Use of models and economic theory in Norges Bank

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Monetary policy regimes in Norway since 1816

- 1816
- 1823
- 1842
- 1874
- 1931
- 1933
- 1946
- August 1971
- December 1971
- May 1972
- March 1973
- December 1978
- October 1990
- December 1992
- May 1994
- March 2001

- Floating exchange rate
- Conversion to silver standard
- Silver standard
- Gold standard
- Floating exchange rate
- Fixed exchange rate against GBP/USD
- Bretton Woods system
- Floating exchange rate
- Smithsonian agreement
- "The snake in the tunnel"
- The European snake
- Trade-weighted currency basket
- Fixed exchange rate against ECU
- Floating exchange rate
- Stability against European currencies
- Inflation targeting and floating exchange rate
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

- Statistical models (SAM)
- Business cycle models (NEMO)
- Equilibrium models

- 0-1 year
- 1-4 years
- Long term
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

1. Monetary policy controls inflation

2. Expectations must be included

3. Based on theory and empirical data

4. Understandable and easy to communicate
“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

- **GDP**
  - Per cent
  - Quarters

- **Inflation**
  - Percentage points
  - Quarters

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:

\[ L = (\pi_t - \pi^*)^2 + \lambda x_t^2 \]
Modelling monetary policy

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

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

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

GDP
Per cent

Inflation
Percentage points

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

- Baseline scenario
- Higher price and cost inflation
- Lower growth abroad

Source: Norges Bank
Budget balances
Per cent of GDP. 2000 – 2012

Government debt
Per cent of GDP. 2000 – 2012

Source: OECD Economic Outlook 89