Tools for Monetary Policy with DSGE Models

g3 – case studies

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INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Outline

- Expert judgments

- Case studies

- Sensitivity analysis

Expert judgments

- Measurement errors
- Seasonal adjustment
- Expert judgments on filter
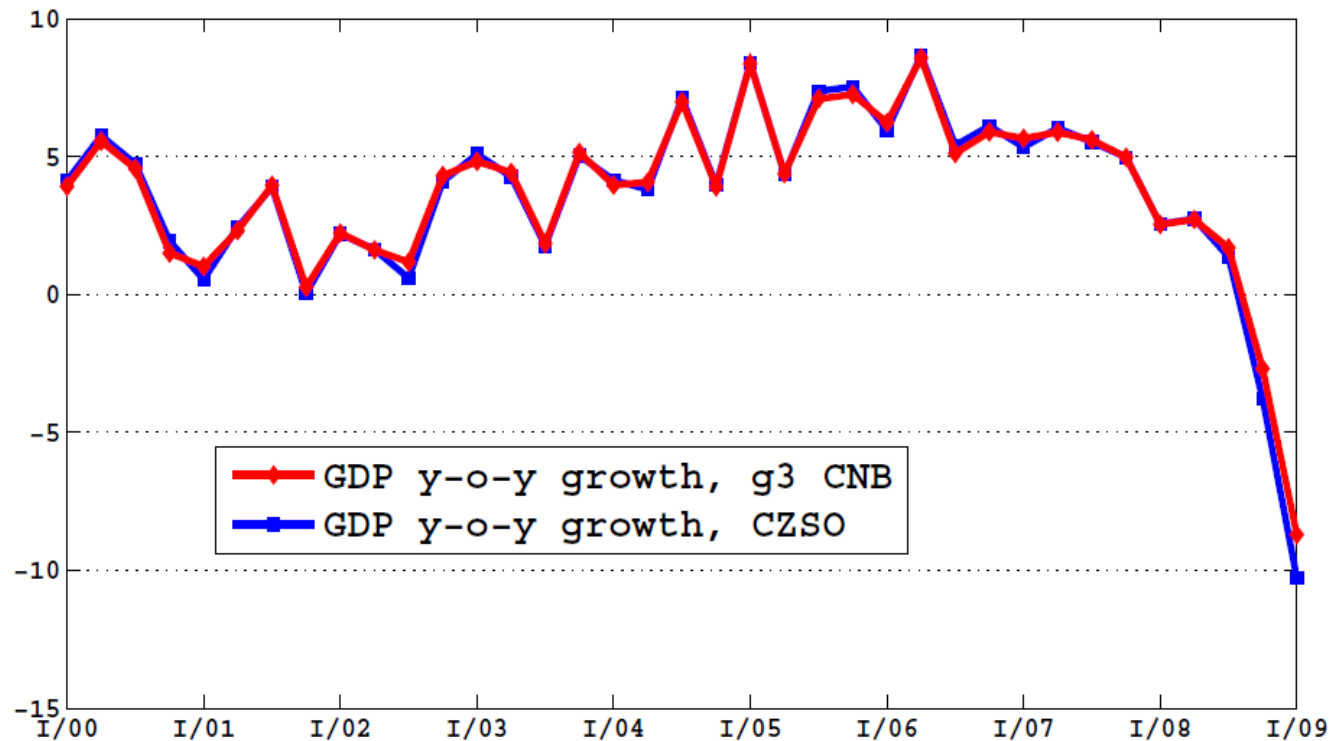- Expert judgment on forecast

