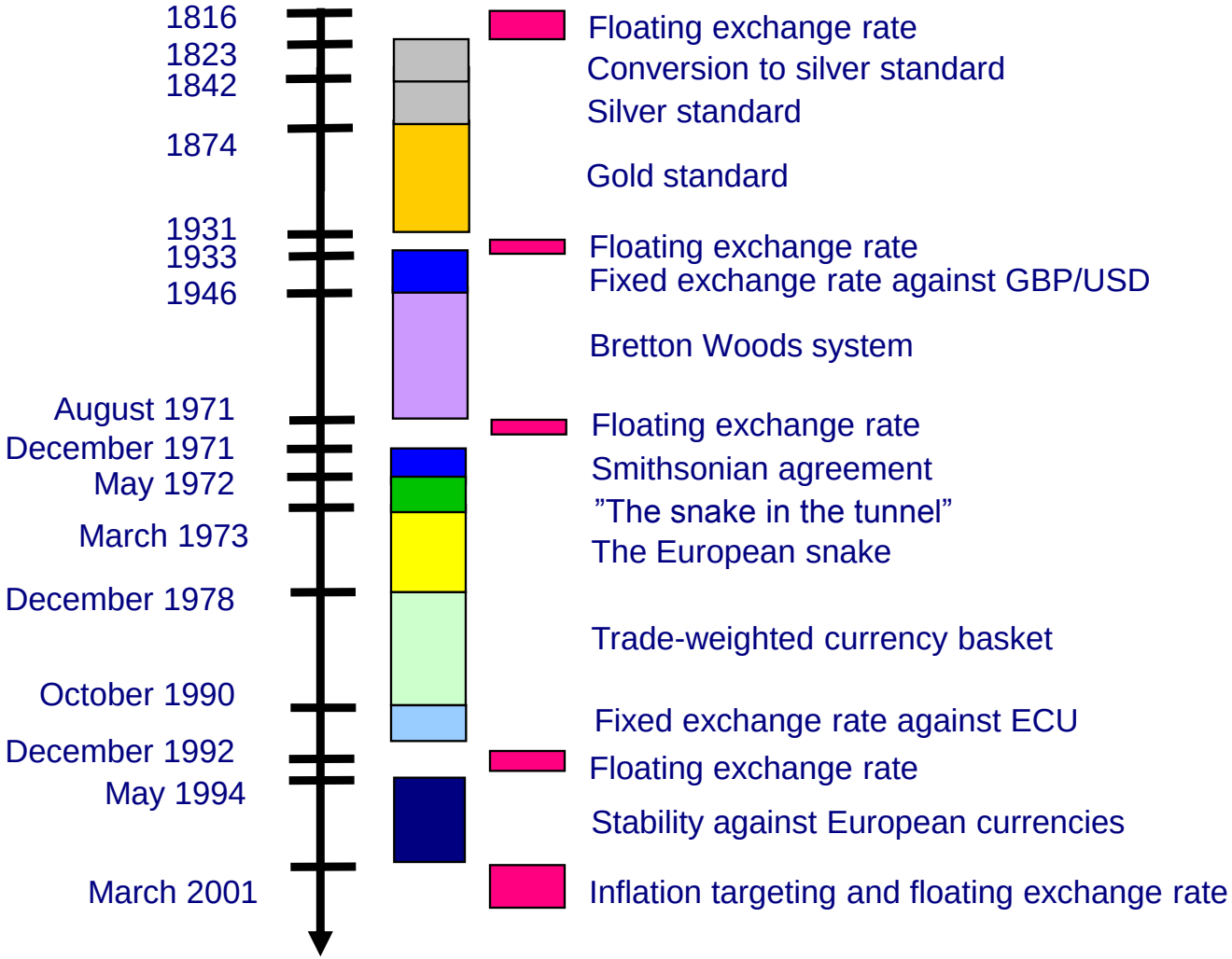
# Use of models and economic theory in Norges Bank

*Governor Øystein Olsen*

*Schweigaard lecture, University of Oslo*

*8. September 2011*

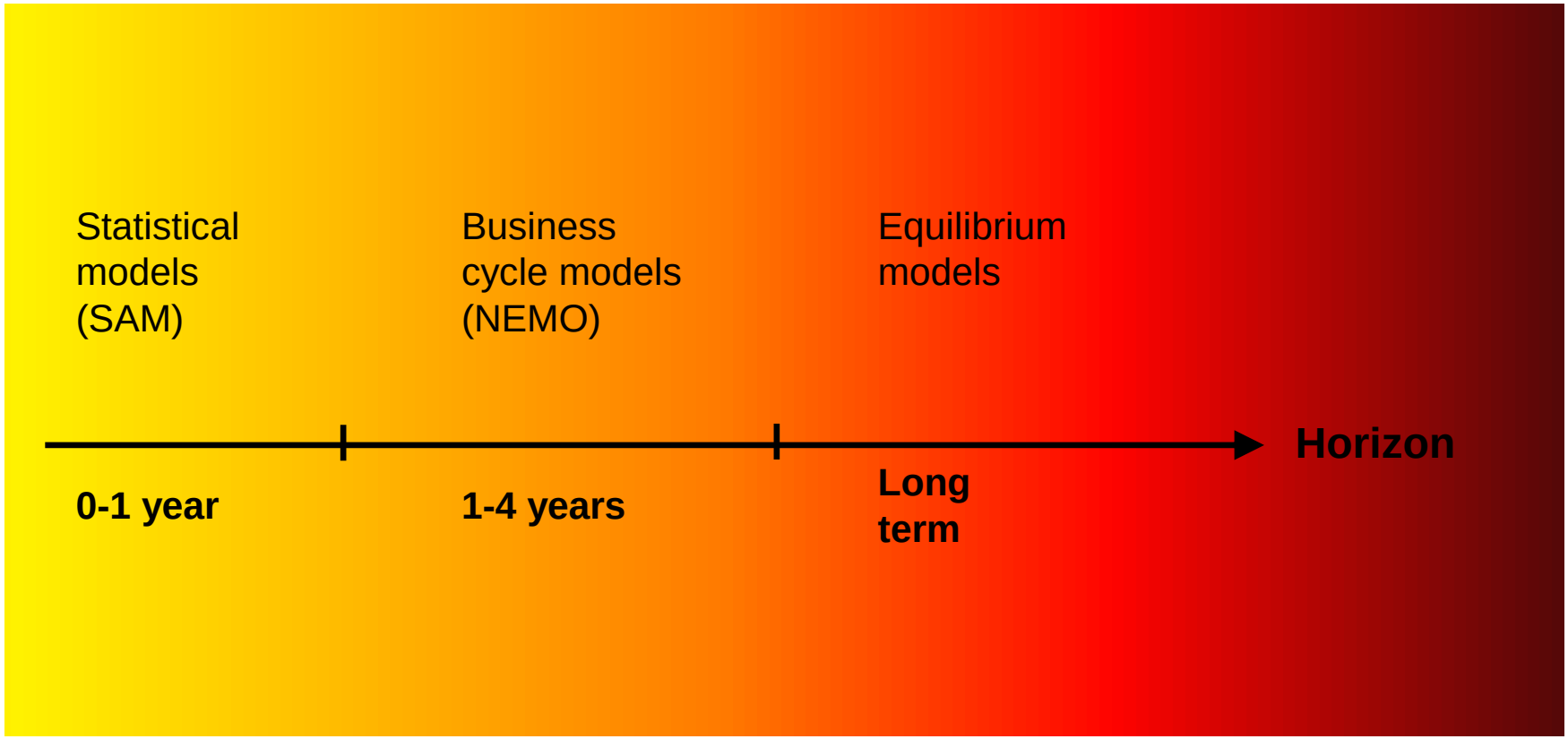
# Monetary policy regimes in Norway since 1816



