

Getting in touch with QPM

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Outline

- 1 Issues in the forecast
- 2 Case studies
- 3 Sensitivity analysis
- 4 Stress Scenarios

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Forecast issues

- Use of expert judgement:
 - ▶ Model change
 - ▶ Data preparation
- Exogenous shocks:
 - ▶ Tax changes: First-round and Second-round effects
 - ▶ Subsidies
 - ▶ Fiscal policy
 - ▶ Risk premium: Exchange rate behavior

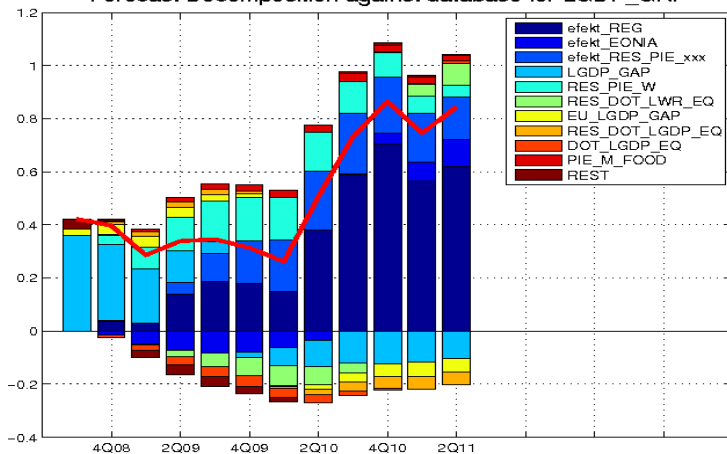
Forecast evaluation

- Alternative scenarios and sensitivity analysis:
 - ▶ Exchange rate sensitivity
 - ▶ Alternative scenarios: Exogenous variables forecasts
 - ▶ Stress scenarios for financial stability studies
- Forecast effects decomposition:
 - ▶ Forecast decomposition: information groups - outlooks for foreign economy, fiscal policy, taxes, etc.
 - ▶ Forecast changes decomposition: What changes drive forecast?
 - ▶ Evaluation of forecast 6 quarters ago: Fulfilment of inflation target

Forecast decomposition

Forecast vs. the previous forecast:

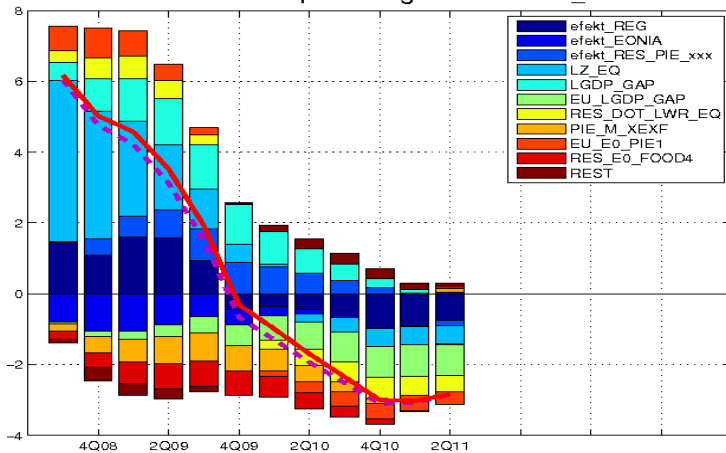
Forecast Decomposition against database for LGDP_GAP



Model comparison

Forecast deviation from steady state:

