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Real Time Estimates Of The Euro Area Output Gap

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REAL TIME ESTIMATES OF THE EURO AREA OUTPUT GAP

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Luxembourg, 5th Eurostat Colloquium

I. Introduction

Output gap key component of conjunctural and monetary policy analysis

Pro: clear summary measure of overall slack in economy

Con: uncertain, uncertain link with inflation (& growth)

Real-time analyses for the US, the UK and Canada : gap measures are unreliable

(e.g. Orphanides-van Norden (2002), Nelson-Nikolov (2003), Cayen-van Norden (2002))

Pseudo real time analysis for the euro area: gap measures are unreliable

(e.g. Proietti et al. (2007), Rünstler (2002), Camba-Méndez -Palenzuela (2003), Mitchell (2004))

In this paper:

1. Real time evaluation for the euro area
2. Several measures, including IMF, OECD, EC
3. Role of averaging
4. Decomposition of sources of uncertainty
5. Comparison with the US (after 2001)

In a related paper (Marcellino Musso 2008):

1. Gap based forecasts of euro area inflation, real time
2. Gap based forecasts of GDP growth, in real time
3. Comparison with the US

II. Data

Five different types of output gaps:

1. Based on capacity utilization (dev. from average or linear trend)
2. Based on multivariate UC models (Proietti et al. (2007)), three versions
3. Provided by IMF, OECD, EC
4. Standard filters (BP, HP, linear), GDP levels
5. Averaging, all or some subgroups 1-4

Sample is 1985-2006. Real time vintages since 2001.

III. How much uncertainty?

Main sources:

1. Model uncertainty
2. Parameter estimation uncertainty
3. Parameter instability
4. Data revisions

III. 1. Model uncertainty

Chart 1: Final estimates of euro area output gaps

(percentage deviations from trend/potential output/average)

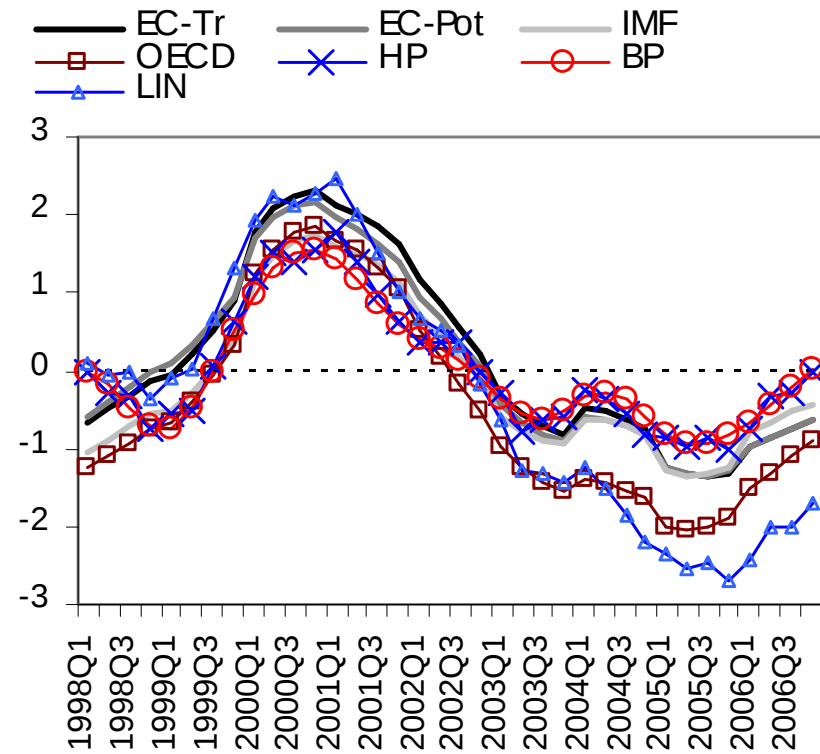
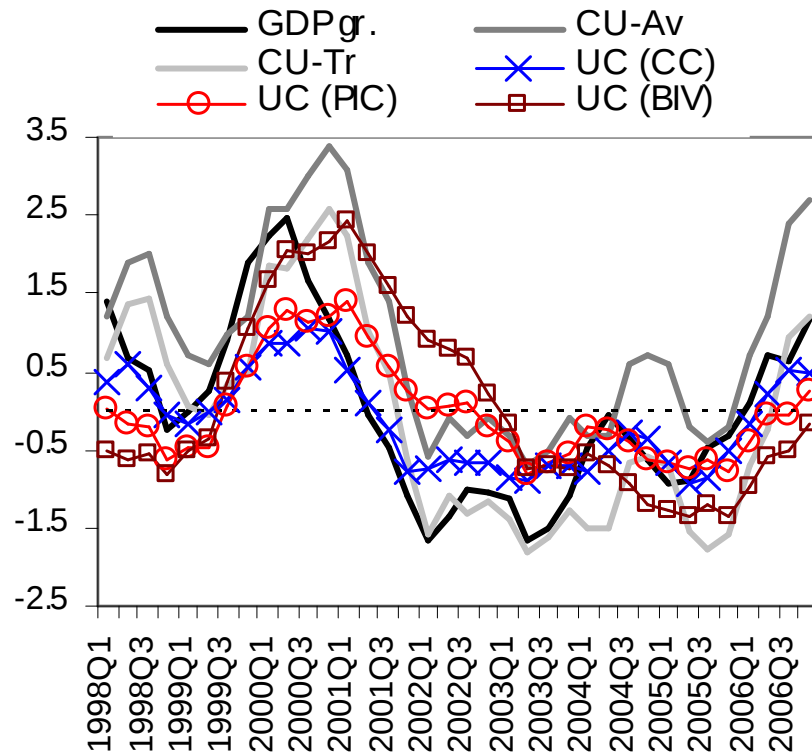
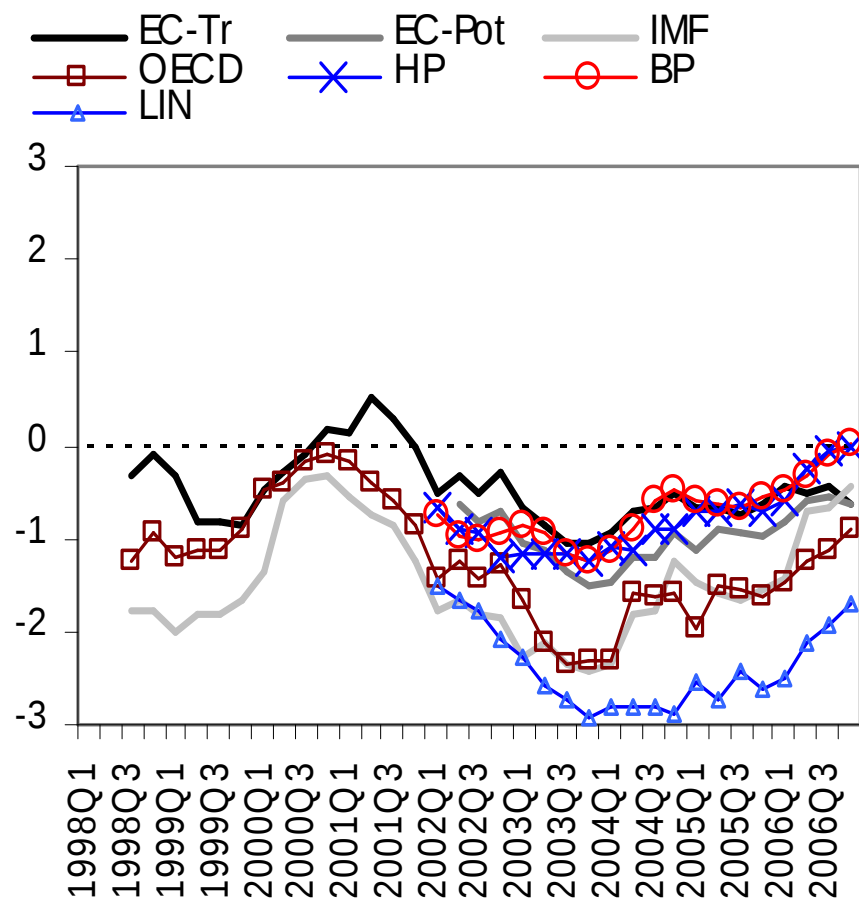
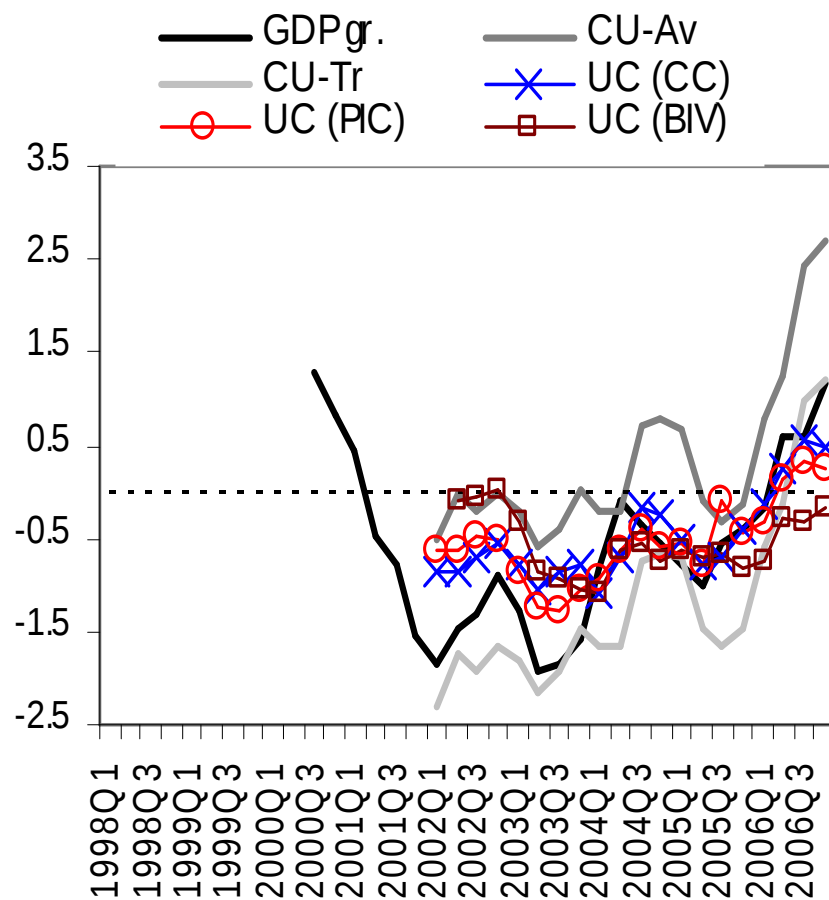