# Monetary policy in Norway

- Inflation target of 2.5 per cent
- Monetary policy shall contribute to stabilising output and employment
- The instrument is the key policy rate

# Different horizons – different models

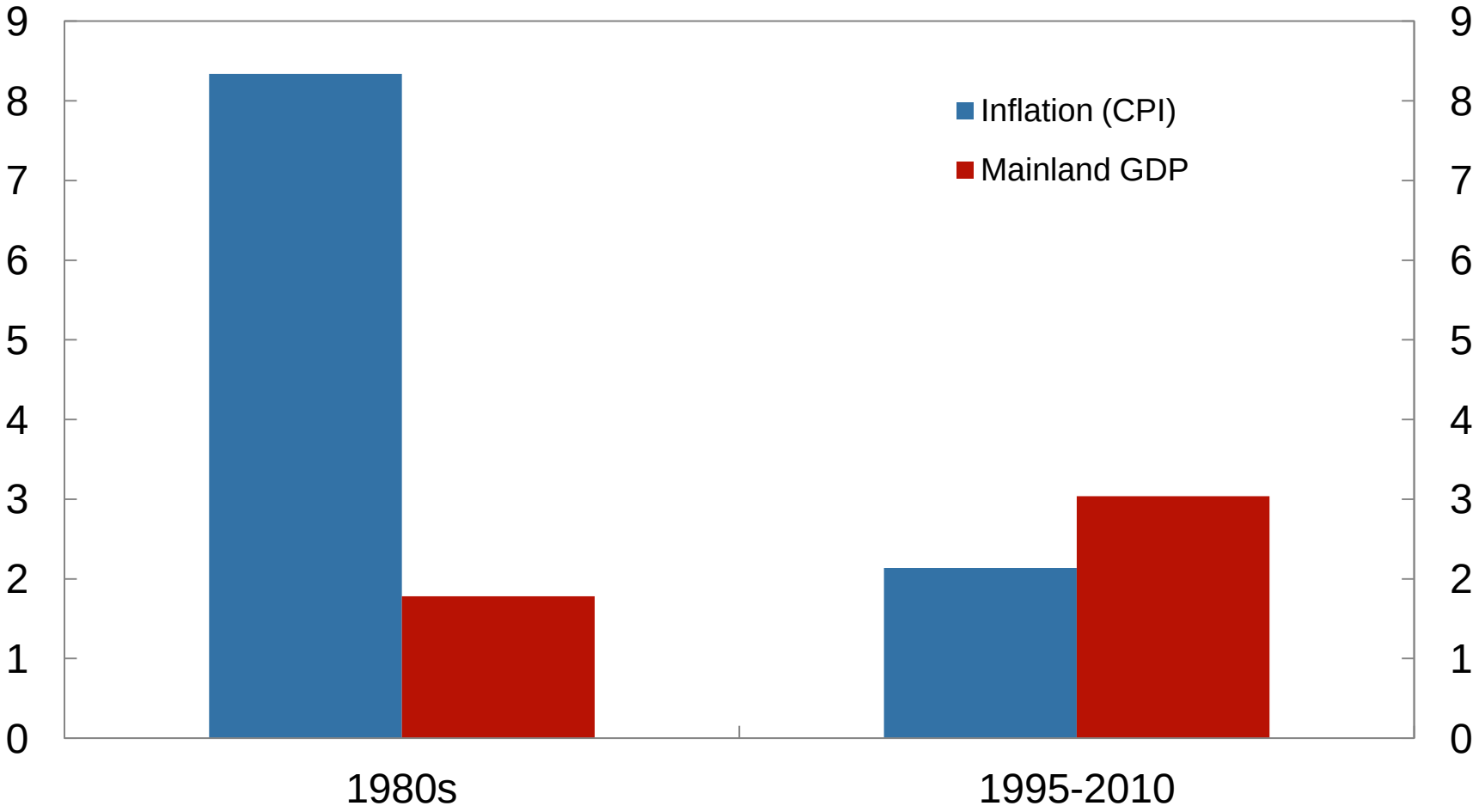


# Main requirements for a model for monetary policy

1. Monetary policy controls inflation
2. Expectations must be included
3. Based on theory and empirical data
4. Understandable and easy to communicate

# Growth and inflation

Percentage annual growth. Average




Sources: Statistics Norway and Norges Bank

# Main requirements for a model for monetary policy

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2. Expectations must be included
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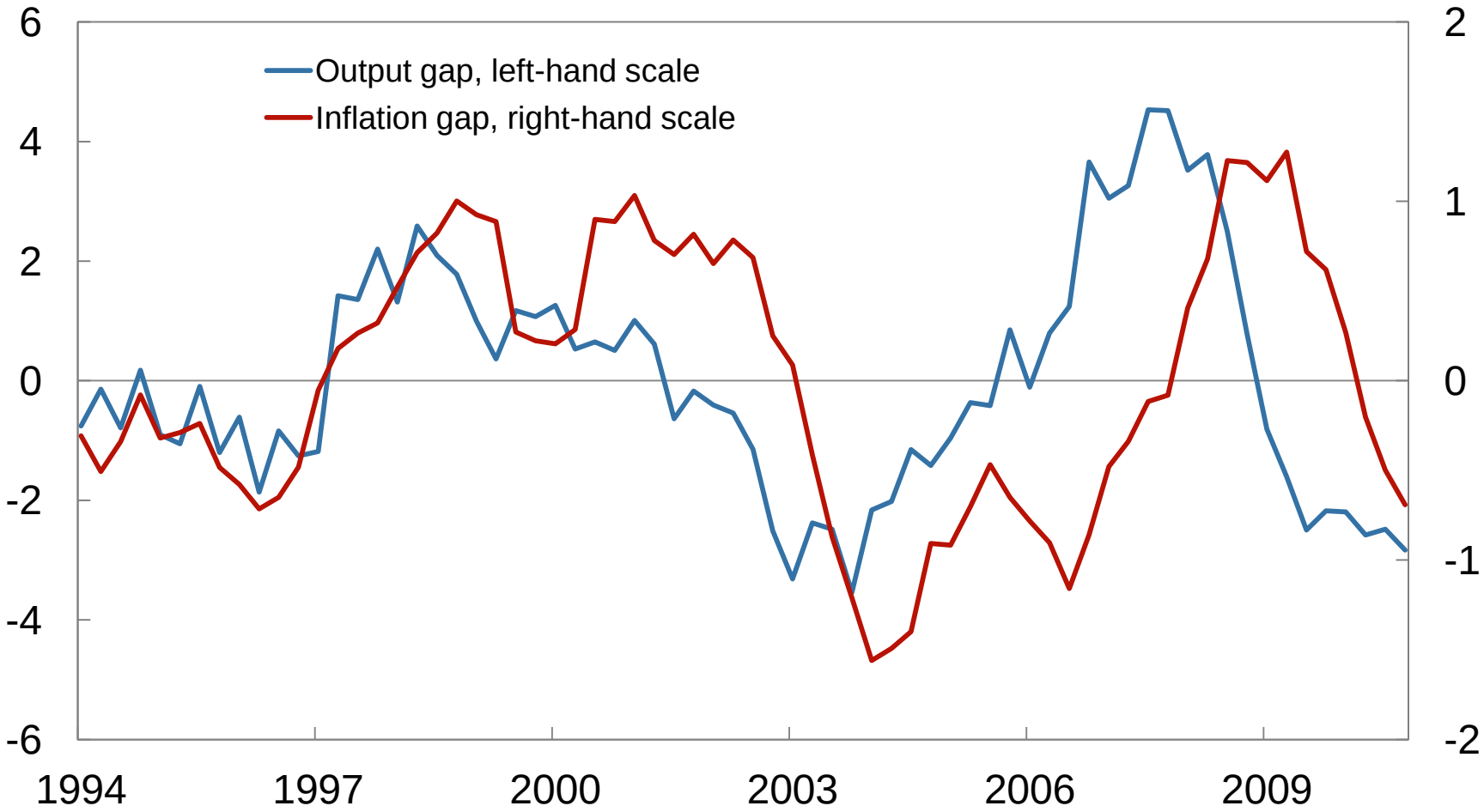
*“Essentially, all models are wrong, but some are useful.”*