Measurement errors

- ME reflect our priors concerning data reliability.
- ME brings some problems in distinguishing between structural shock and measurement error.
- Even in case of ME, a significant portion of information can be used by the model.
- Another problem is that filtered vars need not match exactly raw data, so then ...
- ...we investigate factors for that discrepancy...what are models or data deficiencies.
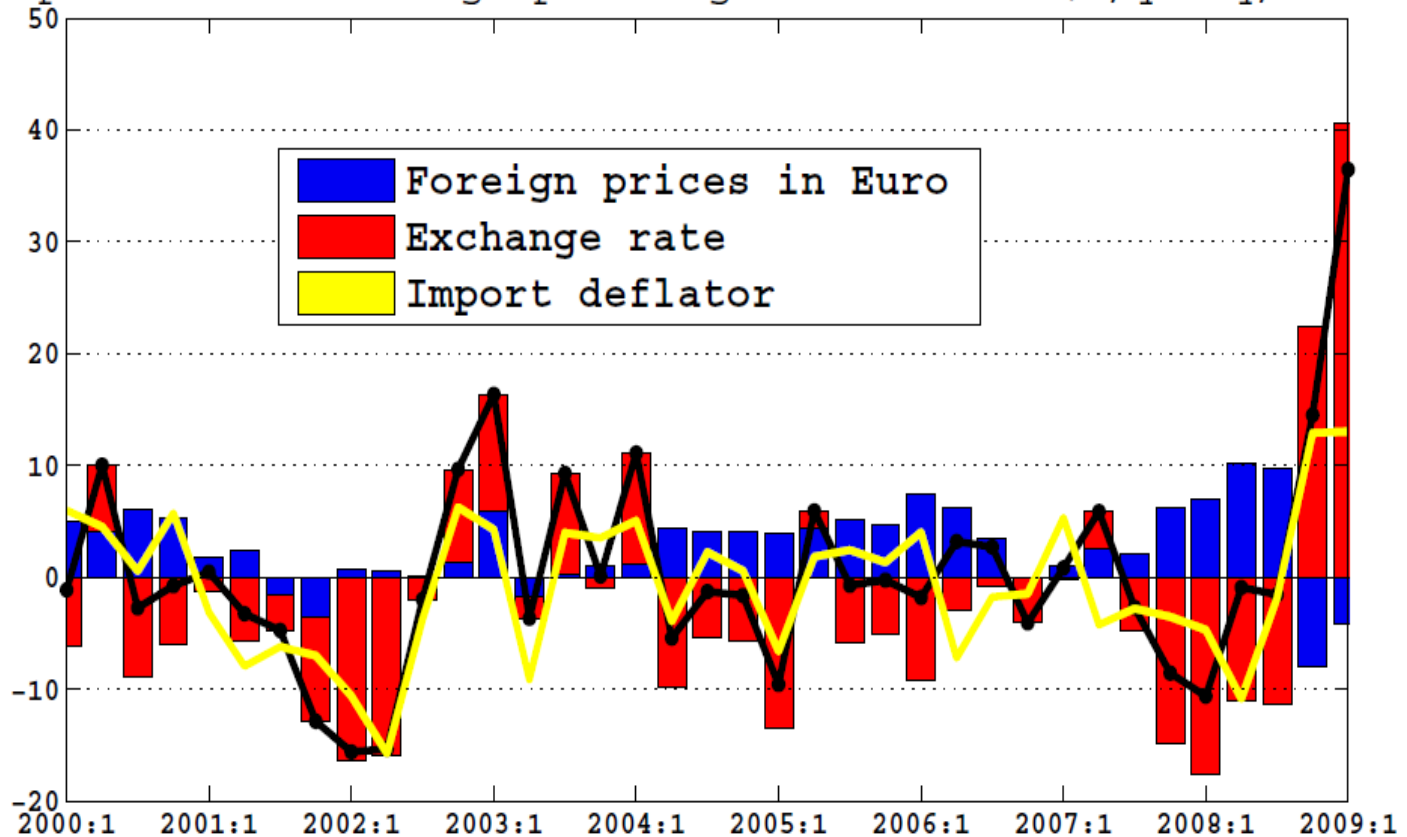
Measurement errors
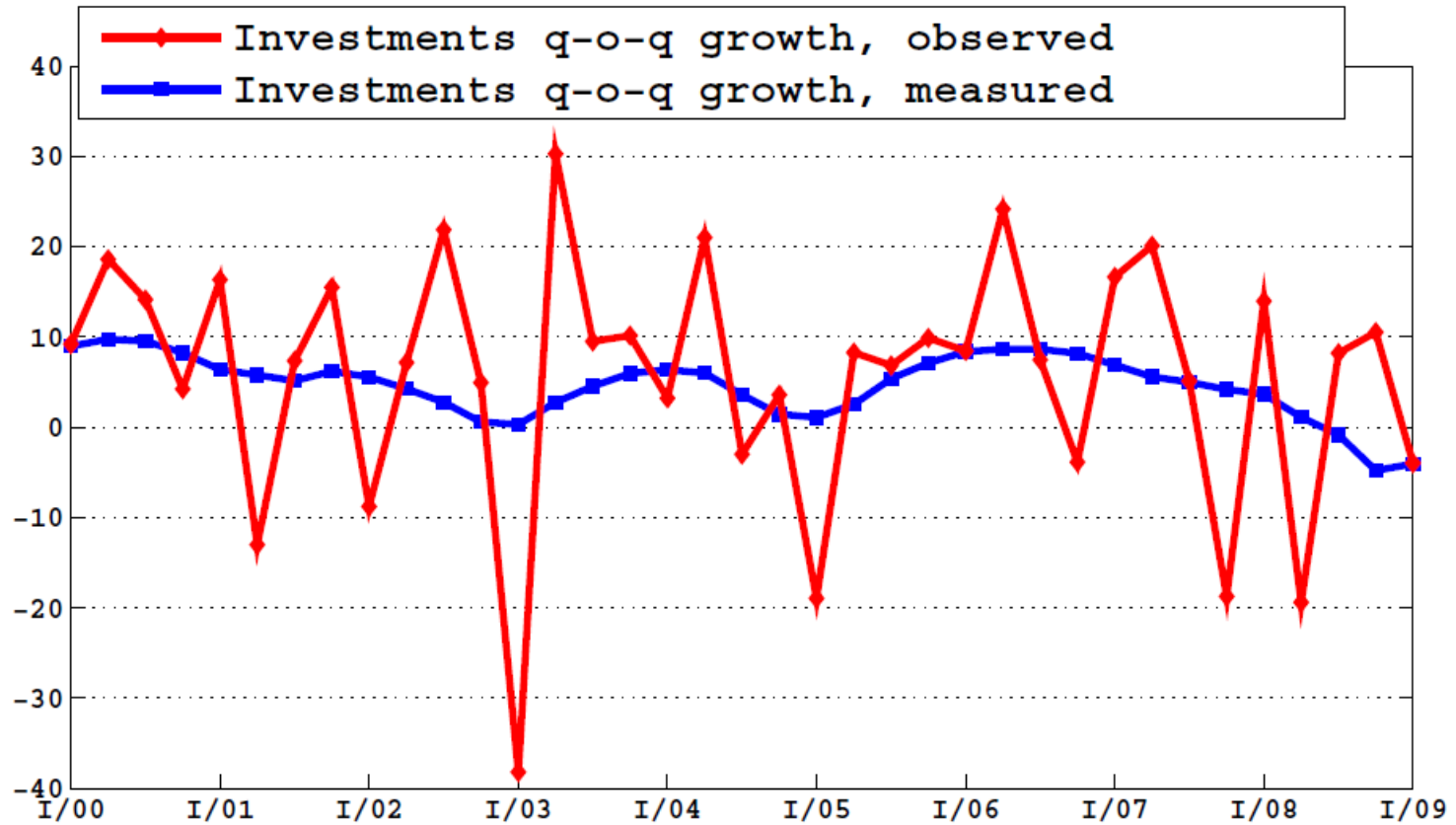
Seasonal adjustment

Problems with CSZO data ($GDP^{sa} \neq C^{sa} + I^{sa} + G^{sa} + X^{sa} - N^{sa}$)

Expert judgment on filter

Decomposition of foreign prices growth in CZK (%,q-o-q, annual.)