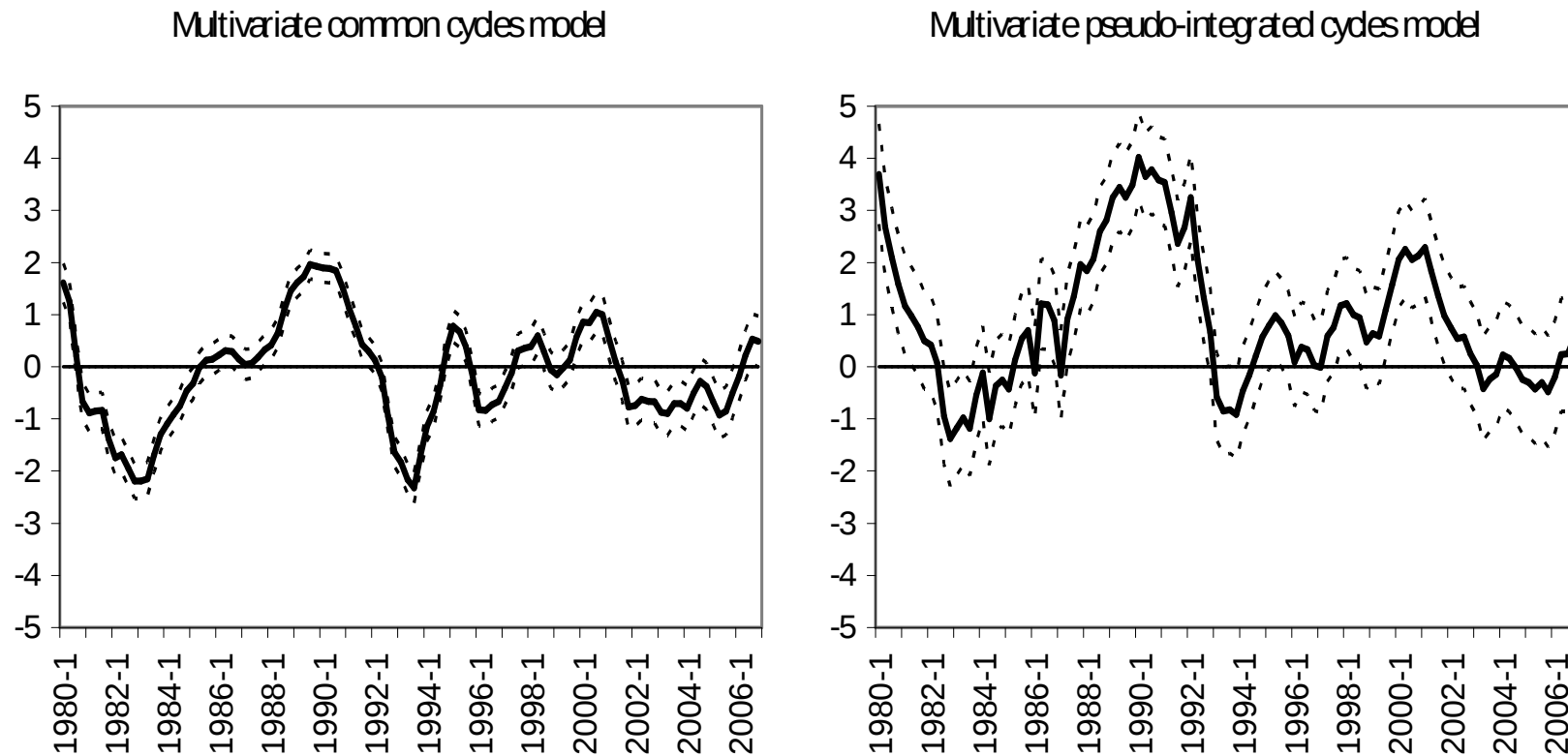
Chart 2: Real time estimates of euro area output gaps