George Box (1979)

# Output and inflation

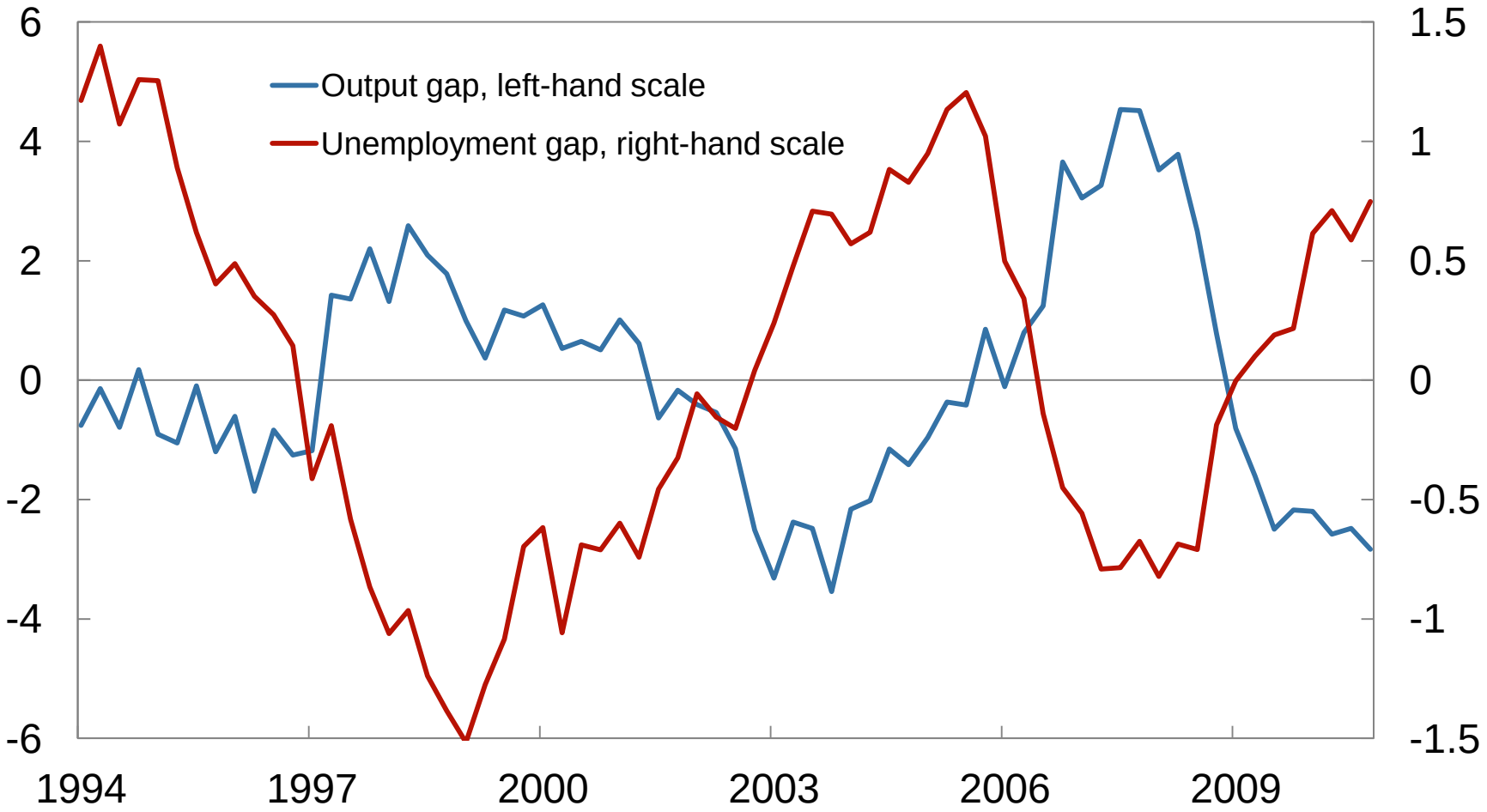
## Percentage deviation from trend




Sources: Statistics Norway and Norges Bank

# Output and unemployment

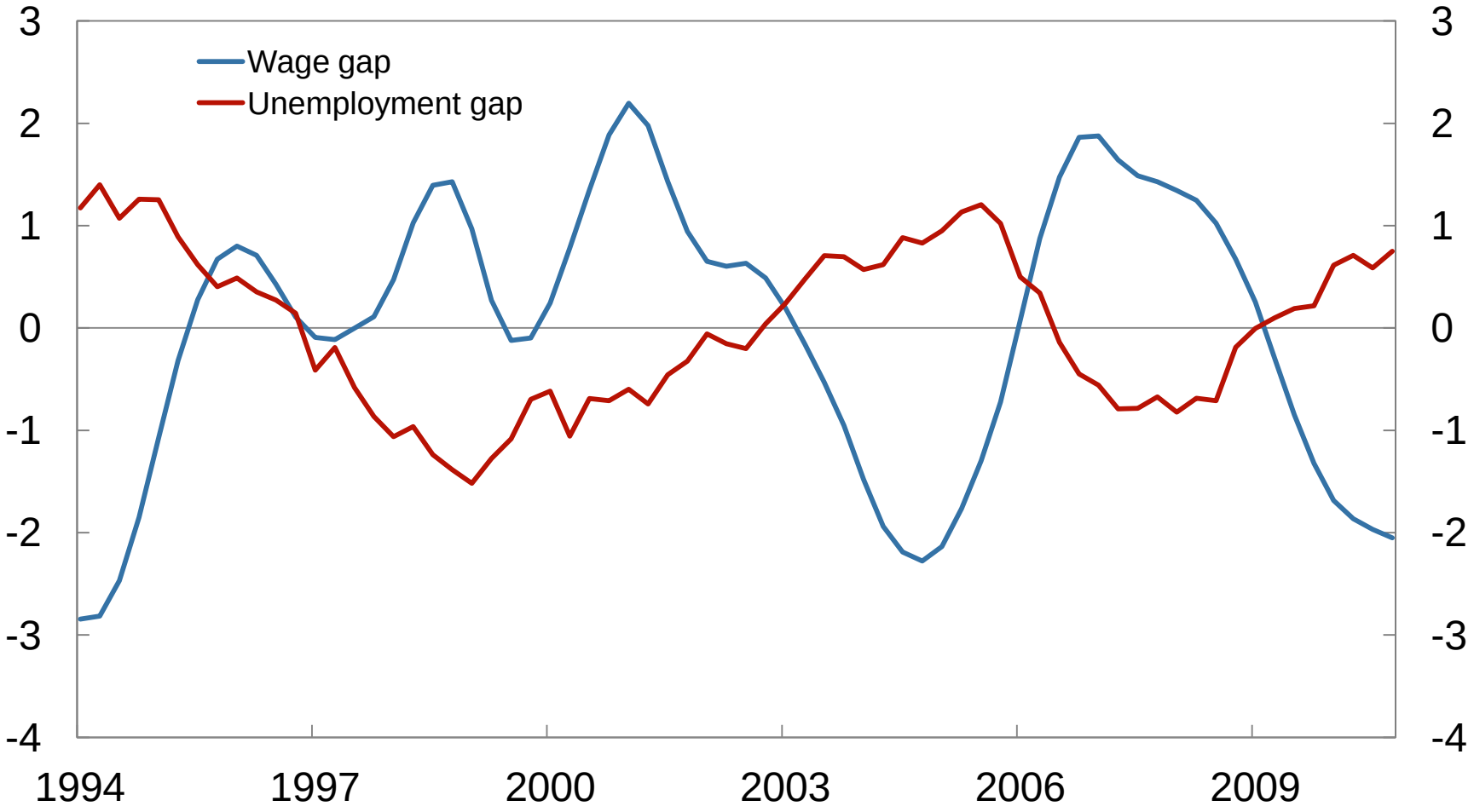
## Percentage deviation from trend




Sources: Statistics Norway and Norges Bank

# Unemployment and wage growth

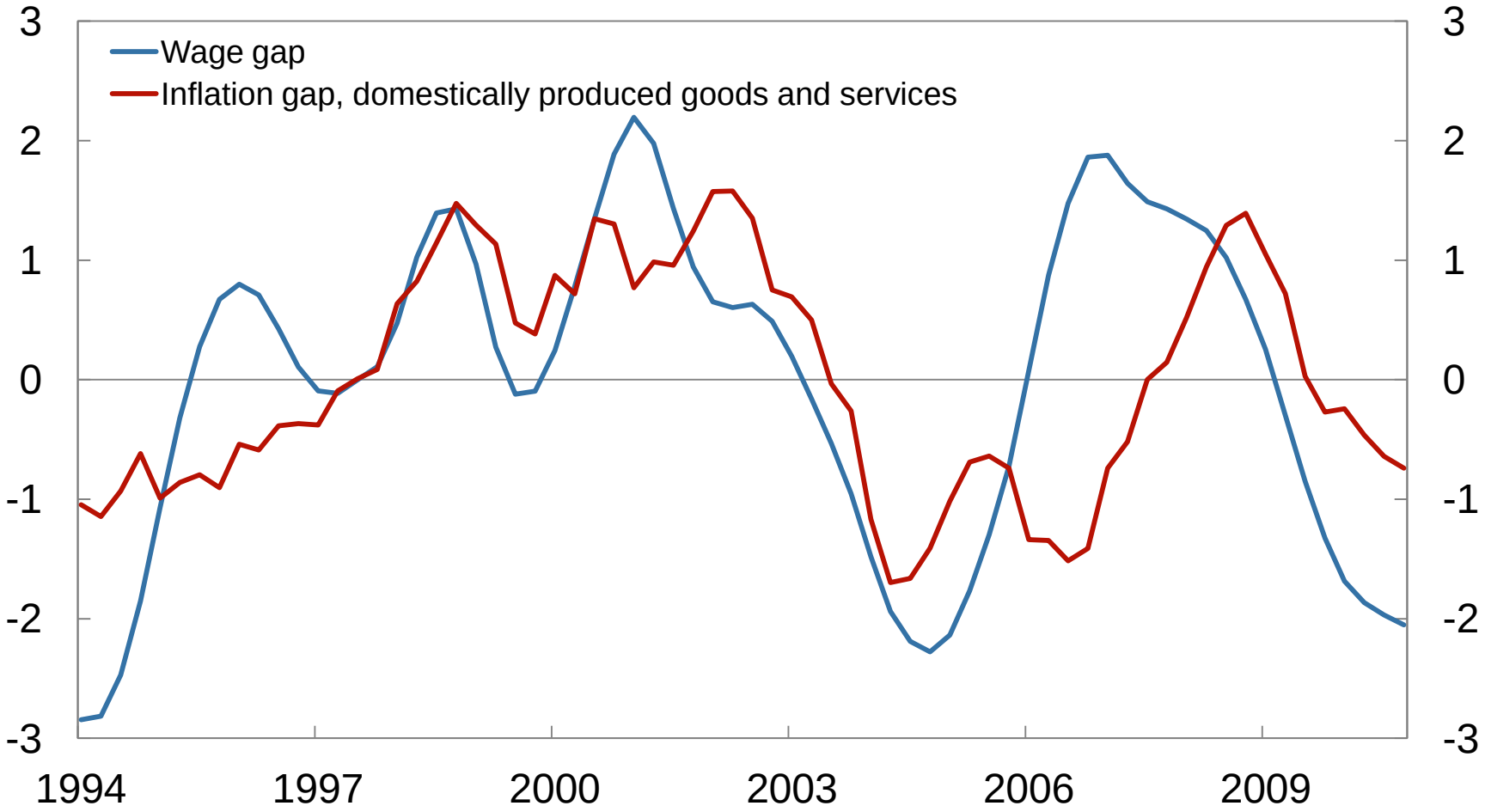
Percentage deviation from trend




Sources: Statistics Norway and Norges Bank

# Wage growth and inflation

Percentage deviation from trend




Sources: Statistics Norway and Norges Bank

