- Especially at 4 and 8 quarters horizons
- Not as good as the AR for some countries (DK, JP, UK, SWE)
- Remarkably well in the US

Summary and conclusion - Global inflation

1. OECD countries inflation is 70% “Global”
2. Global inflation is driven by real activity in short run and liquidity in the long run (in line with the 2 pillars strategy of the ECB)
3. There is a strong Error correction type mechanism at work which brings back national inflation to the global level
(also for some LA countries)
4. The ECM seems to improve the inflation forecasting upon standard benchmarks

Follow ups - Global inflation

1. Look at a larger cross section of countries
2. Purely forecasting paper
3. Investigate more formally why there is so much co-movement in inflation