Forecast Decomposition against SS for LZ_GAP

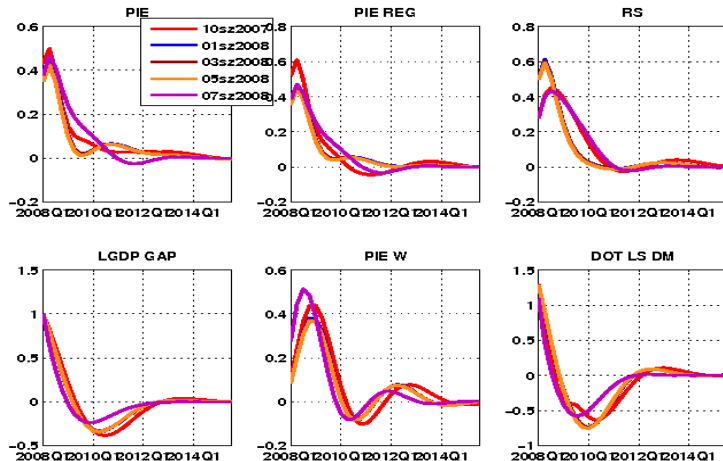


Model changes

- Over the time experience with model use is gained
- New states of economy can be observed: fast appreciation
- Changes in structure of economy: investment inflow

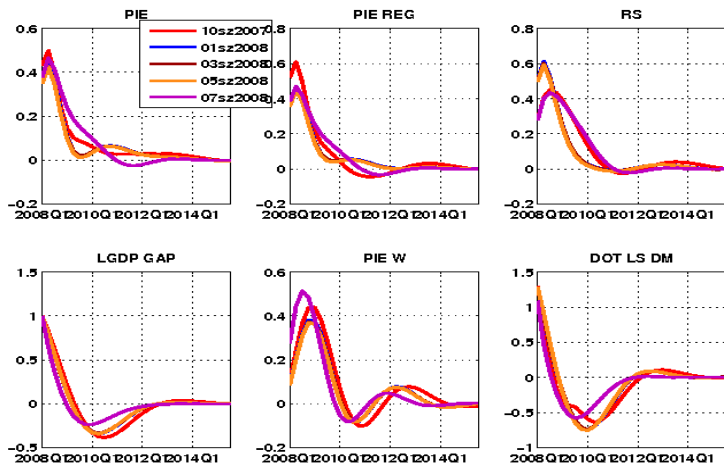
Model comparison

Aggregate demand shock:



Model comparison

Disinflation shock:



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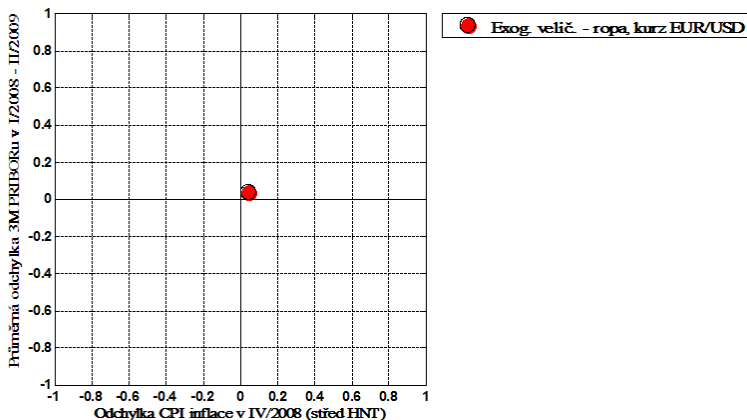
GRIP

How to handle information update?

- GRIP: Graph of Risks of Inflation Prediction
- Sequential update of outlooks in prediction exercise
- Information update is conditional of ordering: disadvantage

