

# Forecasting inflation: An art as well as a science!

---

Ard den Reijer and Peter Vlaar

De Nederlandsche Bank

Forecasting workshop, Rotterdam, May 2004



# Outline of presentation

---

- **Motivation**
- **Model selection procedure**
- **Results for the Netherlands**
- **Do sub-indices give better forecasts?**
- **Dutch NIPE evaluation**
- **Conclusions**



# Purpose: monthly inflation forecast for ESCB eurozone projections

---

- Forecasts for 5 sub-indices
- Common exogenous variables
  - oil prices (futures)
  - other commodity prices (futures)
  - exchange rates (constant)
  - interest rates (constant)
- Up to 16 months ahead
- Including confidence bands for last month



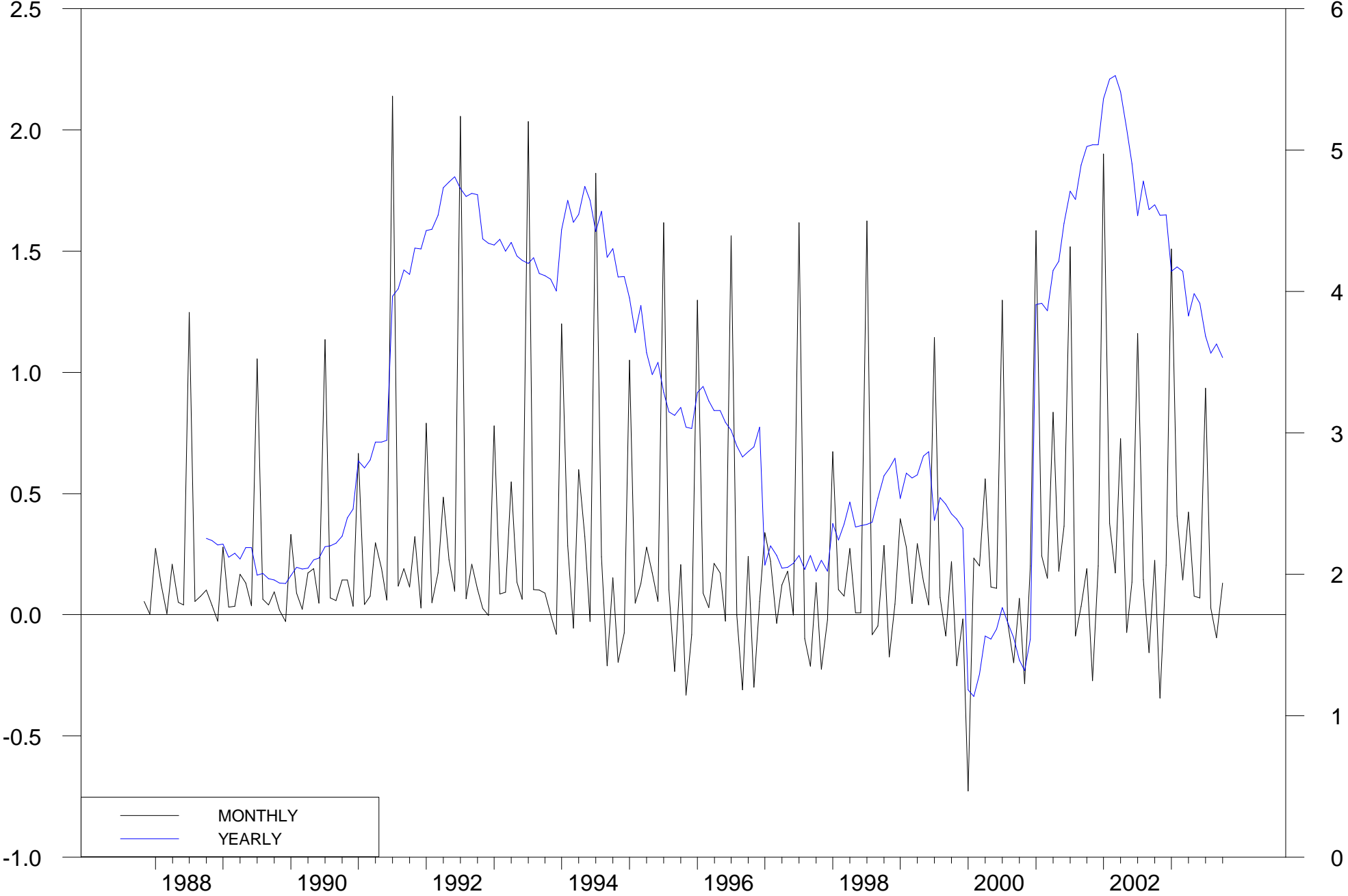
# Main problems

---

- **Changing seasonal patterns**
- **Short sample**
- **Which variables to include?**
  - **Endogenous versus Exogenous**
- **Structural breaks**
- **Non-stationarity**