Legend:
- Foreign prices in Euro
- Exchange rate
- Import deflator

Expert judgment on forecast

- All forecasts are judgemental forecast (calibration of the model, filtering setup, trajectories of structural shocks), but

- we may impose judgements on the development of a particular variable by endogenizing structural shocks innovations, but....

- the question is... what shock or set of shocks to choose and whether these shocks should be treated as anticipated or unanticipated...in which periods

- A special case represents explaining of a current development of a given variable by future innovations...these must be treated as anticipated by all agents in the economy...

- A solution is not unique, we can choose the set of shocks that is the most likely...
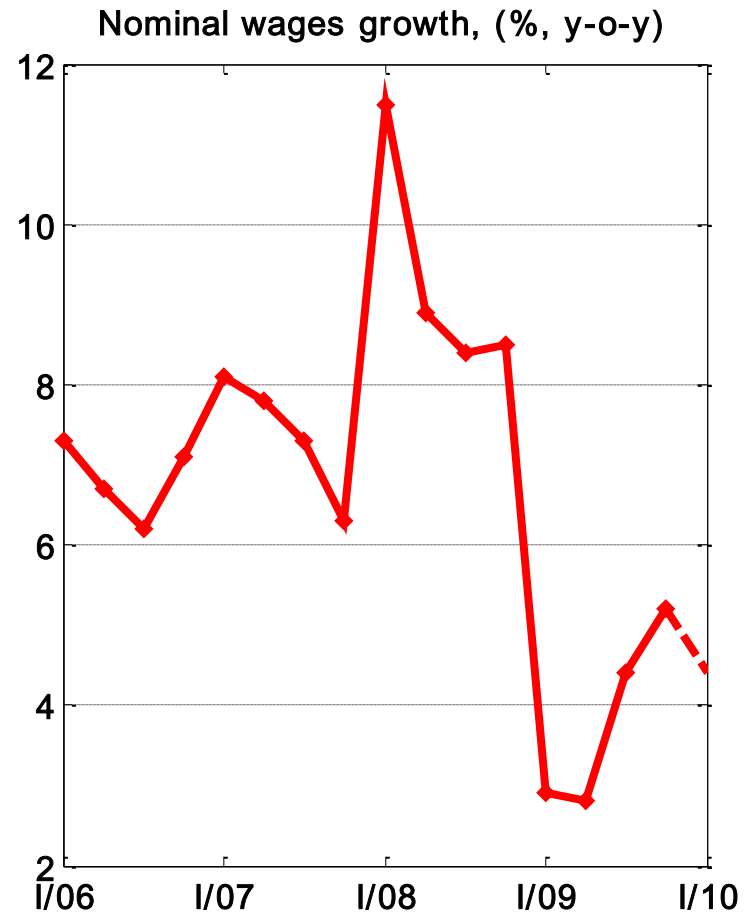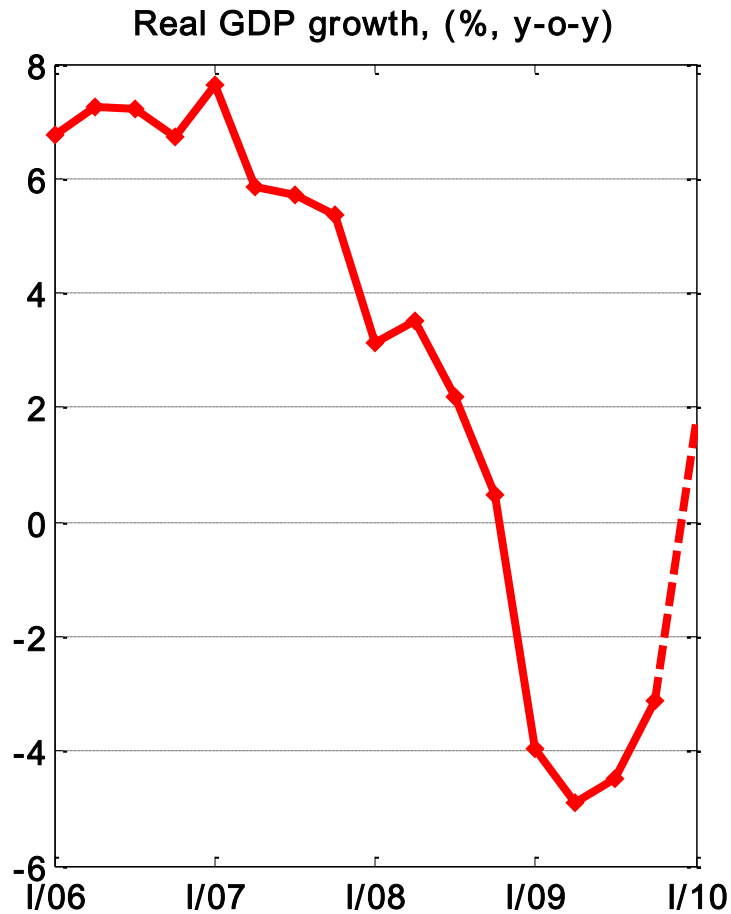
Case studies outline

- Nominal wages

- Increase of credit premium

- Foreign trade fall and openness

- Car scrapping subsidies

- After-crisis steady states growth rates

Case studies of nominal wages

- Real variables slump, nominal wages sticky
- It implies inflation pressures
- Model in reduced form
- Find reason
- Expert judgment

Case studies of nominal wages

Real GDP growth, (%, y-o-y)

Nominal wages growth, (%, y-o-y)

Case studies of nominal wages

	Median of gross month salary (Kč/month)		
	1. half of 2008	1. half of 2009	
Firms	21 330	21 309	
Employees	22 064	21 837	
Fired	18 478		
New		18 115	

Source: prezentation Spáčil, Kasal: Projevy krize v datech ISPV, www.trexima.cz

- Firms could keep the same wages only if fired were employees with low salary and...