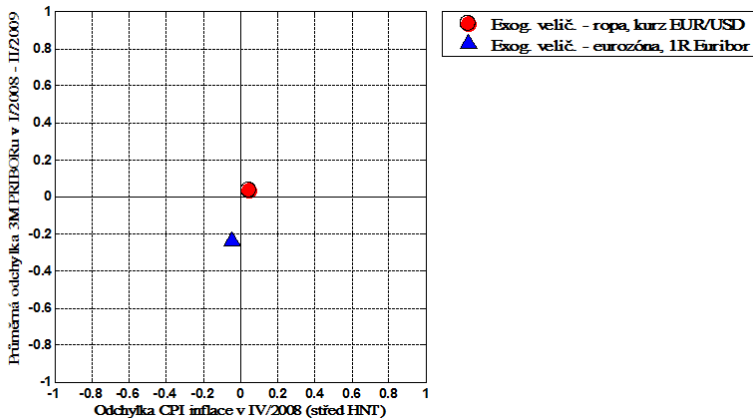
Example I

- GRIP: ex. rate, oil



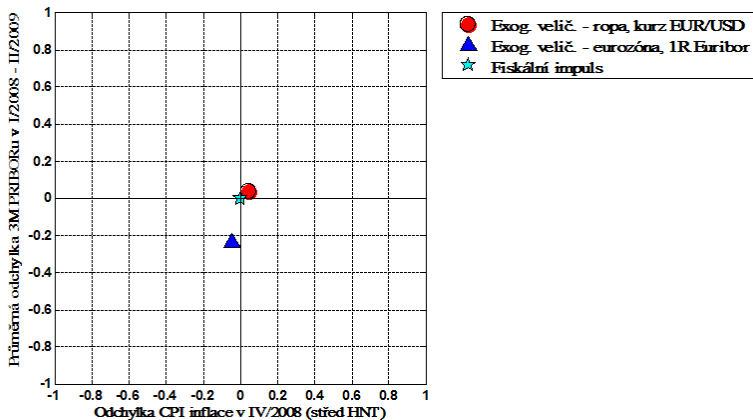
Example II

- GRIP: Eurozone



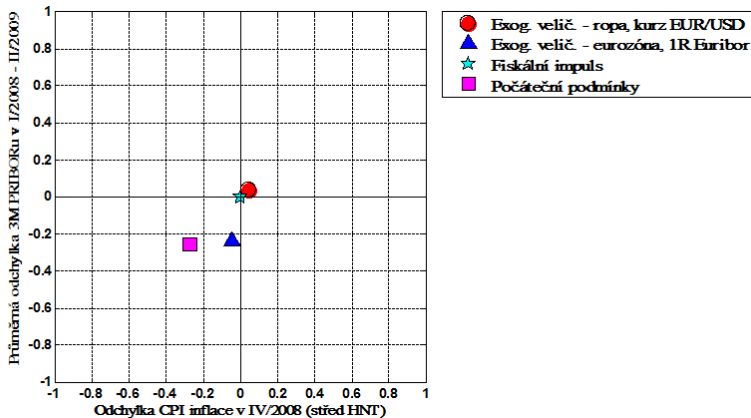
Example III

- GRIP: Government consumption



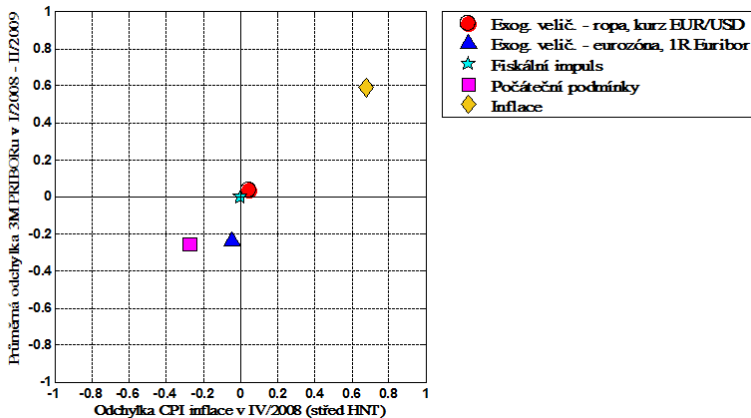
Example IV

- GRIP: Initial state



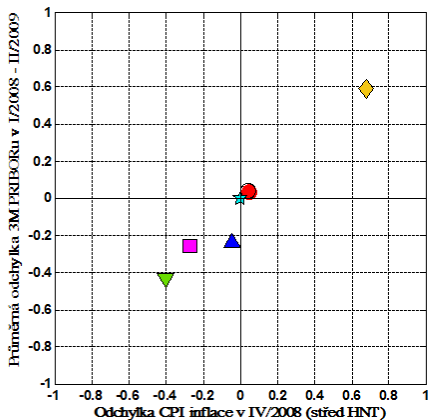
Example V

- GRIP: Inflation



Example VI

- GRIP: Domestic monetary conditions



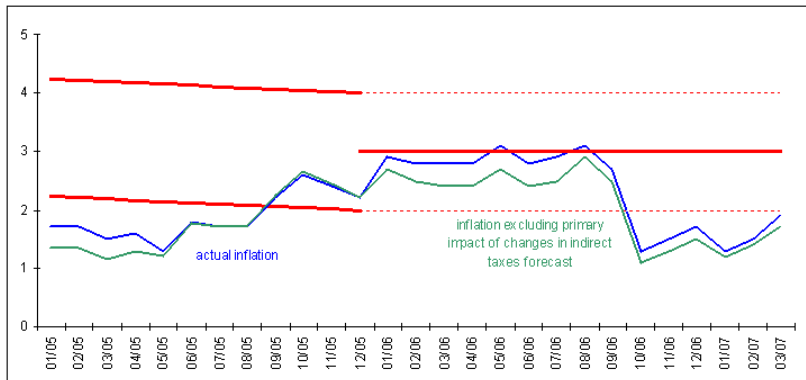
Taxes I

Why to Deal with Taxes?

- Tax reforms affect inflation → should be incorporated in inflation projection
 - CNB applies escape clauses on first-round impacts of change in taxation → no reaction of policy function
- ⇒ Inflation excluding first-round impacts of indirect tax changes, called also **Monetary Policy Inflation**, or Inflation Relevant for MP)
- Tax changes distort inflation expectations → expectations formation should be adjusted

Taxes II

Inflation and MP Inflation



Indirect Taxes III

Requirements

- Information about planned changes in indirect taxes
- Precise estimation of direct first-round effects
- Estimation of primary effects: use CPI basket to assess
- Estimation of impact on inflation expectations formation (second-round effects): wealth effect
- Good enough estimation of direct second-round effects e.g. margin absorption, price stickiness

Taxes IV

Issue I: Foreign Taxes

- Should be treated similarly
- Typically, not enough information nor good estimates of impact on foreign inflation

Issue II: Real Exchange Rate (RER)

- Within the simple model framework, RER is defined involving CPI rather than PPI inflation rates