# Services inflation The Netherlands



# How? Model selection

---

- **Check for changing seasonal pattern**
  - Yes --> (V)ECMX in first and twelfth differences
  - No --> (V)ARX in first differences
- **Statistical evaluation every possible model**
  - Information criteria (AIC, HQ, SC)
  - Root mean squared forecast error (RMSFE)
  - Mixture
- **Economic evaluation of results**
  - Does it make sense?
  - Stable forecasts
- **Periodic revaluation (results not robust)**



# How? Model use

---

- **Adjust data before making forecasts:**
  - structural changes in the past (RTV license)
  - irregular seasonal pattern in last month
- **Assume 'institutional' prices exogenous:**
  - housing rents
  - natural gas
  - wages
- **Ex post adjustments in excel:**
  - foreseeable price changes (VAT, price war)



# Results for the Netherlands:

---

- $\Delta_1 P^{uf} = \text{constant} + \text{seasonals}$
- $\Delta_1 P^e = \alpha_0 + \alpha_1 \Delta_1 P^{oil} + \text{seasonals}$   
(natural gas price exogenous)
- rest VECMX in first and twelfth differences with:
  - at most one lag
  - relation  $\Delta_{12} P^{HICP}$ ,  $\Delta_{12} \text{wage}$ ,  $\Delta_{12} P^{import}$
  - exogenous wage, oil price and/or US\$



# Recursive 'out-of-sample' results

- All models outperform random walk and AR models
- Disaggregated and direct HICP forecasts similar:

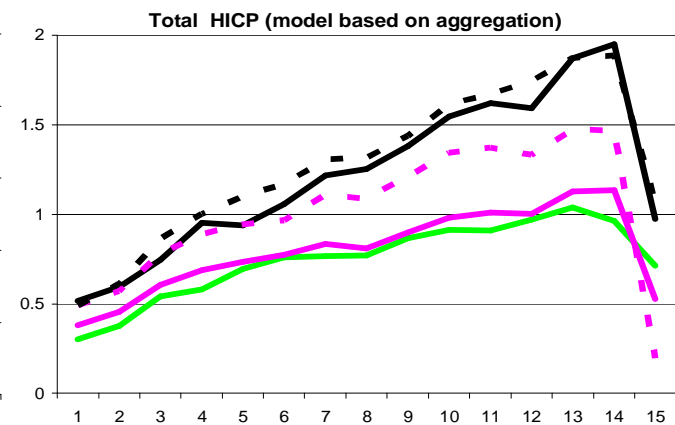
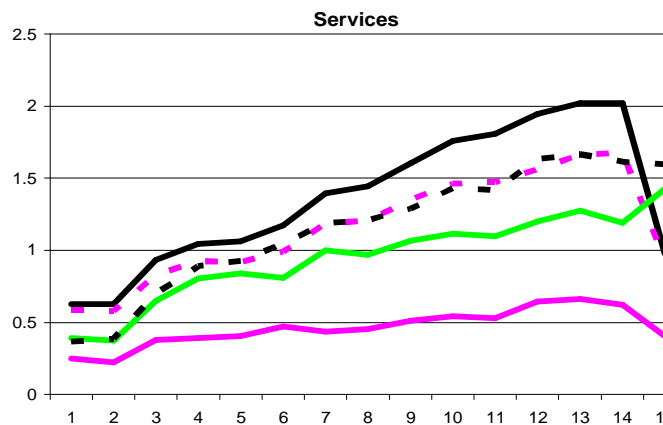
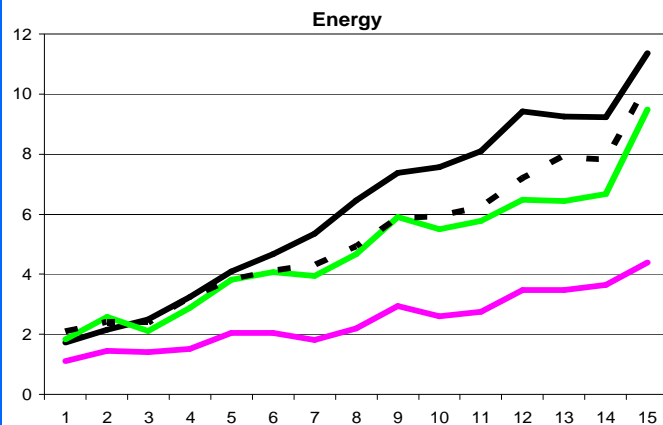
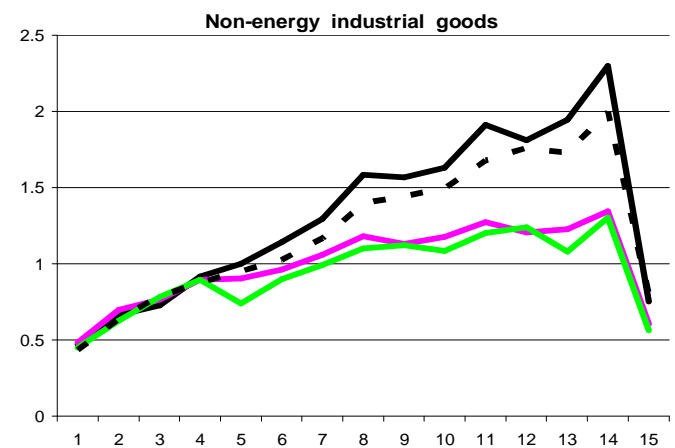
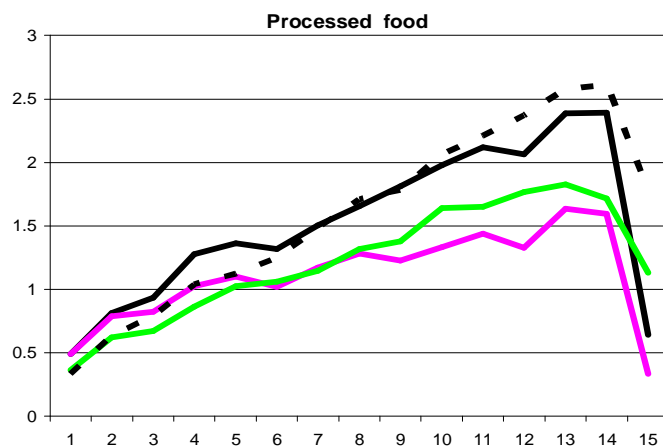
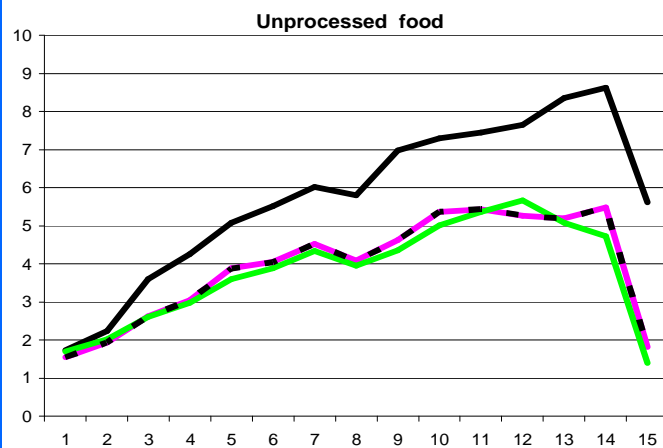
## The Netherlands

## Euro area

horizon	The Netherlands					Euro area				
	Naive	Direct AR	model	Disaggregated AR	model	Naive	Direct AR	model	Disaggregated AR	model
1	0.36	<b>0.36</b>	0.31	0.35	<b>0.28</b>	<b>0.21</b>	0.20	0.19	0.20	<b>0.15</b>
3	0.61	<b>0.71</b>	0.51	0.66	<b>0.46</b>	<b>0.39</b>	0.32	0.30	0.36	<b>0.28</b>
6	0.97	<b>1.11</b>	0.71	1.05	<b>0.70</b>	0.43	0.35	<b>0.32</b>	<b>0.47</b>	0.37
12	1.60	<b>1.79</b>	<b>0.80</b>	1.63	0.98	0.65	0.71	<b>0.59</b>	<b>0.80</b>	0.63
18	<b>1.97</b>	1.94	<b>0.99</b>	1.82	1.10	0.78	<b>0.97</b>	0.96	0.85	<b>0.72</b>