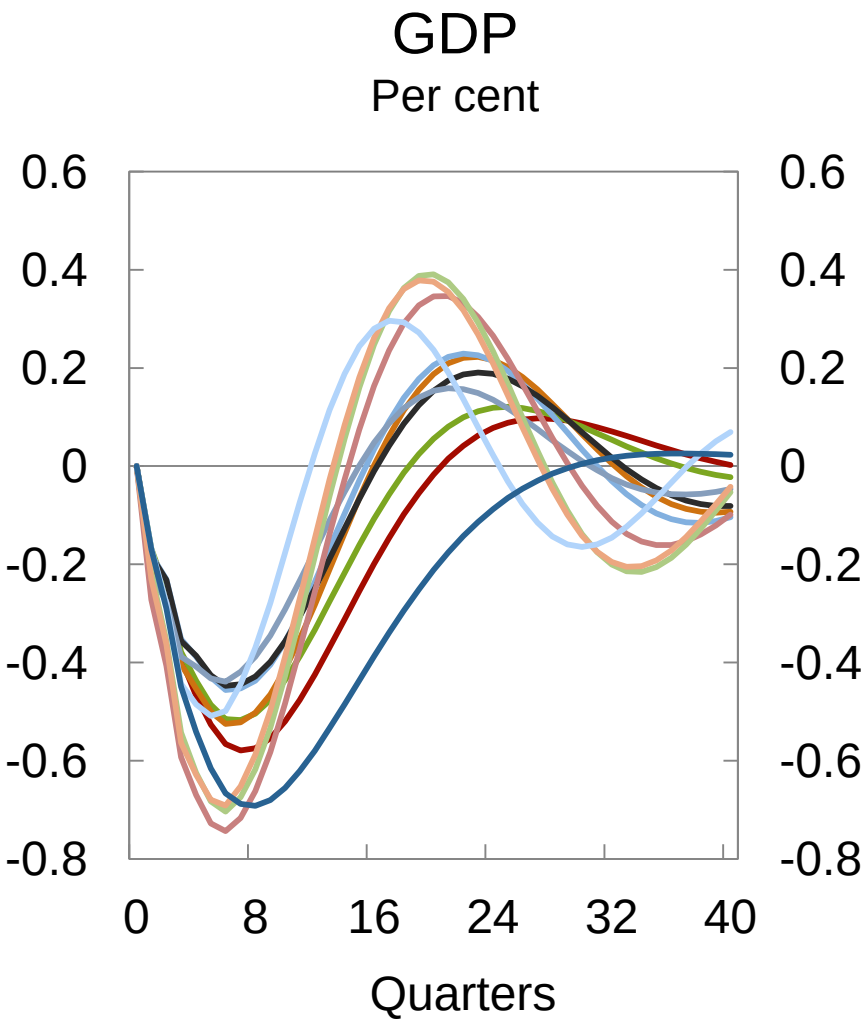
# The interest rate is an endogenous variable

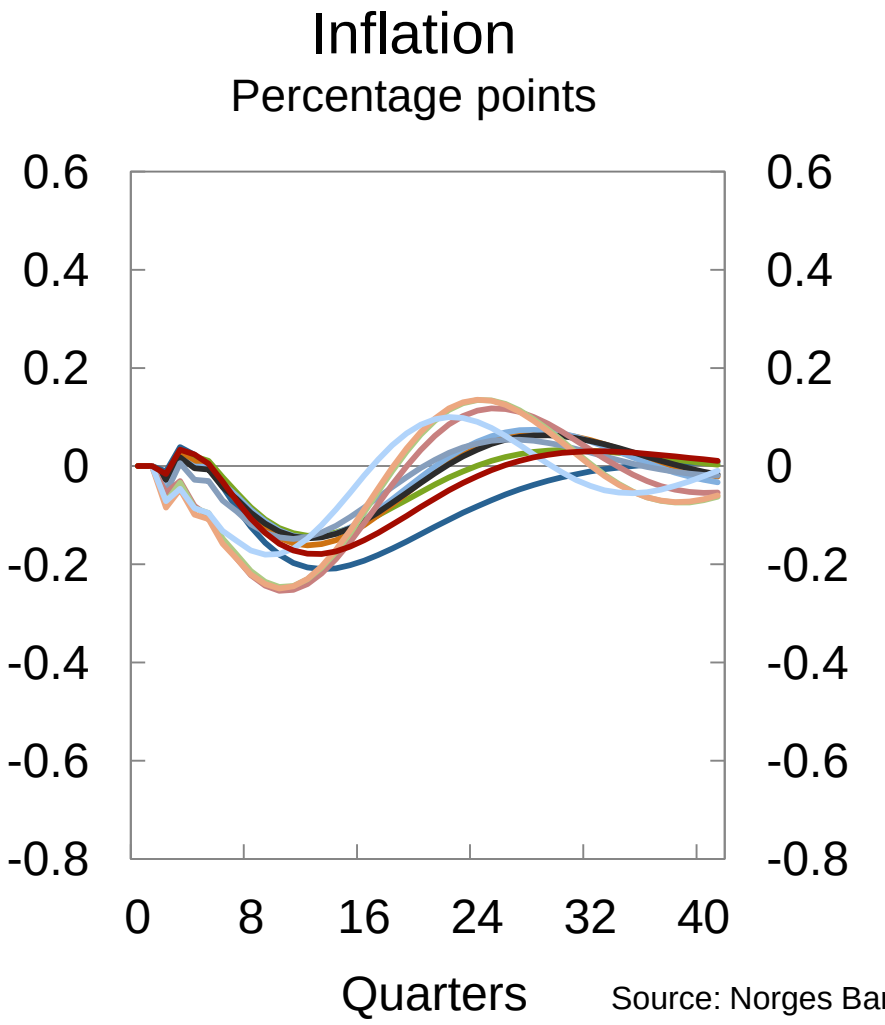
- Interdependency between the interest rate and other variables in the economy
- Demanding to identify the effects of interest rate changes

# VAR model
(Vector Autoregressive Model, structural)

- Mainland GDP
- Inflation (CPI-ATE)
- Exchange rate
- Interest rate

# Effect of monetary policy shocks, different models/estimation periods




Source: Norges Bank

# NEMO (Norwegian Economy Model)

- General equilibrium model (DSGE)
