Conference on

Forecasting and Monetary Policy

Berlin, 23-24 March 2009

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„A Monetary Real-Time Conditional Forecast of Euro Area Inflation“

A monetary real-time conditional forecast of euro area inflation[a]

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[a]The views are those of the authors and not necessarily those of the OeNB

What does the paper suggest?

- Use a structural vector error correction model (VECM) with Markov switching (MS) dynamics
- Produce euro area conditional inflation forecasts (projections) in real time
- Use projections to cross-check the Eurosystem Staff inflation projections
- Use model-based estimates to evaluate different monetary scenarios

Literature

Pro (favourable):

Assenmacher-Wesche and Gerlach (2008, EER)
Neumann and Greiber (2004, BUBA WP)

Carstensen (2007, Kiel WP)
Hofmann (2006, BUBA WP)
Scharnagl and Schuhmacher (2007, BUBA WP)

Beck and Wieland (2008, JME)
Fischer et al. (2007, ECB)

Con (critical):

De Grauwe and Polan (ScanJE, 2005)
Woodford (JMCB, forthcoming)

Model

Markov switching vector error correction model

$$y_t = \nu_{S_t} + \sum_{j=1}^{p} A_{j,S_t} y_{t-j} + \alpha_{S_t} \beta Y_{t-1} + \varepsilon_t, \quad \varepsilon_t \sim \text{i.i.d} N(0, \Sigma)$$

- Euro area aggregates:
  M3 growth, HICP inflation, 3-month EURIBOR, 10-year government bond yield, real GDP
- Cointegration relations:
  Stationary real money growth, stationary interest rate spread
- Dynamic specification:
  3 lags, state-dependent adjustment coefficients and dynamics
- Estimation sample:
  1974 up to the most recent observed values for any data

Real time data issues

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- Data source:
  Real time data on the EABCN website
  Data are completed with data of the EAWM
  Interest rates are linked, M3 and HICP are chained by growth rates
  HICP is seasonally adjusted in EViews

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- Missing and outlying values:
  Estimates replace missing end-of sample values of GDP, M3 and HICP
  Estimates replace two outliers in M3: 1990Q3 and 2001Q1

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- Use model-based estimates to evalue different scenarios

Digression: Model-based estimates of missing data

Missing data in $\tilde{y}_t$, implies a value for $\tilde{Y}_t$.[1)]
The estimate has to take into account the value $\bar{y}_{t+1}$ [2)]

Re-write the model as

$$0_{T-p} = \imath_{T-p} \otimes \nu + \Phi y^T + \left[I_{T-p} \otimes \alpha\right]\left[I_{T-p} \otimes \beta\right] Y^{T-1,p} + \varepsilon^{T,p+1}$$

where Φ has as typical element on the diagonal

$$\Phi = \left[A_p \cdots A_1 \; -I_N\right]$$

1) $\alpha\beta\tilde{Y}_t = \alpha\beta\left(Y_{t-1} + \tilde{y}_t\right)$

2) $\bar{y}_{t+1} = Y_{t+1} - \tilde{Y}_t = Y_{t+1} - Y_{t-1} - \tilde{y}_t \equiv \Delta_2 Y_{t+1} - \tilde{y}_t$

After some manipulation:

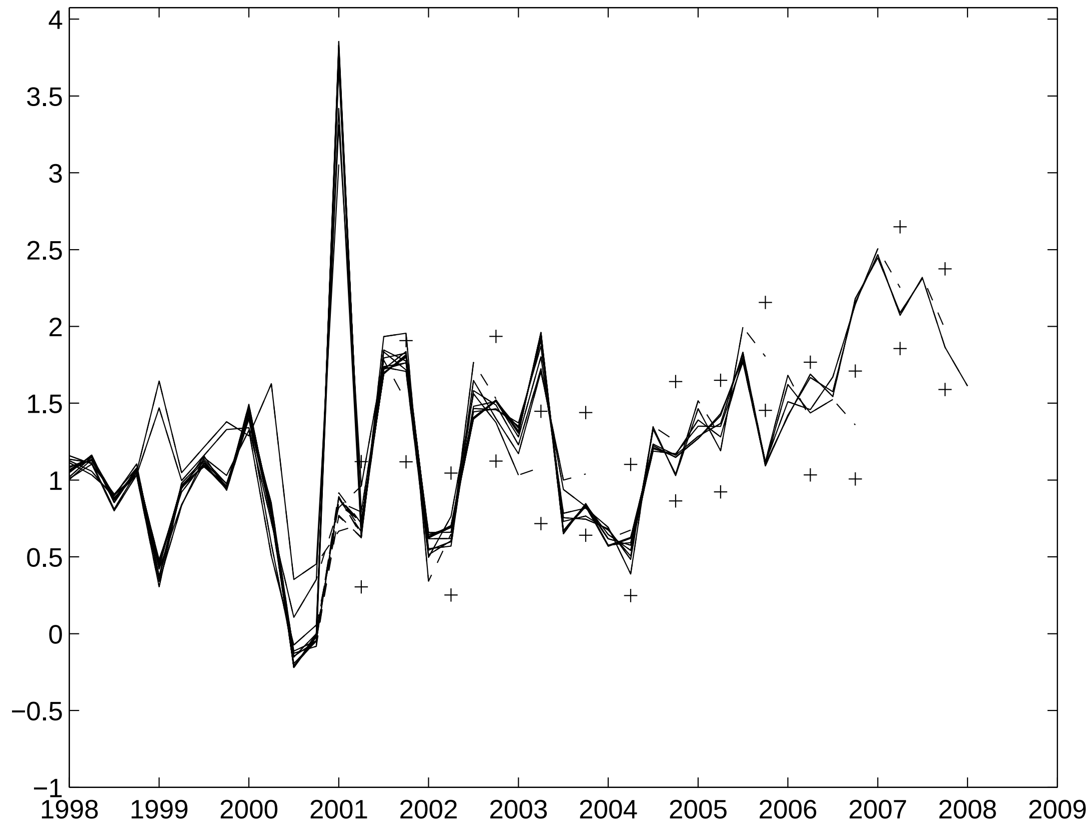
$$\pi\left(\tilde{y}_t|\theta, y^*\right) = N(m, M)$$

and conditional on observed values $\tilde{y}_{t,2}$ in $\tilde{y}_t$

$$\pi\left(\tilde{y}_{t,1}|\tilde{y}_{t,2}, \theta, y^*\right) = N(m_1, M_1)$$

Model-based estimates of missing data

Real money growth. +/- one standard deviation



Forecast setting

Use data vintage available as of May 1 and November 1 in the years 2001 – 2006

Produce dynamic conditional forecasts keeping the 3-month EURIBOR at current level, conditional on the last state

Forecast inflation changes for the current year and the next one or two years

Cumulate the inflation changes to obtain HICP projections

Compute average yearly inflation
$\longrightarrow$ consistency with Eurosystem staff projections published in the June and December Monthly Bulletin

Episode 2005-2006

Monthly Bulletin	Information up to	Projection year 2005	2006	2007	ECB rates Date	Δ
June 2005	20.5.2005	2.0*	1.5			
		(1.8 2.2)	(0.9 2.1)			
	1.5.2005	1.4	1.2			
		(1.2 1.6)+	(0.4 1.9)			
Dec. 2005	21.11.2005	2.2	2.1	2.0		
		(2.1 2.3)	(1.6 2.6)	(1.4 2.6)		
	1.11.2005	2.2	3.8	4.3		
		(2.19 2.25)	(3.3 4.2)	(3.3 5.3)	6 Dec.	+25
June 2006	19.5.2006	**2.2**	2.3	2.2		
			(2.1 2.5)	(1.6 2.8)	8 Mar.	+25
	1.5.2006		1.9	2.0		
			(1.7 2.1)	(1.1 2.89)	15 Jun.	+25
			2.2	**2.1**		

Episode 2007-2008

Monthly Bulletin	Information up to	Projection year 2007	2008	2009	ECB rates Date	Δ
June 2007	11.5.2007	2.0*	2.0			
		(1.8 2.2)	(1.4 2.6)		14 Mar.	+25
	1.5.2007	2.0	2.9			
		(1.8 2.2)+	(2.1 3.6)		13 Jun.	+25
Dec. 2007	14.11.2007	2.1	2.5	1.8		
		(2.0 2.2)	(2.0 3.0)	(1.2 2.4)		
	1.11.2007	2.0	2.3	2.6		
		(1.91 1.98)	(1.9 2.8)	(1.6 3.5)		
March 2008	14.2.2008	**2.1**	2.9	2.1		
			(2.6 3.2)	(1.5 2.7)		
	1.3.2008		3.0	3.0		
			(2.7 3.2)	(2.2 3.8)		
			3.3			