(percentage deviations from trend/potential output/average)



III. 2. Parameter uncertainty

Chart 5: Estimate of euro area output gap and bands, UC models



III. 3. Parameter instability

Table 3 – Pseudo real time estimates of the euro area output gap

		mean	st dev	min	max	AR	corr	sign
Cap. util. rate (dev. av.)	Pseudo RT	0.33	0.91	-0.59	2.70	0.85	1.00	95.0%
	Rev FP	-0.09	0.03	-0.11	0.00	0.98	0.92	
Cap. util. rate (dev. lin. trend)	Pseudo RT	-1.18	0.96	-2.30	1.20	0.87	0.96	100.0%
	Rev FP	0.18	0.28	-0.14	0.73	0.99	-0.60	
Band-Pass Filter	Pseudo RT	-0.72	0.35	-1.28	0.00	0.89	-0.02	85.0%
	Rev FP	0.34	0.52	-0.28	1.22	0.94	-0.67	
HP Filter	Pseudo RT	-0.83	0.39	-1.41	-0.01	0.90	0.11	85.0%
	Rev FP	0.42	0.56	-0.32	1.36	0.91	-0.61	
Linear Filter	Pseudo RT	-2.39	0.47	-3.03	-1.44	0.86	0.61	85.0%
	Rev FP	0.97	0.84	-0.07	2.19	0.97	0.20	

Notes: Sample period is 2002:1 to 2006:4 in all cases (20 observations).

III. 4. Data uncertainty

1. Lack of most recent observations (preliminary estimate used)
2. Revisions of published data
3. End-of-sample instability
4. Sometimes conditional on projections

Chart 3: Vintages of euro area real GDP growth

(percentages, year-on-year growth)

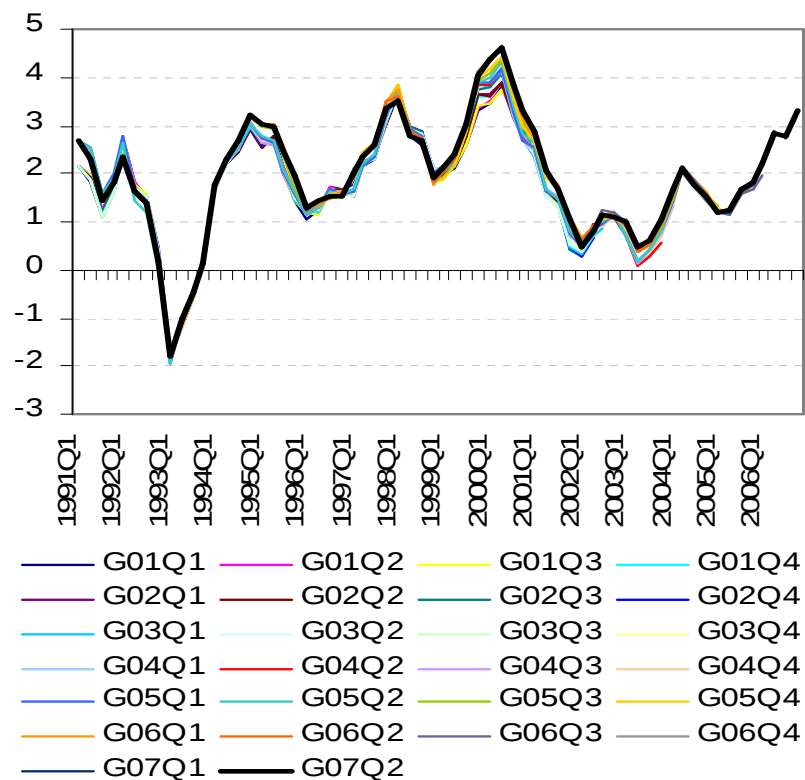
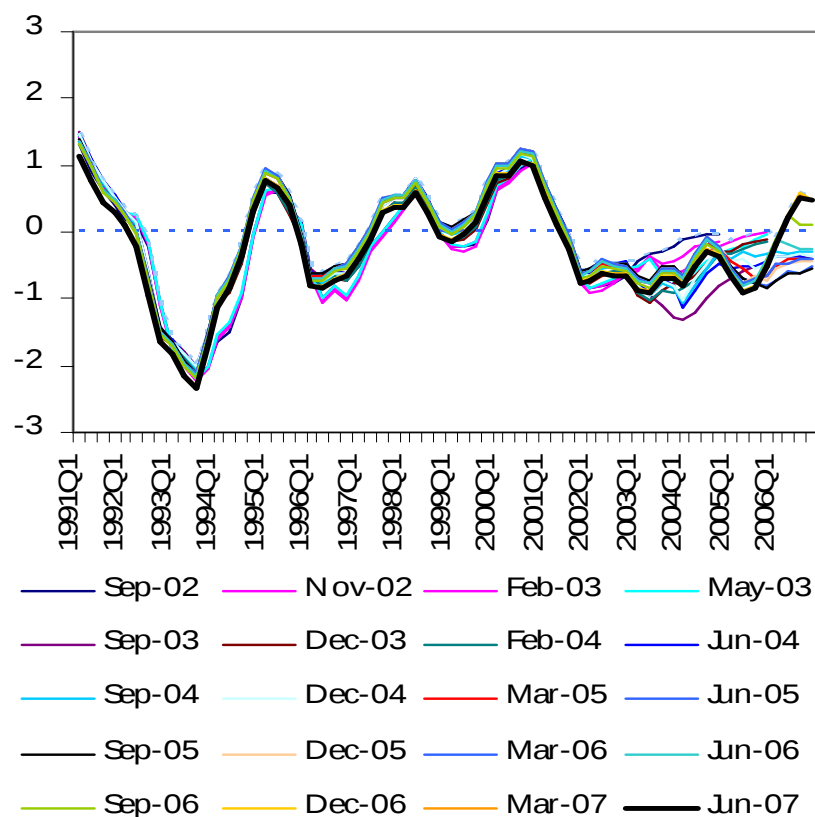