Case studies of nominal wages

	Number of employees (thousands)		
	1. half of 2008	1. half of 2009	
Firms	1 707	1 619	
Employees	1 383	1 409	
Fired	323		
New		210	

- **1/3 less new employees than fired**

Source: prezentation Spáčil, Kasal: Projevy krize v datech ISPV, www.trexima.cz

Case studies of nominal wages

	Hours worked monthly		
	1. half of 2008	1. half of 2009	
Firms	153.6	149.9	
Employees	154.8	149.3	
Fired	148.6		
New		154.1	

- **Fired have the lowest hours worked**

Source: prezentation Spáčil, Kasal: Projevy krize v datech ISPV, www.trexima.cz

Case studies of nominal wages

|	Hours of sickness monthly		
	1. half of 2008	1. half of 2009	
Firms	6.1	5.0	
Employees	5.1	5.0	
Fired	10.3		
New		4.8	

- **Fired have the highest hours of sickness.**

Source: prezentation Spáčil, Kasal: Projevy krize v datech ISPV, www.trexima.cz

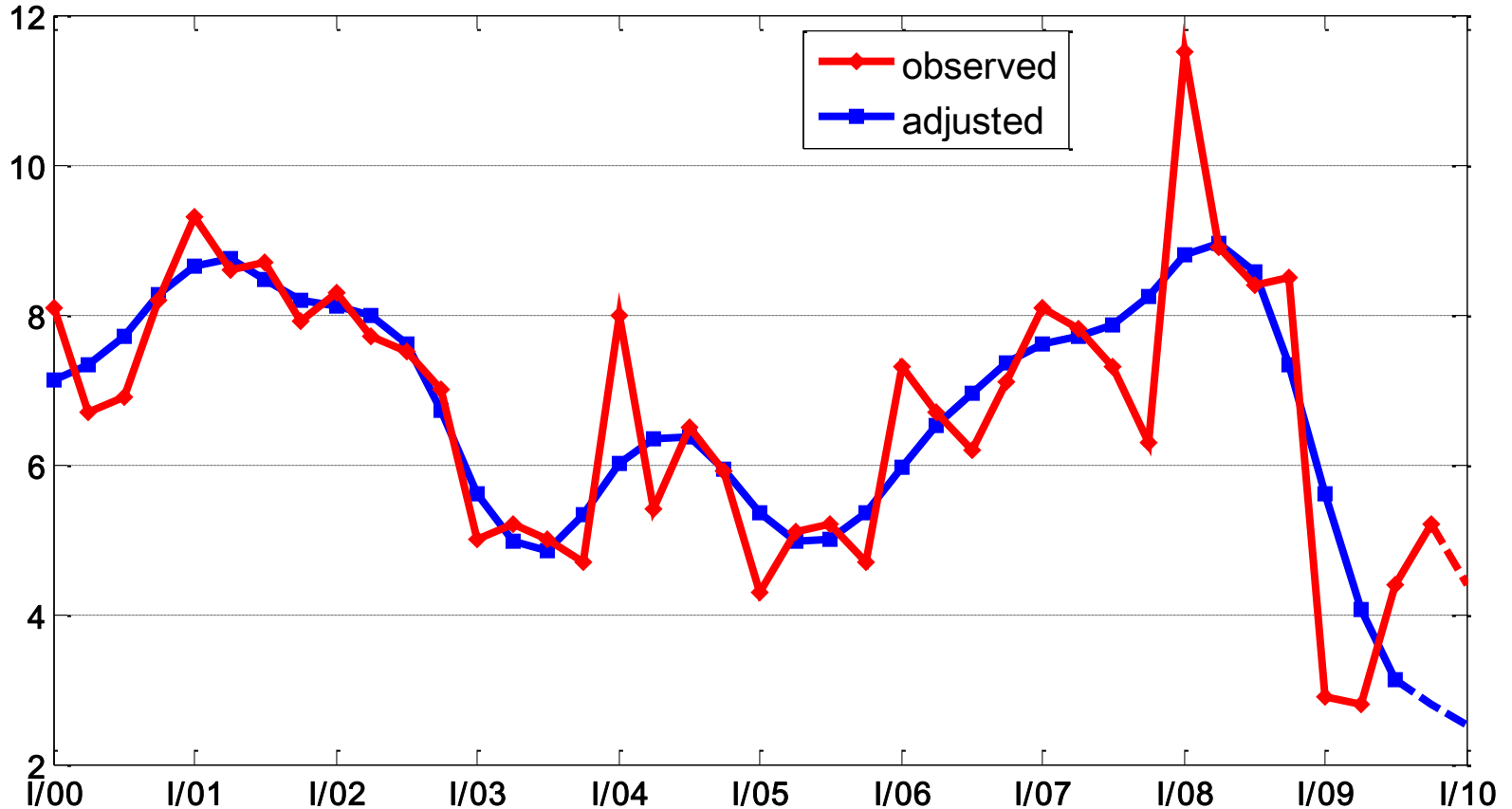# Case studies of nominal wages

- Who lost job?
  - Low wages employees
  - Double sickness absence
  - Low hours worked
  - Low qualified
  - Basic education
- It increases average wages, however we need fundamental wages.
- It requires expert judgment…how much?
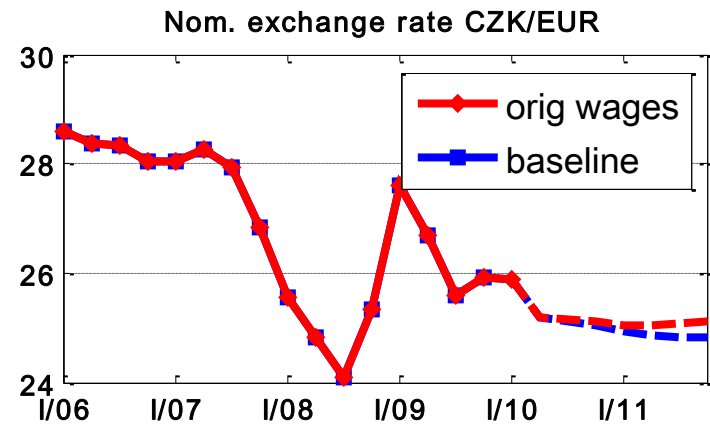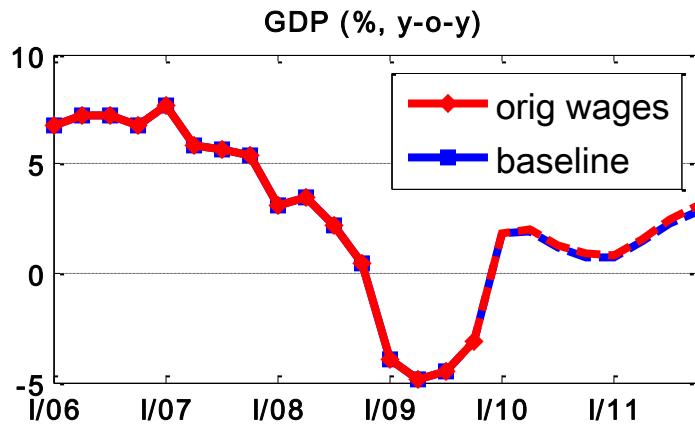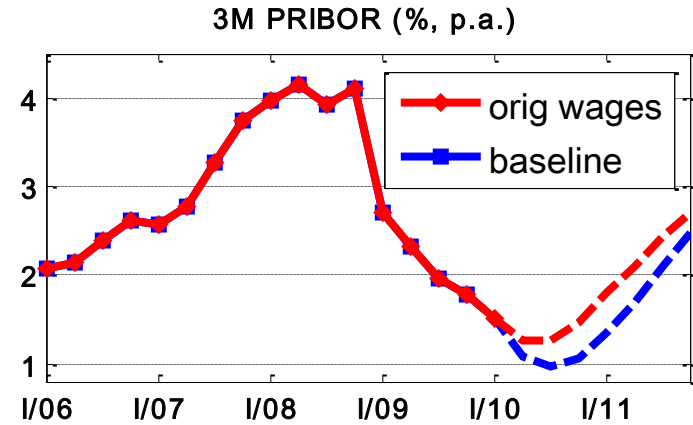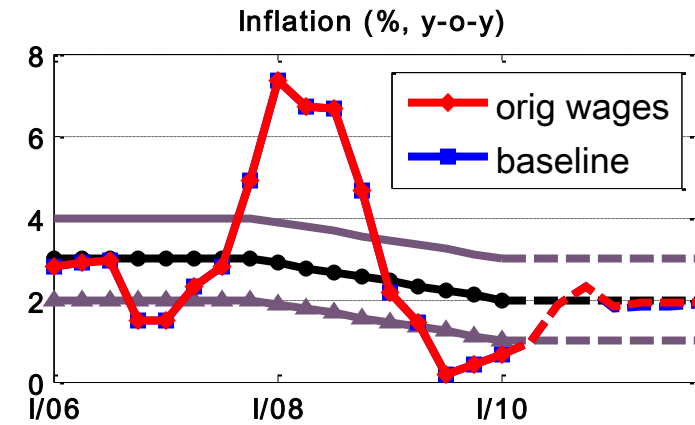
Case studies of nominal wages