- Forward-looking participants
- Monetary policy controls inflation and gives weight to stabilising output
- No long-term trade-off between inflation and unemployment
- Estimated on Norwegian data

# Modelling monetary policy

The central bank sets the interest rate with a view to minimising the loss function:

$$L = (\pi_t - \pi^*)^2 + \lambda x_t^2$$

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The central bank sets the interest rate with a view to minimising the loss function:

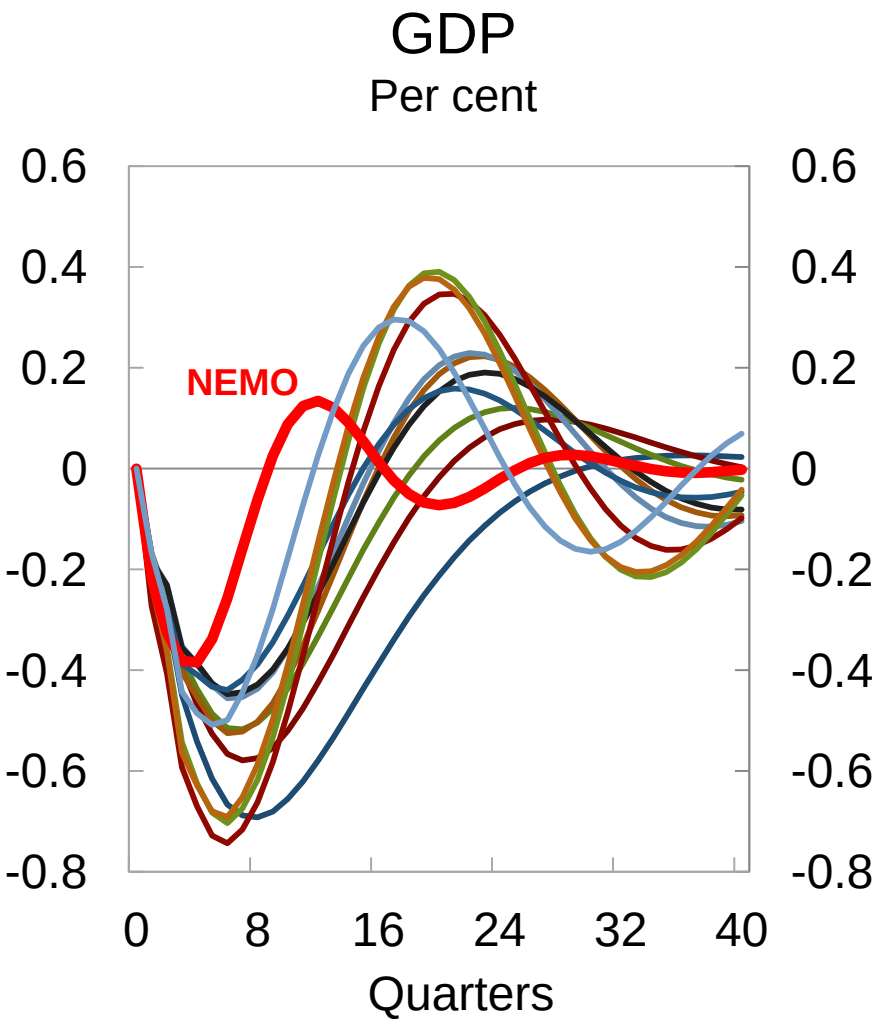
$$L = (\pi_t - \pi^*)^2 + \lambda x_t^2$$