Chart 4: Vintages of euro area output gap estimates by the IMF

(percentage deviations from potential output)



UC-CC has highest correlation between final and real time, 0.96, and 100% of same sign

Chart 7: Revisions to real-time estimates of euro area output gap

(differences between latest and real-time estimate)

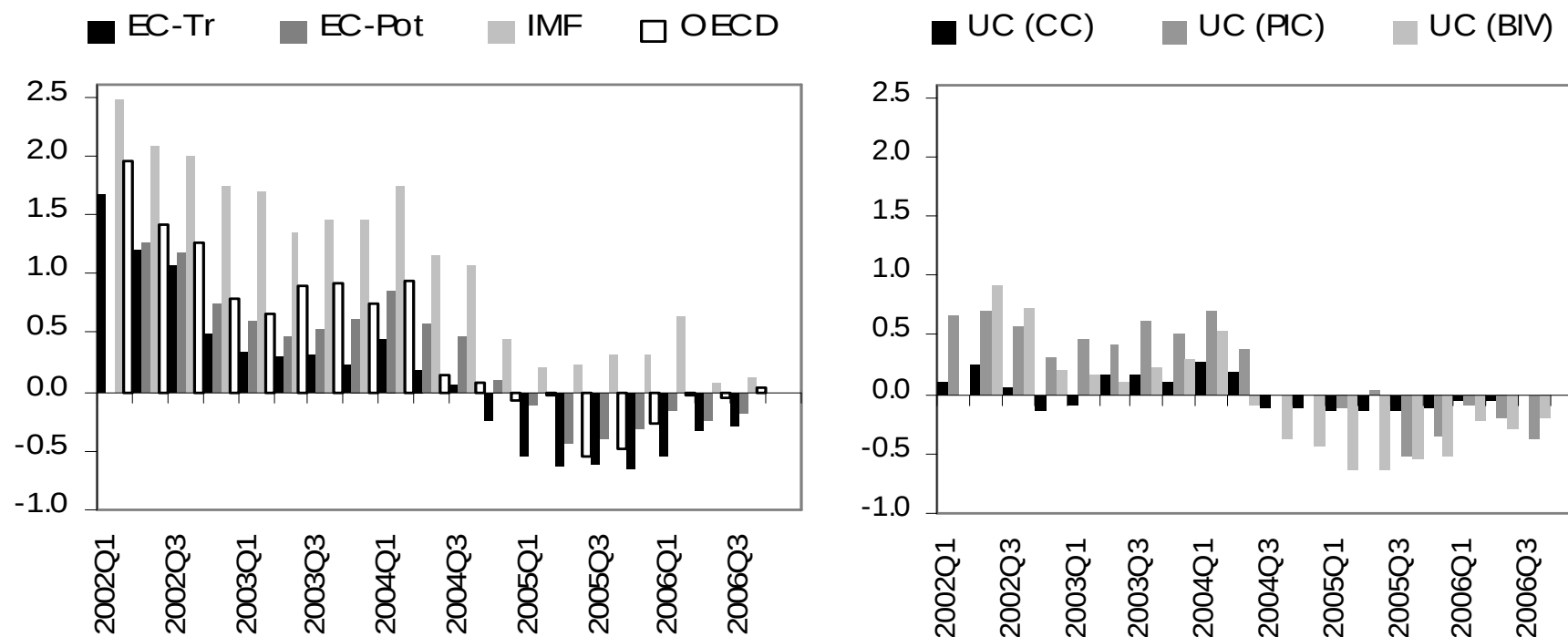
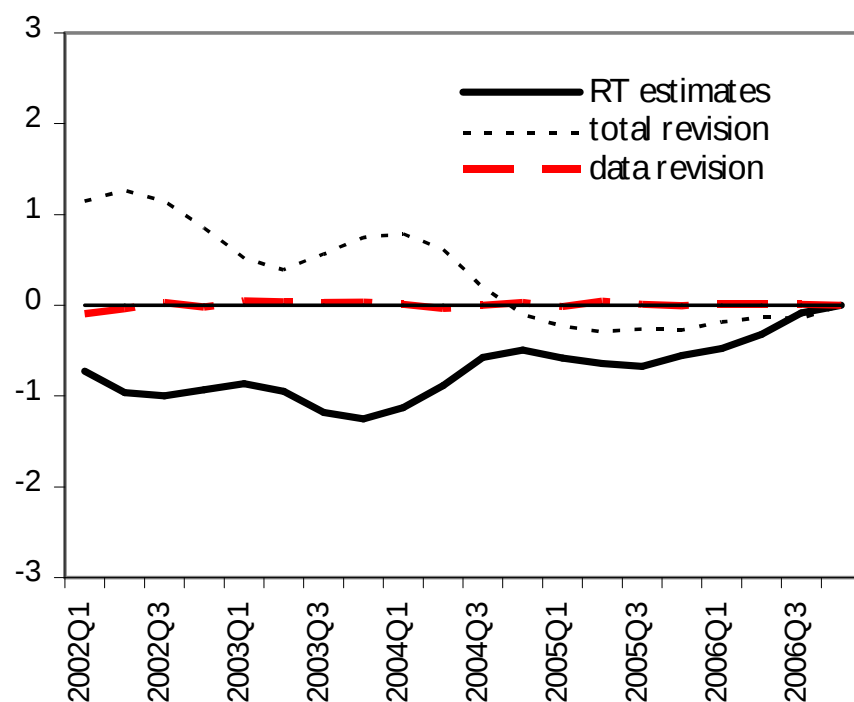
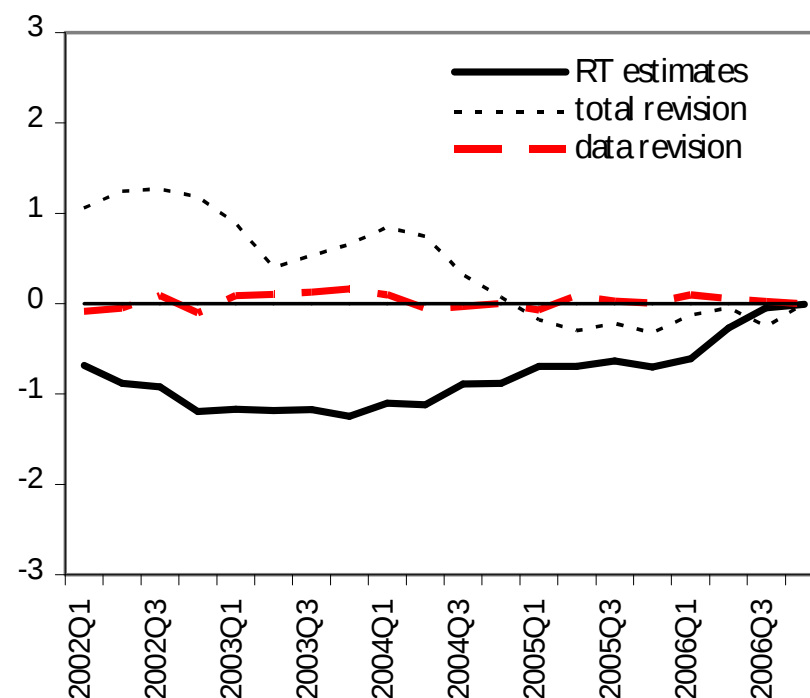