Q-o-Q wage growth (seasonally adjusted)
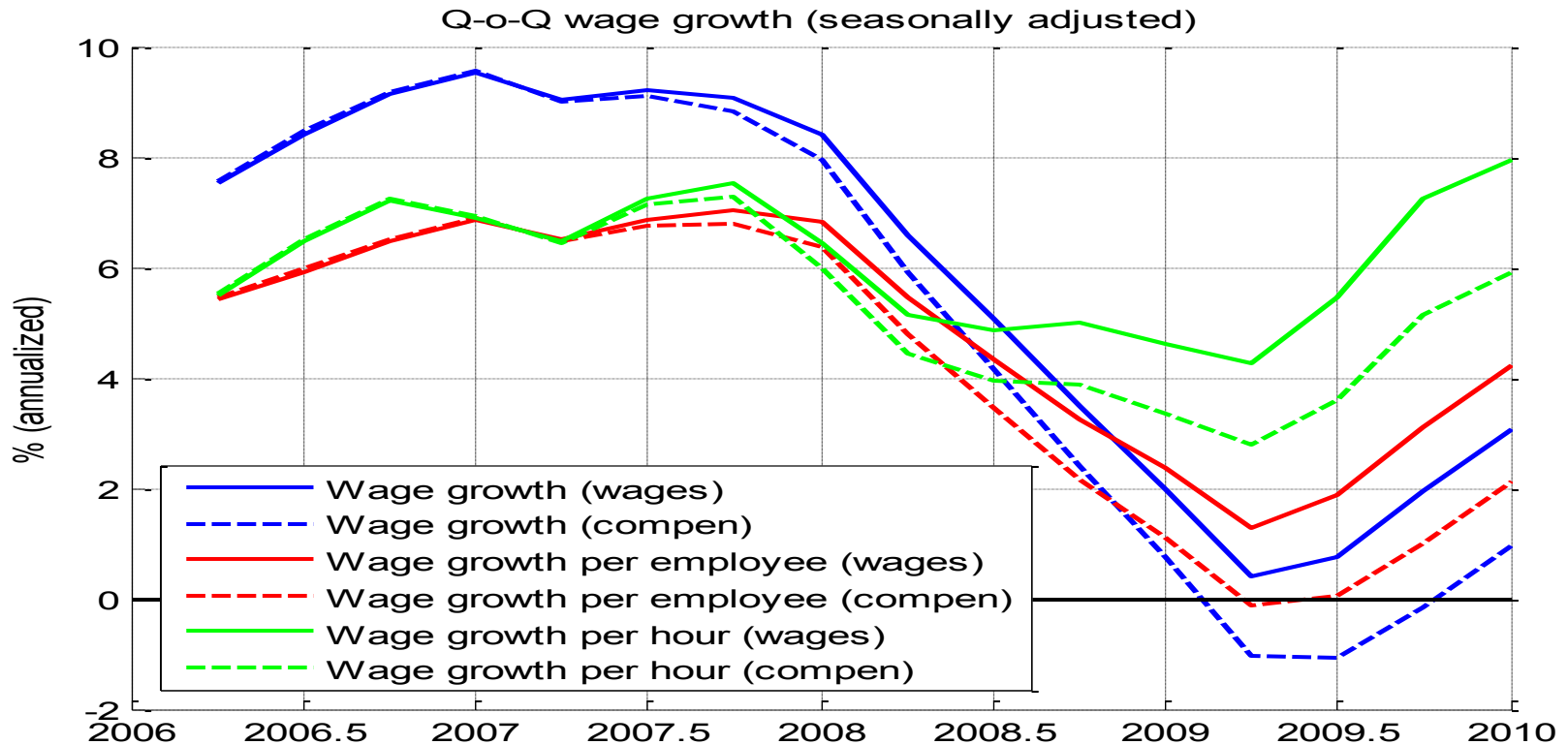
Case studies of nominal wages

Nominal wages growth (%, y-o-y)

Case studies of nominal wages

Case studies of credit premium

- Observation of an increase of credit premium (interbank 3M PRIBOR rates did not follow changes of the 2W CNB's policy rate)

- Associated with uncertainty, releasing worse and worse economic data (at the beginning of 2009) etc.

- g3 shows us a trajectory of the interbank rate but does not incorporate policy rate (2W REPO rate)

- the setting of 2W REPO rate is based on the model consistent trajectory of 3M PRIBOR interbank rate and a credit premium
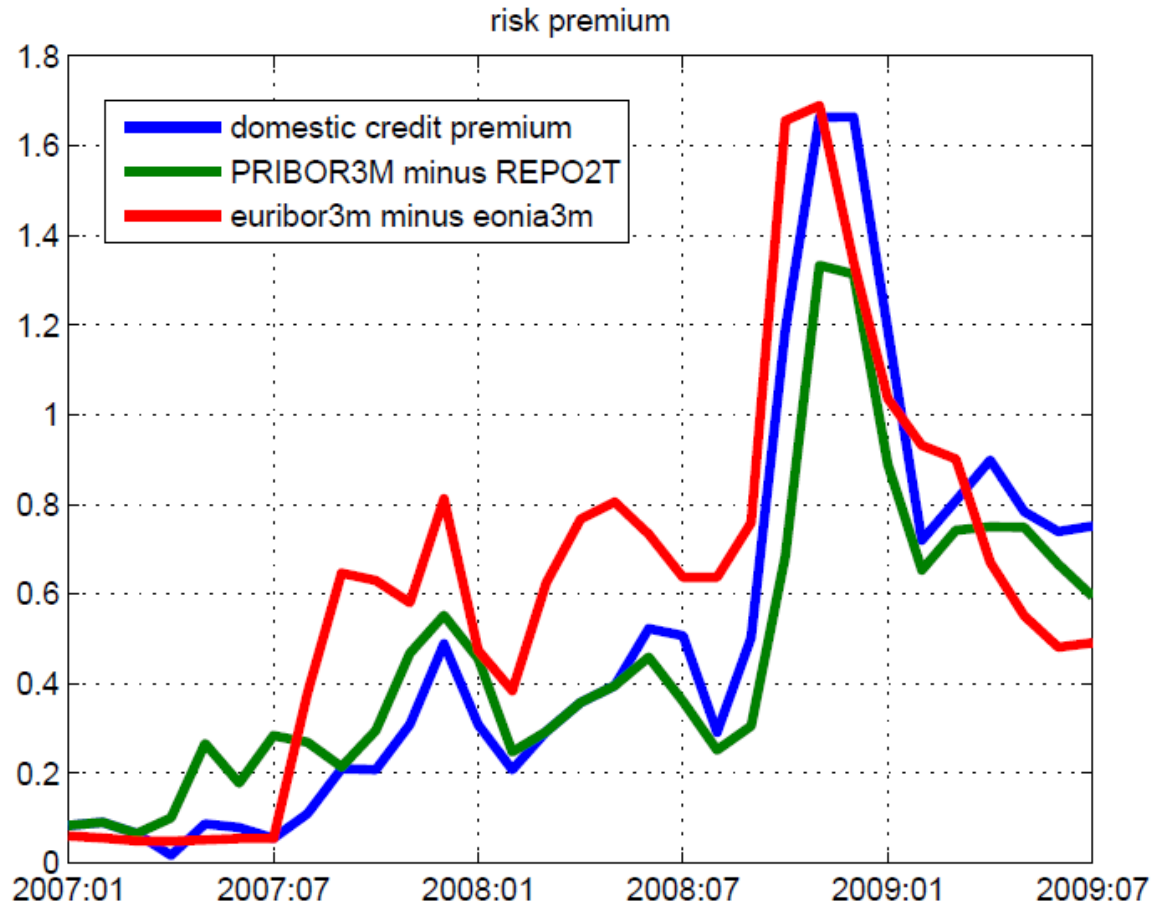
Case studies of credit premium

- Solution outside the model ! necessity of assumption about a premium to recognize required trajectory of the policy rate

- Assumption that the premium in the Czech economy corresponds to a European Area premium

- Approximation using monthly data:

Cred prem$_t$ = 3mPribor$_t$−(2wRepo$_t$+2wRepo$_{t+1}$+2wRepo$_{t+2}$)/3

Case studies of credit premium

Case studies of trade fall

- Observation of deep and equivalent slumps of export and import volumes

- The Czech economy case: large import intensity of exports (not only value added is traded ...)