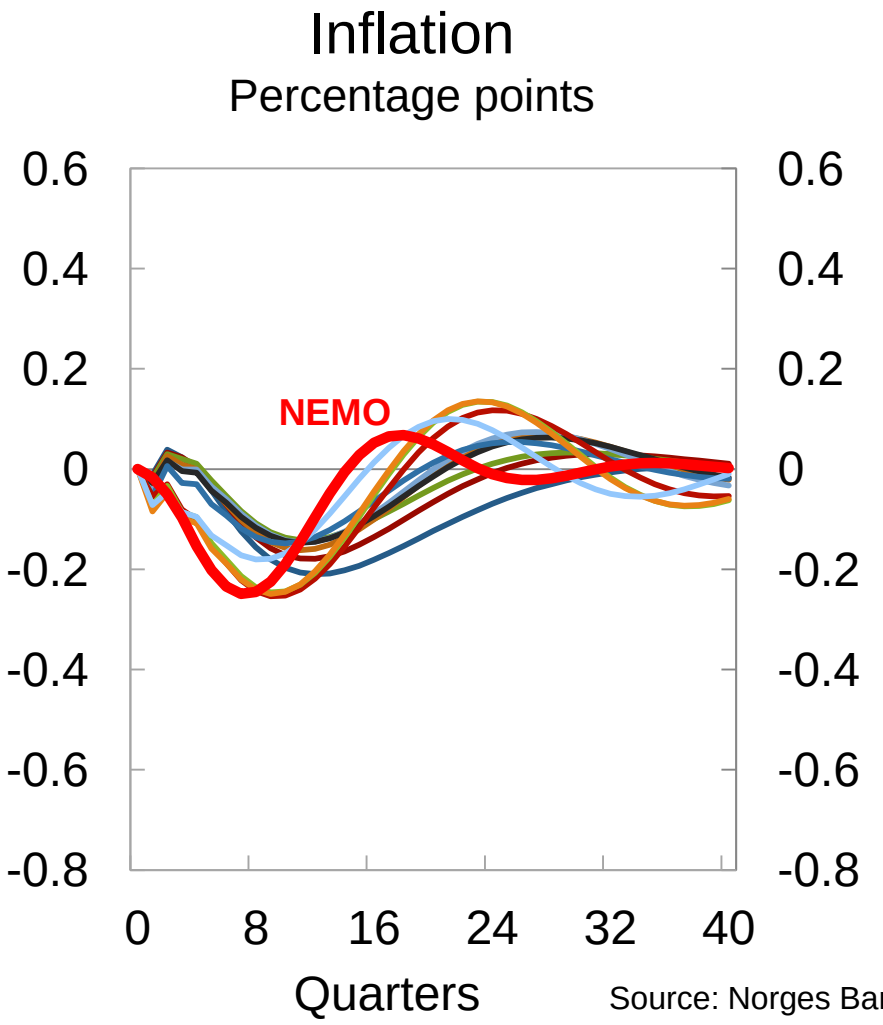
given the structure of the economy:

$$x_t = E_t x_{t+1} - \sigma(i_t - E_t \pi_{t+1}) + u_t$$

$$\pi_t = E_t \pi_{t+1} + \kappa x_t + e_t$$

# Effect of monetary policy shocks in the VAR models and in NEMO

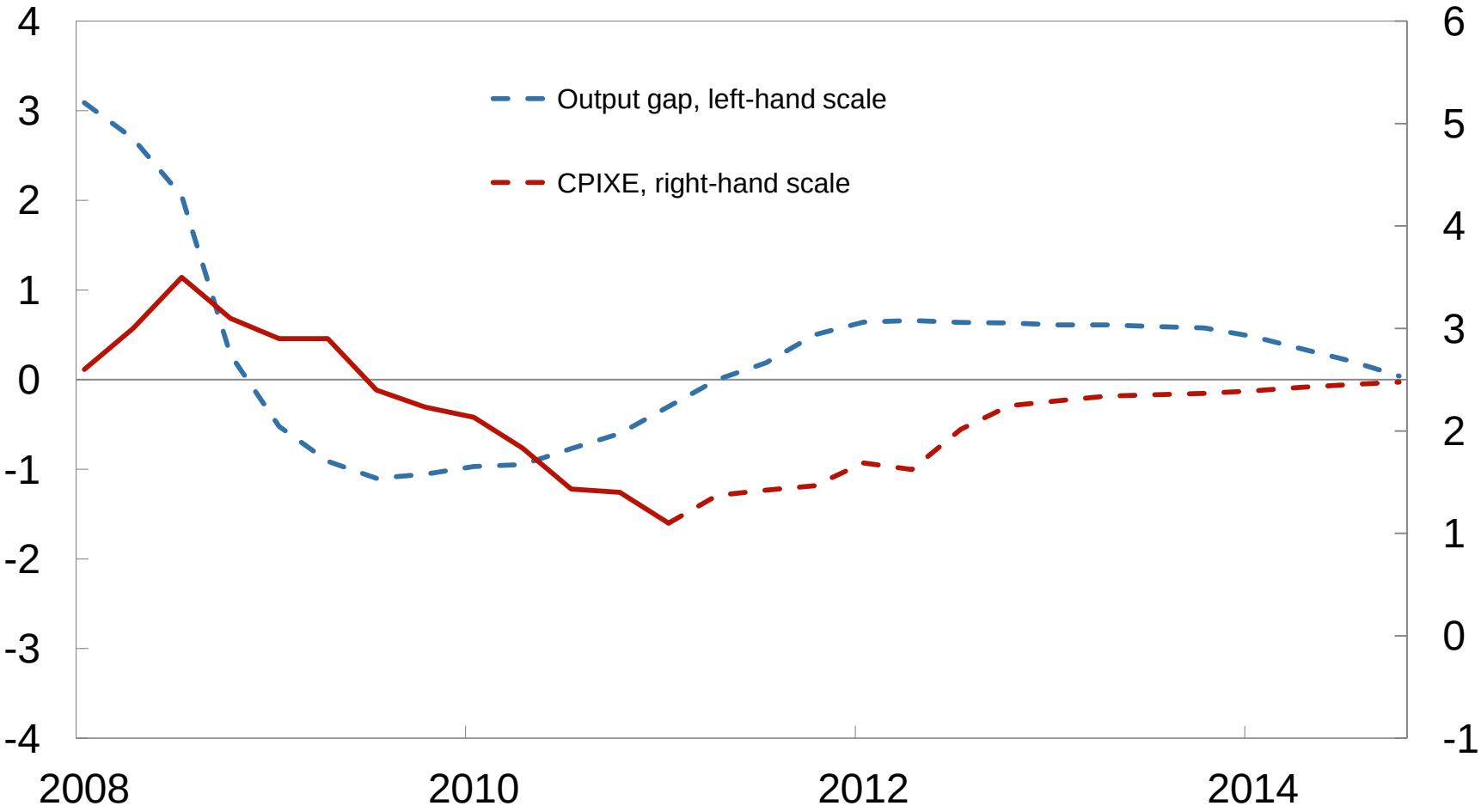



Source: Norges Bank

# Projected inflation and output gap in the baseline scenario from MPR 2/11

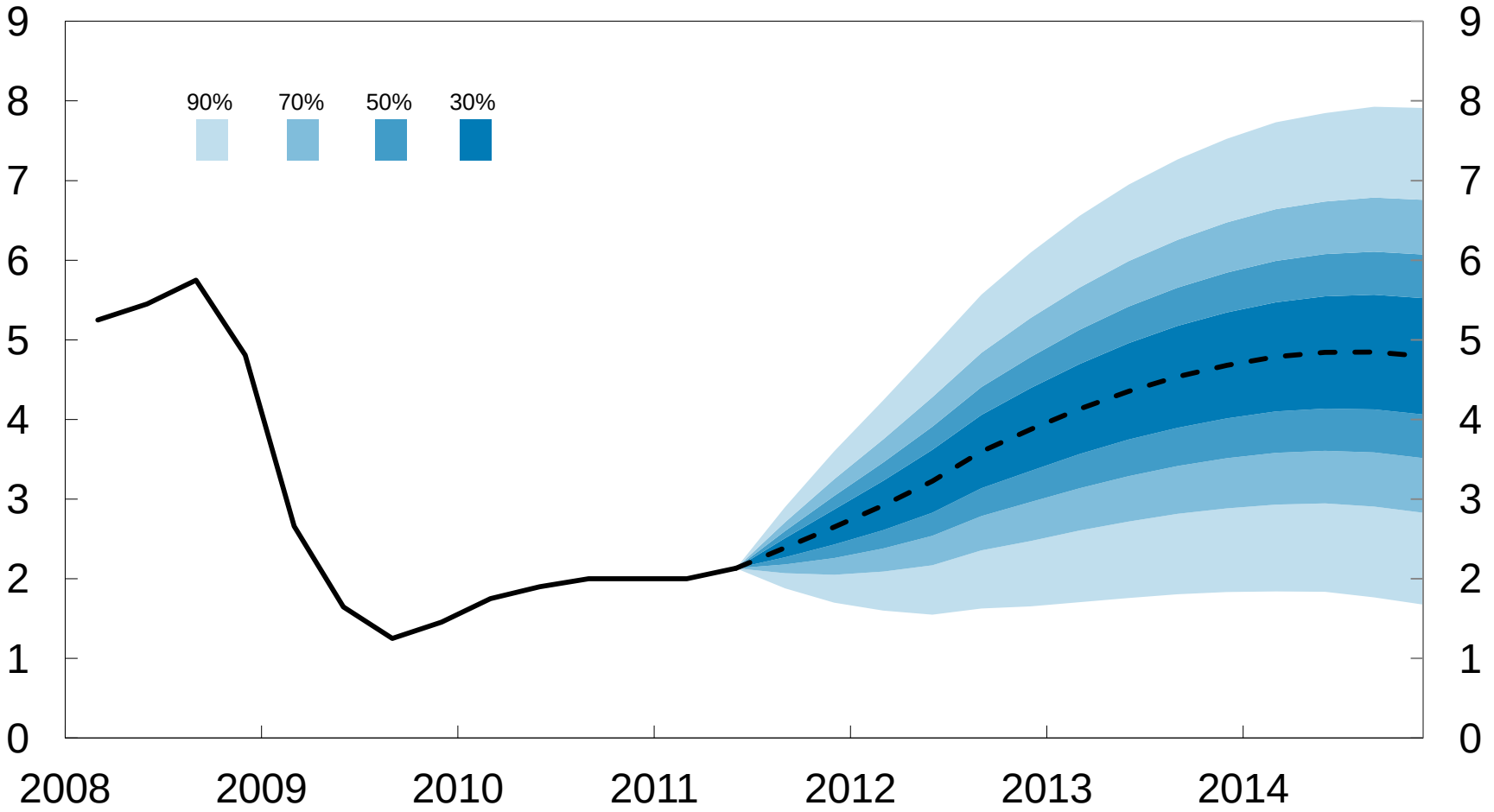
Per cent. Quarterly figures. 2008 Q1 – 2014 Q4




Sources: Statistics Norway and Norges Bank

# Projected key policy rate in the baseline scenario from MPR 2/11 with fan chart

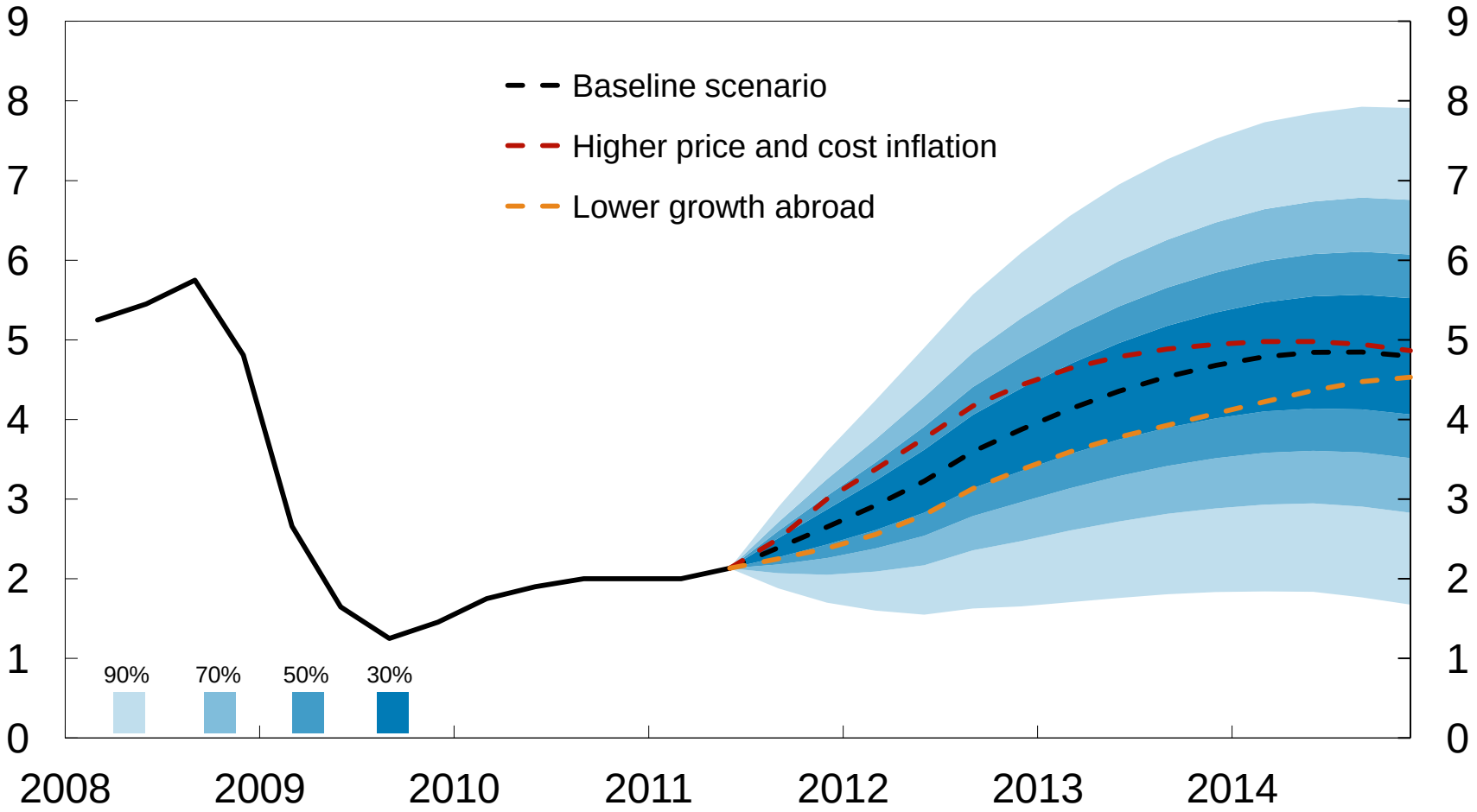
Per cent. Quarterly figures. 2008 Q1 – 2014 Q4