- From theory, RER should be adjusted to changes in indirect taxes (domestic and foreign)
- However it is difficult to apply, having usually small effects on projection

Tax changes

Czech Experience:

- From January 2004 - domestic VAT changes incorporated
- From April 2006 - foreign VAT changes incorporated
- From April 2007 - RER adjustment applied

Quantification of effects of tax changes: Time profile and size of impact (volatility of forecast)

More tax issues

- 1 Foreign tax change
 - ▶ Should be treated similarly
 - ▶ Typically, not enough information nor good estimates of impact on foreign inflation
- 2 Real Exchange Rate (RER)
 - ▶ Within the simple model framework, RER is defined involving CPI rather than PPI inflation rates
 - ▶ From theory, RER should be adjusted to changes in taxes (domestic and foreign)
 - ▶ However it is difficult to apply, having usually small effects on projection

Oil price I

Czech Experience:

- Oil price shock started in autumn 2005, peak in summer 2008
- Small weight of fuel prices (around 3% in CPI)
- Expected increase in fuel prices and regulated prices
- Very large increase in oil prices as well as their maintaining at high levels is no longer consistent with behavioral mechanism described in QPM (affects inflation expectations)
- Systematic upward bias of inflation over several periods, especially in adjusted inflation excluding fuels
- At the same time, nominal exchange rate appreciated rapidly in comparison with the forecast
- Outlook of foreign variables affected - use of a global economy model