- Because slumps of volumes implies a fall in re-exports, the decrease of GDP is smaller

- Explanation: cut-off of some logistics centres with relatively low added value

Case studies of trade fall

- g3 is well-suited for this situation and provides a tool for a solution

- g3 incorporates the openness technology to capture the different (and significant in reality) growth rates of trade volumes with respect to output growth (re-exports)

Case studies of trade fall

- Initial conditions (model filtration): we observed a decrease of the openness technology

- Part of volume slumps can be attributed to a decrease of openness technology

- On the other hand, the near-term-forecast (NTF) reassesses the nowcast of trade volumes in order to have deeper slump of exports than imports (see the figure in the introduction) -> a decrease of output

Case studies of car scrapping subsidies

- Car scrapping subsidies in some European countries raise demand for Czech cars
- Car industry is very significant in the Czech Republic (Skoda, TCPA - Toyota Peugeot Citroen Automobile, Hyundai, many suppliers)
- Car scrapping significant mostly for lower class cars (the majority of Czech production) ! we observe an increase of car production, and hence exports
- But subsidies in 2009, strong uncertainty for 2010

Case studies of car scrapping subsidies

- Foreign demand modelled exogenously

- Expert judgement for foreign demand: significant increase in 2009, but a decrease in 2010 with the termination of subsidies

- People will exploit subsidies before the termination with subsequent fall in demand for cars

- Reference paper: Adda, J. and Cooper R. (2000): Balladurette and Juppette: A Discrete Analysis of Scrapping Subsidies. *The Journal of Political Economy* 108:4.

Case studies of after crisis SS

- Relatively high steady-state growth rates before the crisis
- Uncertainty with the after-crisis growth (in the short- as well in the long-run)

Case studies of after crisis SS

- We keep the same steady-state to have historical filtrations unchanged

- But for the forecast the steady-state growth rates of technologies are decreased...

- ...(assumption about the gradual recovery)

- We simulate various scenarios with (lower growth rates in middle-run and long-run, lower wages, negatively shocks to technologies etc.)

Scenario analysis

- Scenario vs. Fan charts (graphs with confidence intervals)
- Scenario analysis is constructed to capture uncertainty of the produced forecast.
- Scenario analysis also serves the purpose of gaining better intuition.
- Scenarios may differ not only in alternative paths of exogenous variables but also whether and what variables are anticipated or unanticipated.
- Our decomposition tools are:
  - decomposition of alternative scenarios into factors,
  - analysis of sources of a difference between two successive forecast,
  - dynamics decomposition of a forecast w.r.t the steady state.

Scenario analysis

- Nominal wages and productivity
- Foreign demand
- Energy prices
- Exchange rate
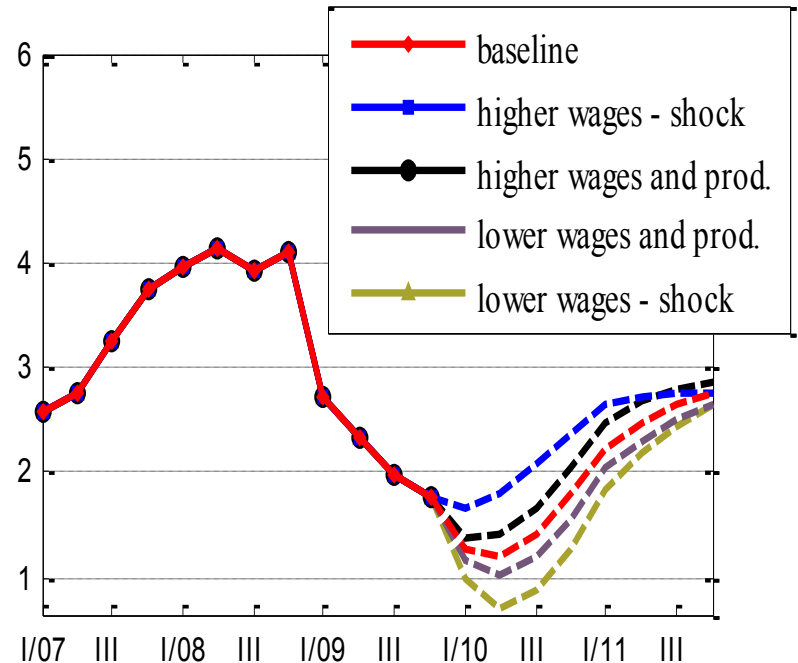
Sensitivity to nominal wages and productivity

- Four experiments
- Observation of higher wages is shock
- Observation of higher wages due to higher productivity
- Expert judgment of lower wages on forecast is shock
- Expert judgment of lower wages on forecast due to lower productivity