Chart 6: Real time euro area output gap, total revision and data rev.

Band-pass filter estimates



HP filter estimates



Data revisions matter for the US (Orphanides and van Norden (2002)), but different sample

III. 5. Summary of results for euro area

1. Substantial changes across vintages of gap data for the same quarter; even sign can change, and size of revision can be larger than original gap value
2. Revisions in underlying GDP data not so relevant
3. Recursive computation relevant, likely parameter changes
4. Parameter uncertainty never reported, but large
5. Averaging different gap measures does not work

Output gap useless (and dangerous) for structural analysis or economic policy making in the euro area.

IV. A Comparison with the US

Longer time series (start 1959) and more vintages (start 1965, filter based only)

Wrt previous analyses for US:

1. Assess effects of great moderation with longer post 1985 sample
2. Evaluate changes wrt Orphanides and van Norden (2002), up to 1997

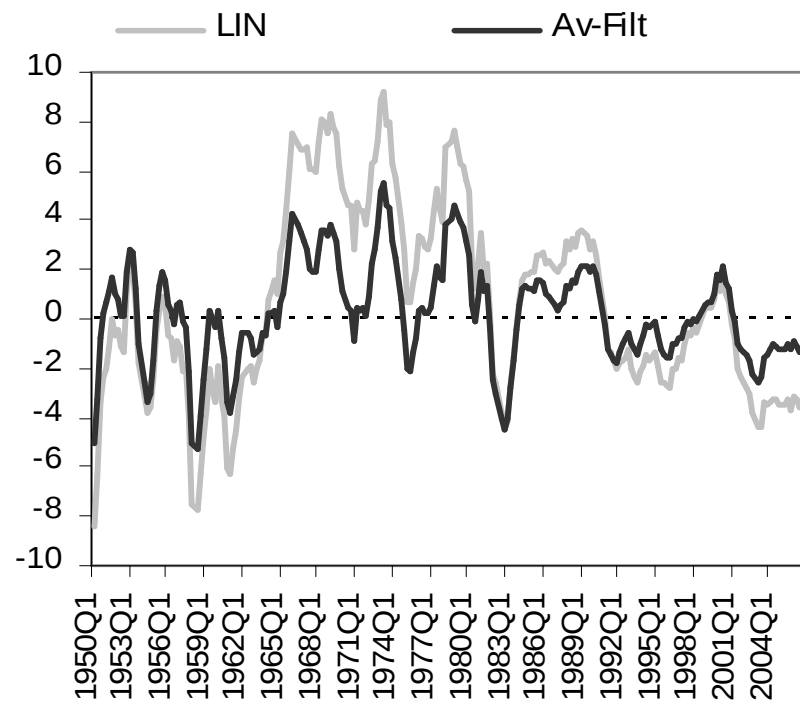
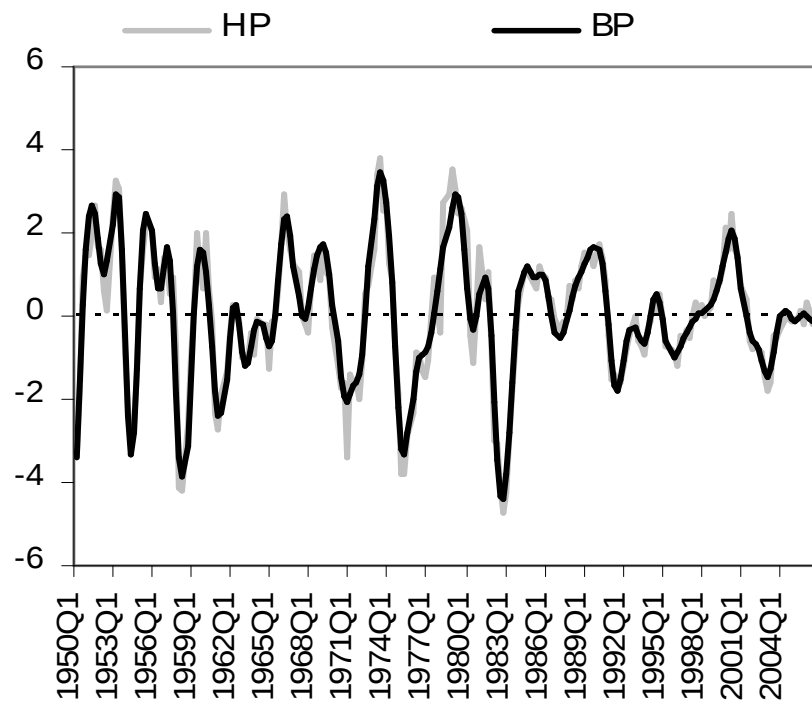
Main results with final vintages:

1. Post 1985 results: lower volatility not only GDP growth but all gap measures
2. Post 1985 results: fairly similar to euro area in terms of volatility and persistence
3. Post 2001 results: further reduction in volatility and persistence

Model uncertainty

Chart 8: Final estimates of US output gap

(percentage deviations from trend/potential output/average)



Parameter instability

Table 7 – Pseudo real time estimates of the US output gap

		mean	st dev	min	max	AR	corr	sign
Band-Pass Filter	Pseudo RT	-0.54	0.67	-1.68	0.16	0.96	0.91	75.0%
	Rev FP	0.13	0.29	-0.11	0.98	0.85	-0.65	
HP Filter	Pseudo RT	-0.63	0.77	-1.84	0.17	0.94	0.89	90.0%
	Rev FP	0.17	0.36	-0.22	1.08	0.75	-0.65	
Linear Filter	Pseudo RT	-4.09	0.56	-5.30	-3.36	0.80	0.53	100.0%
	Rev FP	0.66	0.49	0.00	1.55	0.96	-0.68	

Notes: Sample period is 2002:1 to 2006:4 in all cases (20 observations).

Data uncertainty

Chart 9A: Vintages of US real GDP growth

(percentages, year-on-year growth)

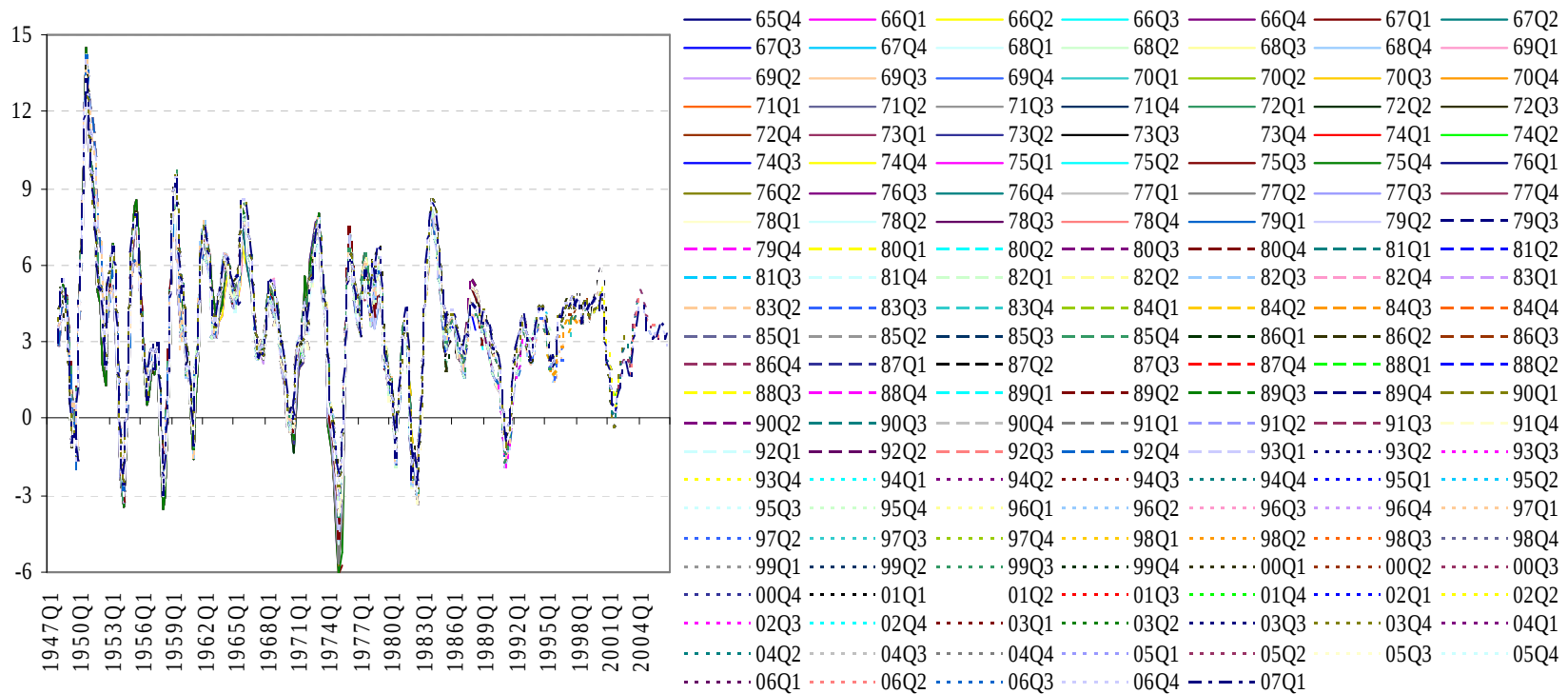


Chart 9B: Vintages of annual estimates of US output gap (BP cycles)

(percentage deviations from trend output)