Oil price II

- Oil Prices - Brent



Implementation I

- Effects to administered prices: energy for households
- Energy price inflation: non-administered portion of consumption basket
- Impact on foreign inflation

Revision of CPI Weights I

Czech Experience:

- New weights introduced from January 2007
- Previous revision in January 2001
- Model framework assumes constant weights in CPI
- QPM forecasts since July 2002: New experience

Revision of CPI Weights II

- Computing q-o-q and y-o-y inflation correctly: Auxiliary indices CPI1 and CPI4 were introduced
- Smooth transition
- Systematic shift in inflation: Structural change in real equilibrium exchange rate

Outline

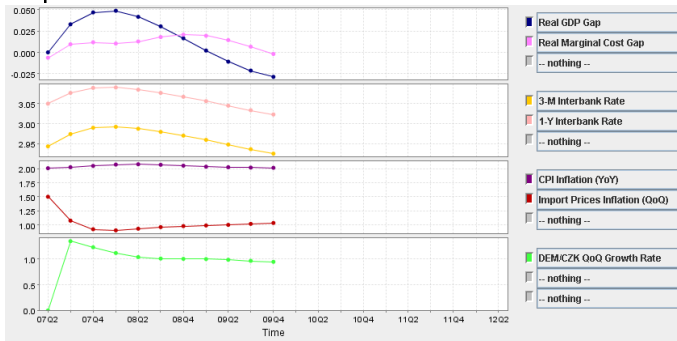
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Analysis I

- Model is not closed in the sense of S. Schmitt-Grohe and M. Uribe (2003)
- What is the difference in scenario of appreciation and depreciation?
- Linear model properties

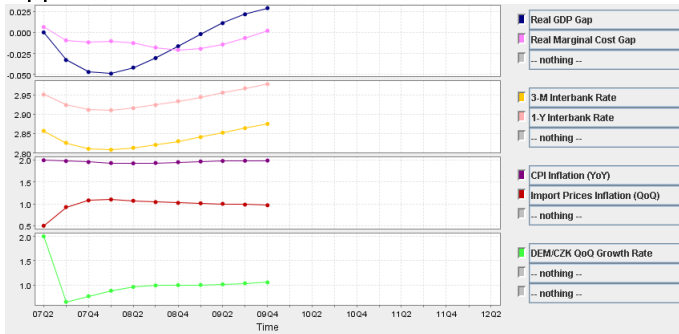
Analysis II

● Depreciation



Analysis III

● Appreciation



● Reporting in the SR:

Analysis IV

- Appreciation by 3%

	07q1	07q2	07q3	07q4	08q1	08q2	08q3	08q4
Celková meziroční inflace (p.b.)								
apreciáce kurzu CZK/EUR o 3 %	-0.1	-0.3	-0.7	-1.0	-1.1	-1.0	-0.8	-0.6
3M PRIBOR (p.b.)								
apreciáce kurzu CZK/EUR o 3 %	0.0	-0.6	-1.0	-1.2	-1.2	-1.2	-1.1	-0.9
Mezera výstupu								
apreciáce kurzu CZK/EUR o 3 %	0.0	-0.5	-0.7	-0.8	-0.7	-0.5	-0.3	-0.1
Kurz (CZK/EUR)								
apreciáce kurzu CZK/EUR o 3 %	-0.8	-0.6	-0.4	-0.3	-0.2	-0.2	-0.2	-0.2

Shock persistence I

- Volatile development of exchange rate: January 2007
- Re-simulation of sensitivity scenario
- Standard simulation: No persistence in shock
- Advanced simulation: Various degrees of autocorrelation
- Results:

	07q1	07q2	07q3	07q4	08q1	08q2	08q3	08q4
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Stress testing

- Cooperation with supervision units
- Scenario for financial stability department
- Scenarios for the bank risks evaluations models
- Series used for probability of defaults calculations
- Goals:
 - ▶ Usually unfavorable developments to be modeled
 - ▶ Probability of defaults calculations: economy wide