Comparison of projections

(a) First versus final release in pp

Forecast	2003	2004	2005	2006	2007	2008		Average	StD
MB	-0.6	-0.5	-0.6	-0.6	-0.1	-1.4		-0.63	0.17
MS-VECM	+0.6	-0.2	-0.3	+0.5	+2.2	-1.2		+0.27	0.47

(b) June versus final release in pp

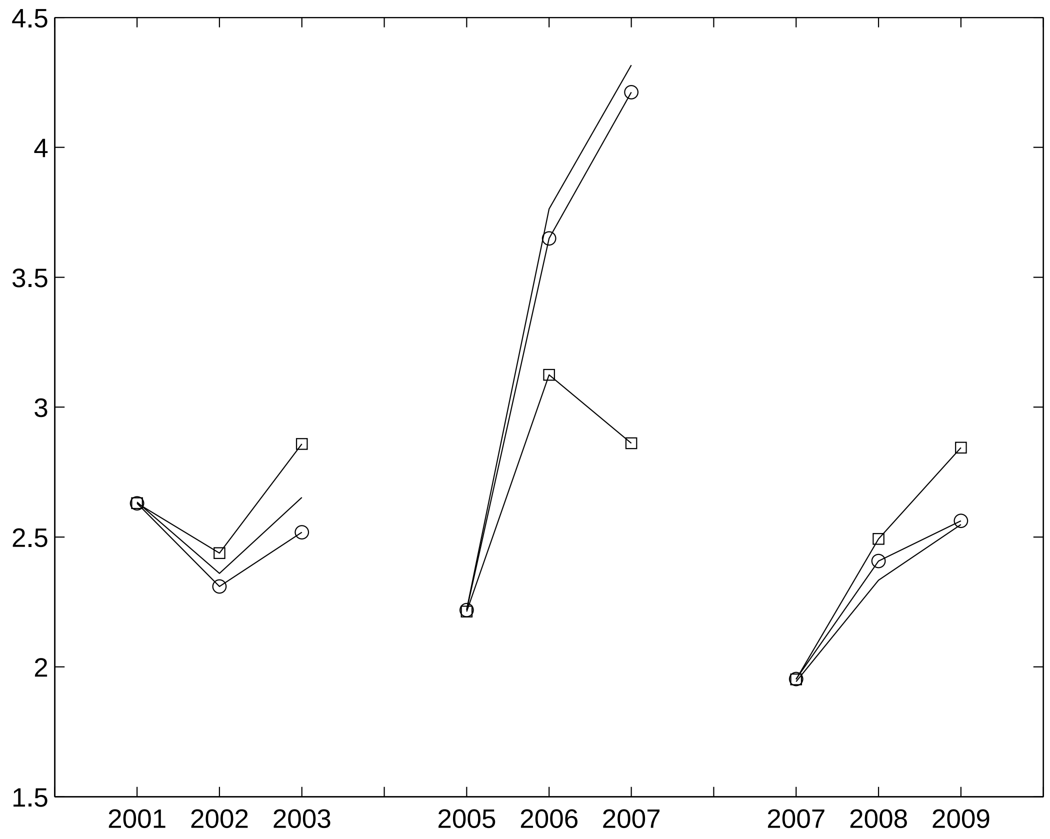
Forecast	2001	2002	2003	2004	2005	2006	2007	Average	StD
MB	0	0	-0.1	0	-0.2	+0.1	-0.1	-0.04	0.04
MS-VECM	-0.3	-0.1	+0.3	-0.5	-0.8	-0.3	-0.1	-0.26	0.14

Data structure under different scenarios

Scenarios	Vintage 1.11.2005 baseline		Vintage 1.1.2006 int.rates included		Vintage 1.1.2006 M3 growth included	
Level as of	Q3	Q4	Q3	Q4	Q3	Q4
R	3.27	3.32	3.27	3.42	3.27	3.42
r	2.13	2.2	2.13	2.34	2.13	2.34
Δm	2.80	*	2.79	*	2.79	1.26
Δp	0.80	*	0.76	*	0.76	*
$yr^{(a)}$	*	*	1.44	*	1.44	*

$^{(a)}$ in logs

Projections under different scenarios



— vint. 1.11., -o- vint. 1.1., interest rate, -□- vint. 1.1., M3 growth

Conclusion

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A small model ...

to produce “monetary” inflation forecasts

in real time

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We find evidence ...

for additional information content of these forecasts

Conclusion

A small model ...

to produce "monetary" inflation forecasts

in real time

to evaluate different monetary scenarios with model-based estimates of missing values

We find evidence ...

for additional information content of these forecasts

for the usefuleness of evaluating different monetary scenarios