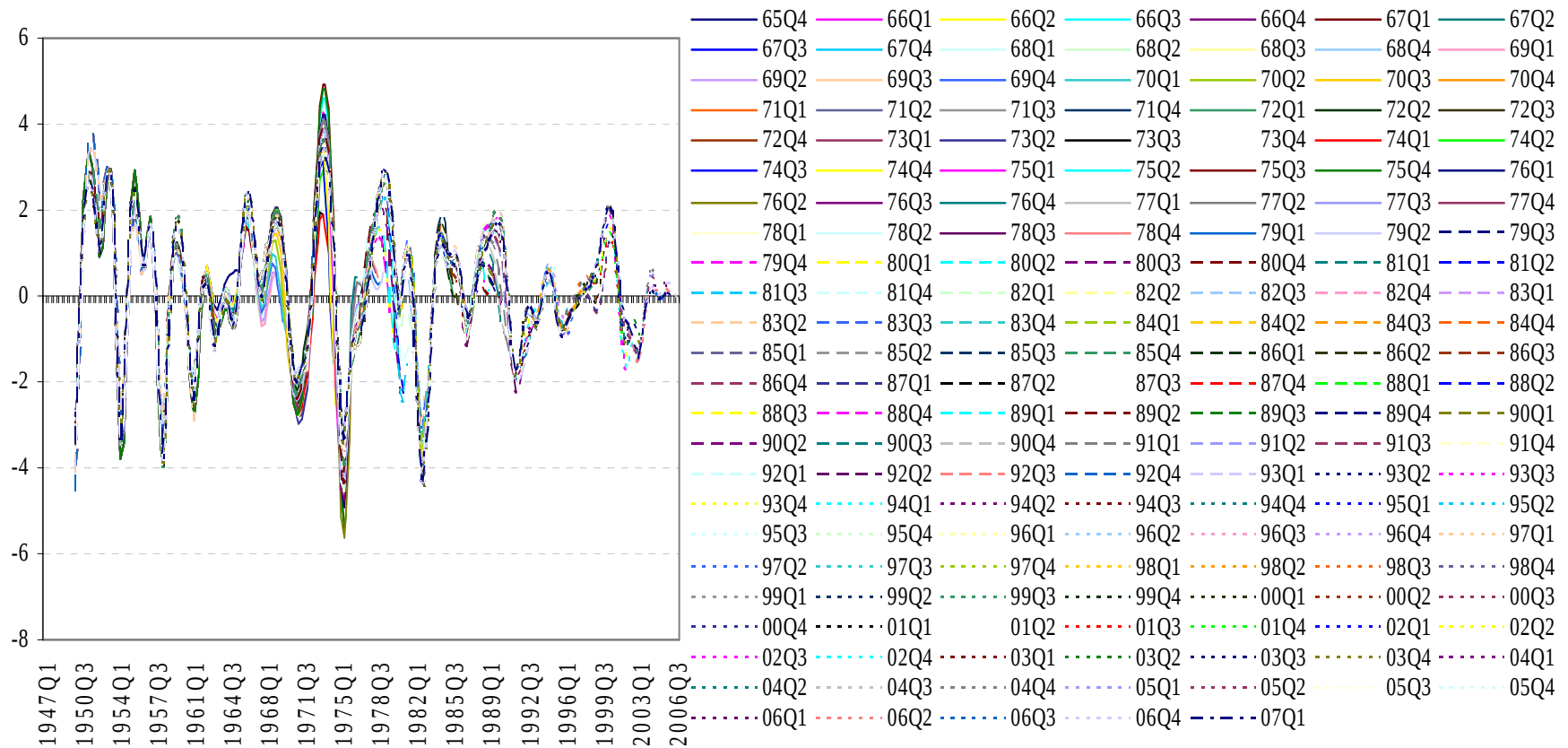


Chart 10: Real time estimates of US output gap, total revision and data revision (whole sample period) *(percentage points)*

Band-pass filter estimates

HP filter estimates

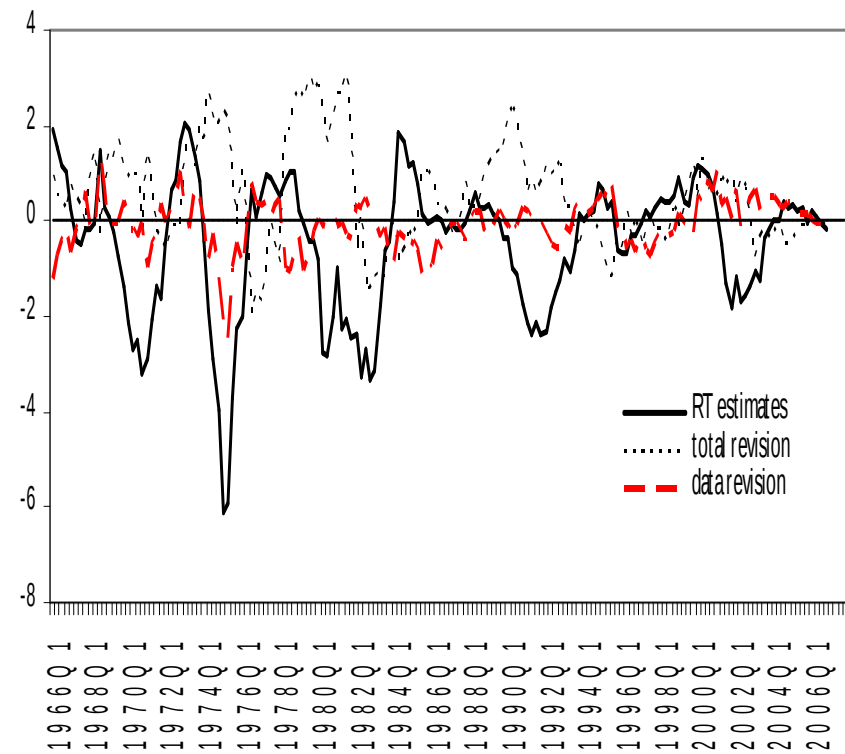
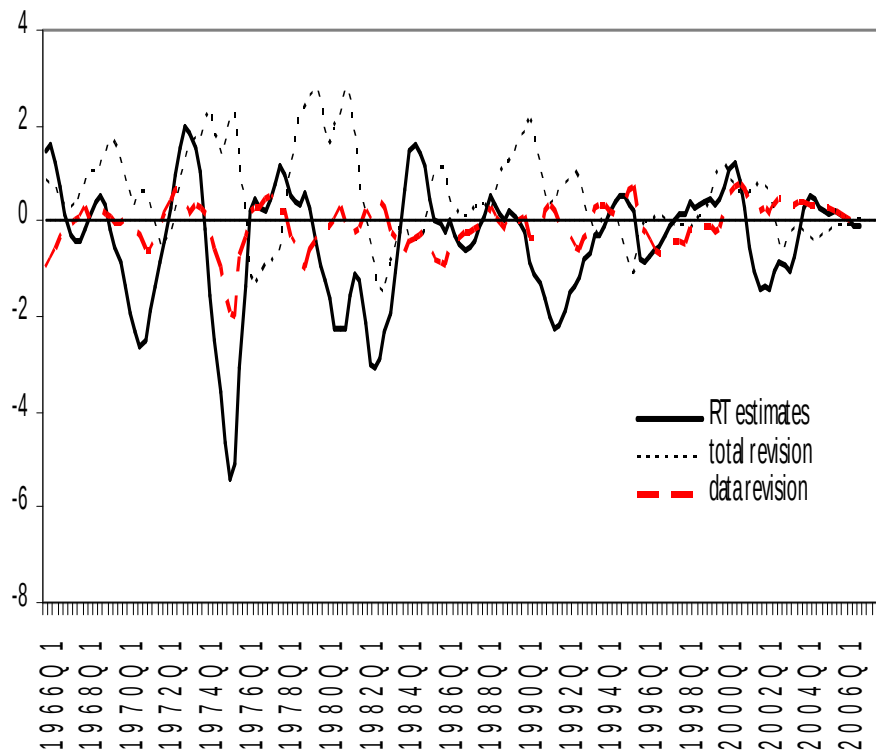