# Evaluation first 16 NIPE rounds

- NIPE about equally good as model ..... AR    — naïve — model
- Outperforms benchmarks almost uniformly    — NIPE ..... no RTV



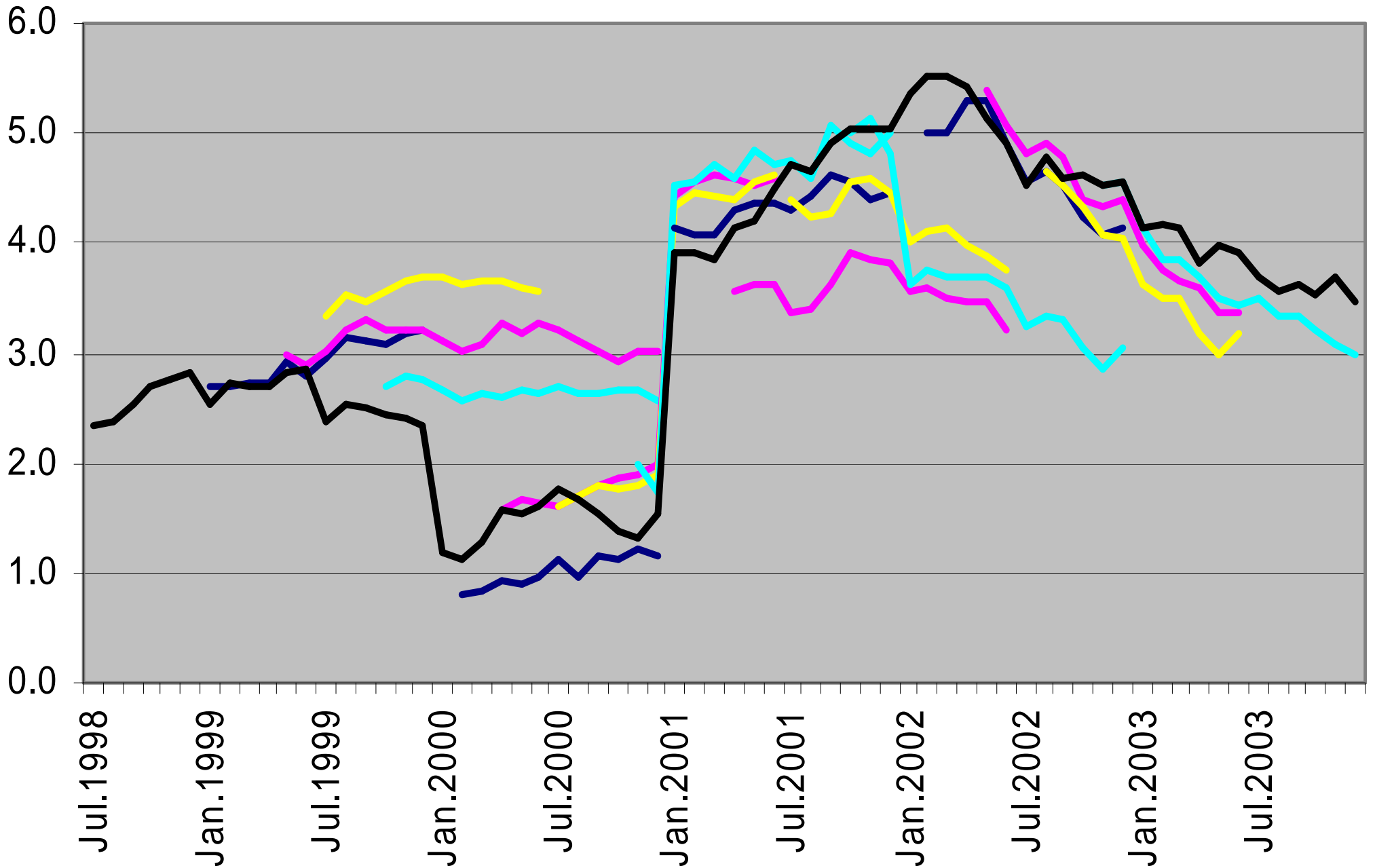
# Conclusions

---

- **Changing seasonal patterns essential element**
- **No 'best' way to select models**  
⇒ look at everything
- **No clear preference for disaggregated approach**
- **Institutional knowledge (excel) just as important as econometrics**  
⇒ An art as well as a science!
- **Robust models are not likely to be found**



# Services Netherlands



# Confidence bands based on bootstrap

- Same draw for all sub-indices to preserve correlation