Source: Norges Bank

# Key policy rate in the baseline scenario and in the alternative scenarios from MPR 2/11

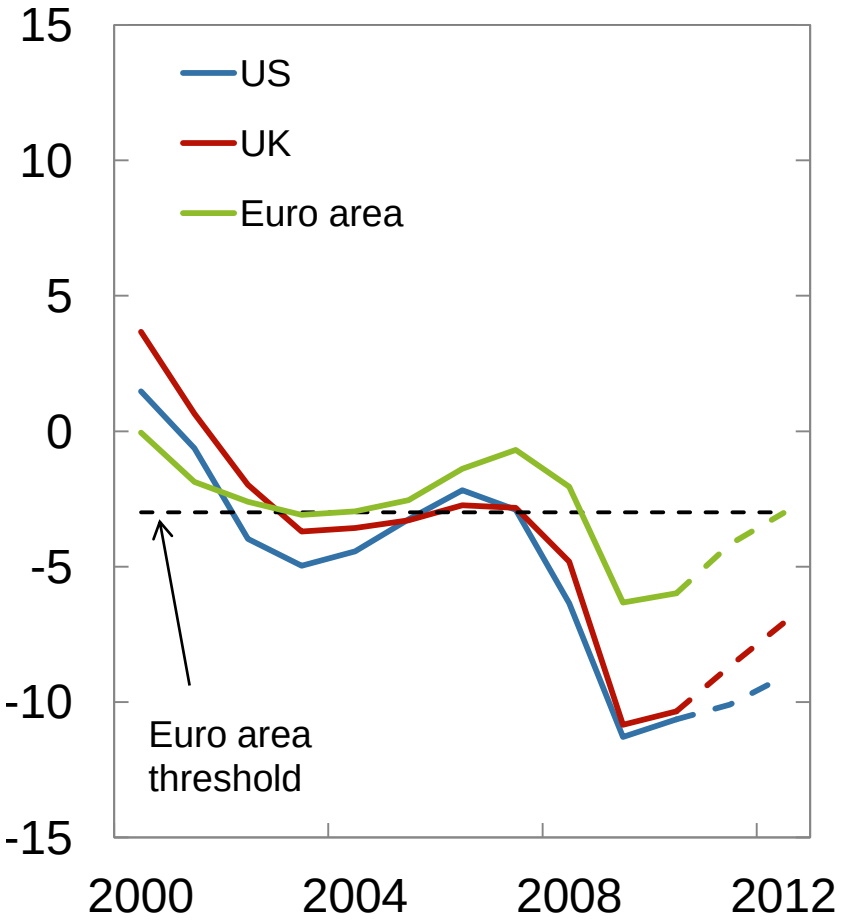
Per cent. Quarterly figures. 2008 Q1 - 2014 Q4




Source: Norges Bank

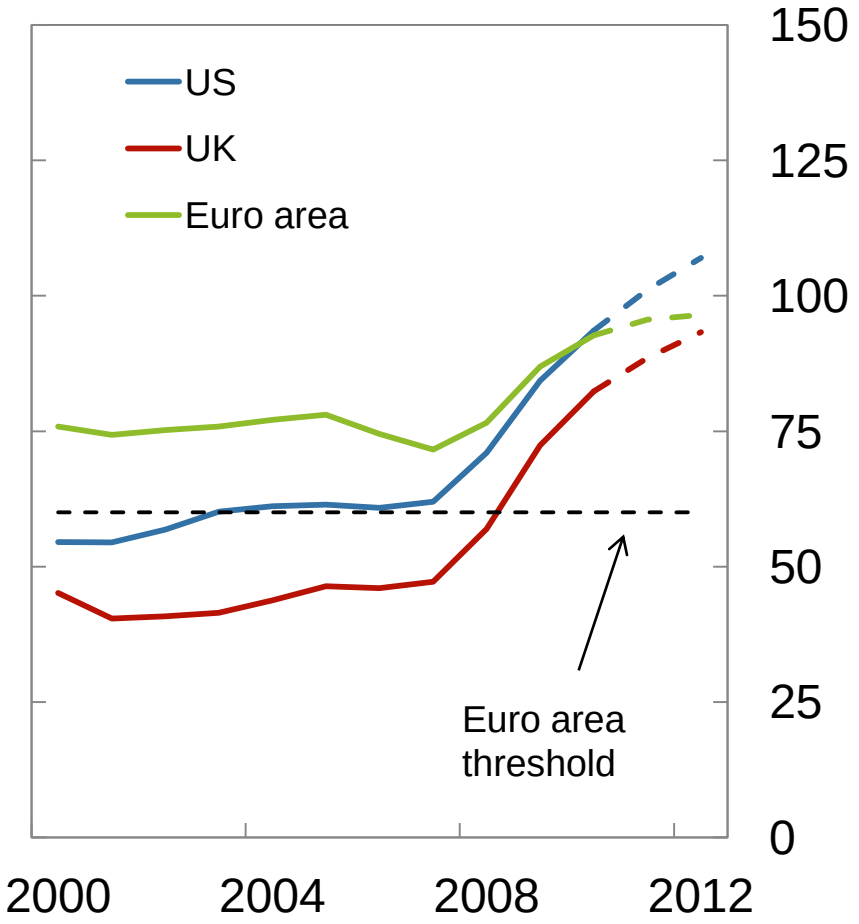
# Budget balances

Per cent of GDP. 2000 – 2012




# Government debt

Per cent of GDP. 2000 – 2012




Source: OECD Economic Outlook 89