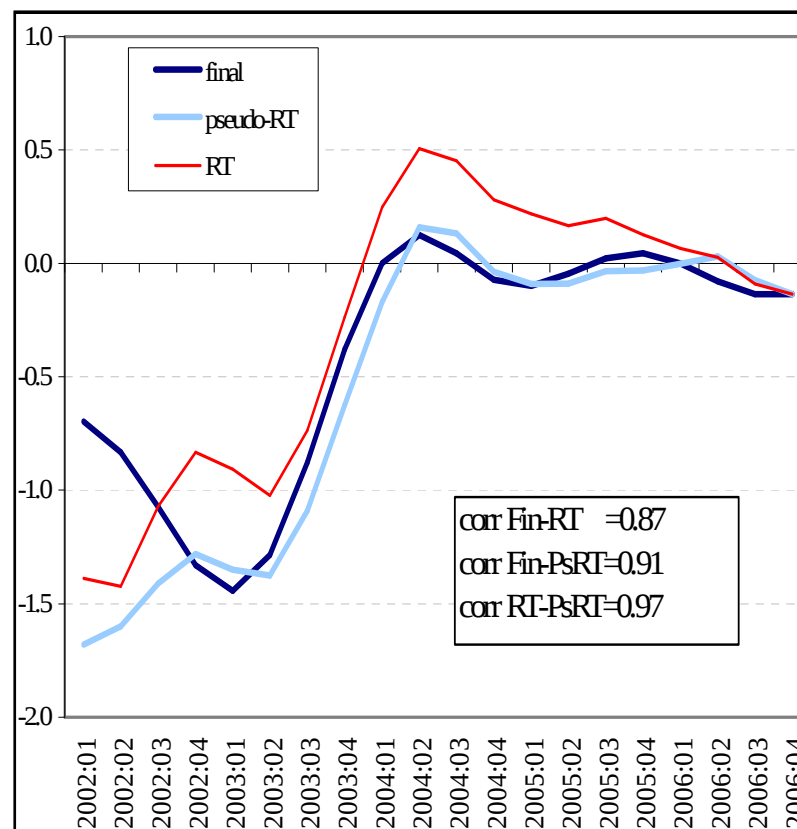
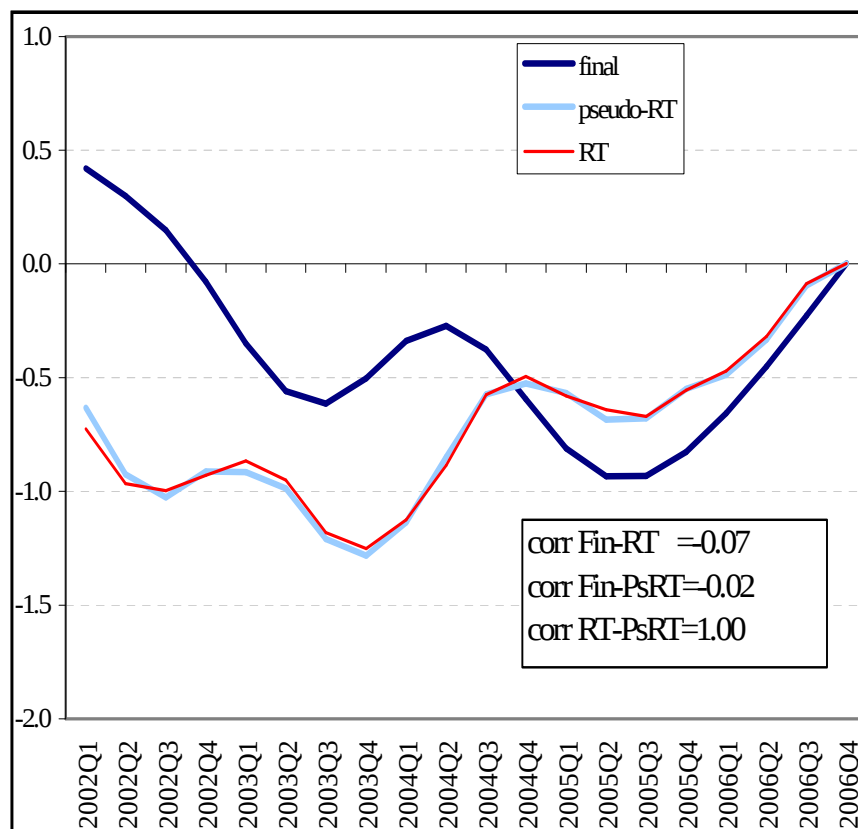
Chart 11: Final, real time and pseudo real time estimates (2002 onwards)

(percentage points)

Euro Area

US

Band-pass filter estimates



V. Conclusions

A thorough evaluation of the reliability of real time output gap measures for the euro area

As for other economic areas, high degree of uncertainty due to:

1. Model uncertainty – relevant
2. Parameter uncertainty – relevant, often ignored
3. Parameter instability – relevant
4. Data uncertainty – not so relevant

With respect to the US after 2001:

1. Parameter instability more relevant
2. Data uncertainty less relevant

Overall, output gap useless (and dangerous) for structural analysis or economic policy making in the euro area.

Moreover (Marcellino Musso (2008)), output gap not useful for real time forecasts of euro area inflation. However, some gap measures do improve euro area GDP growth forecasts