Sensitivity to nominal wages and productivity
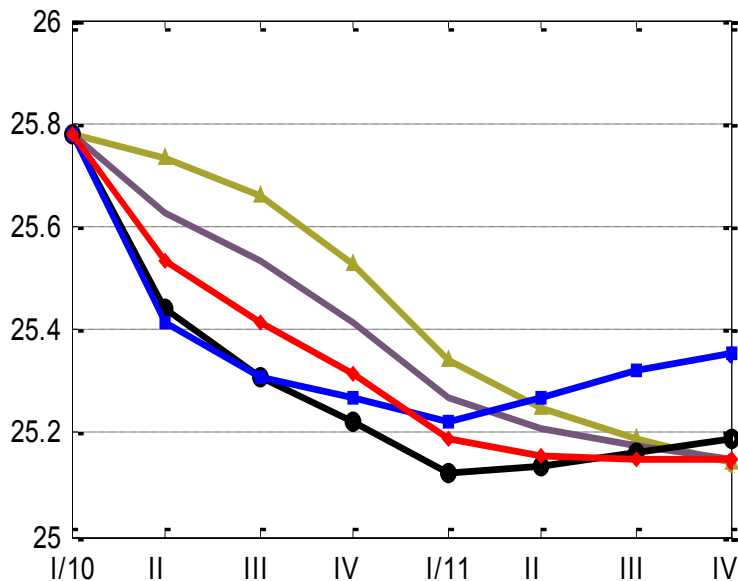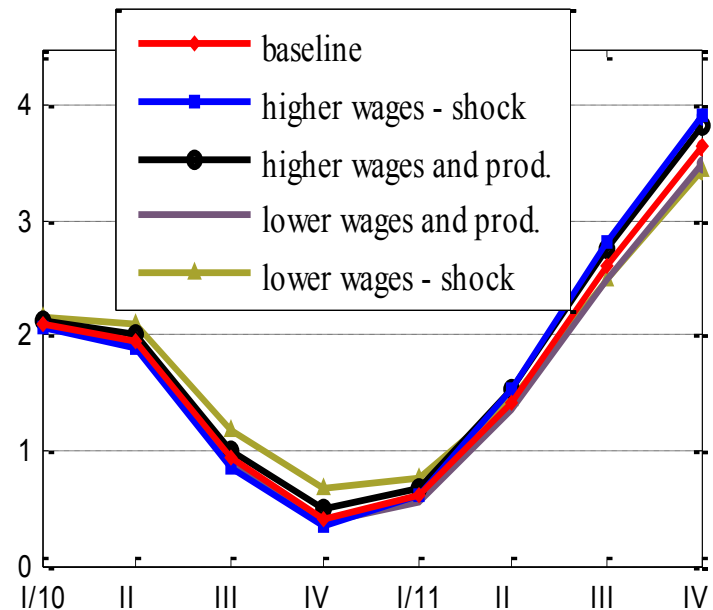
Inflation CPI (y-o-y, %)
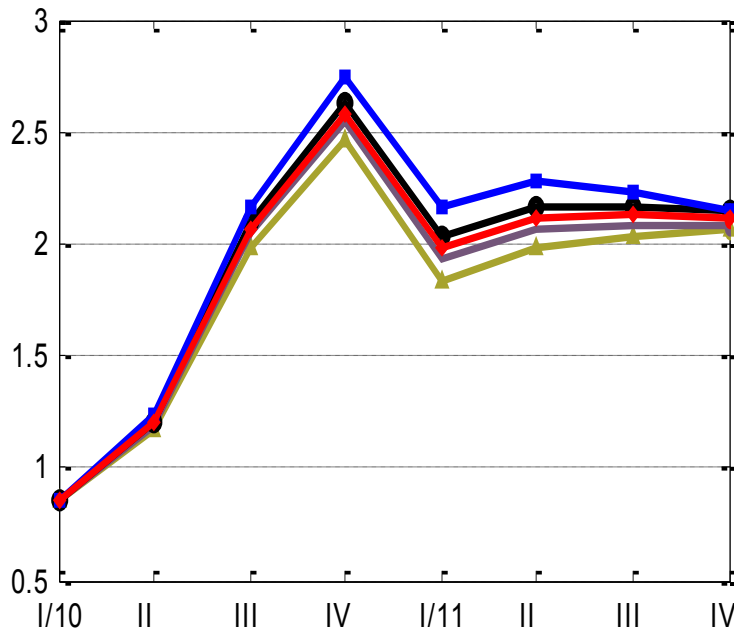
3M PRIBOR (%)

Sensitivity to nominal wages and productivity

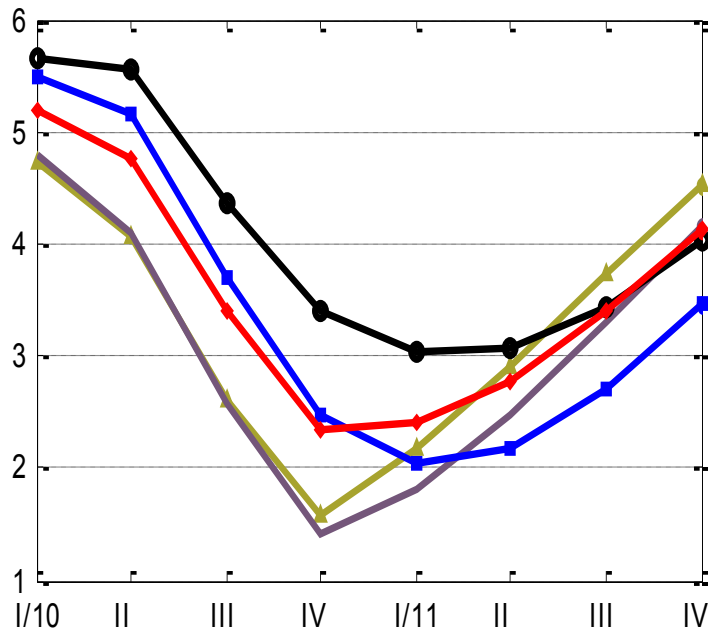**Nominal exchange rate CZK/EUR**
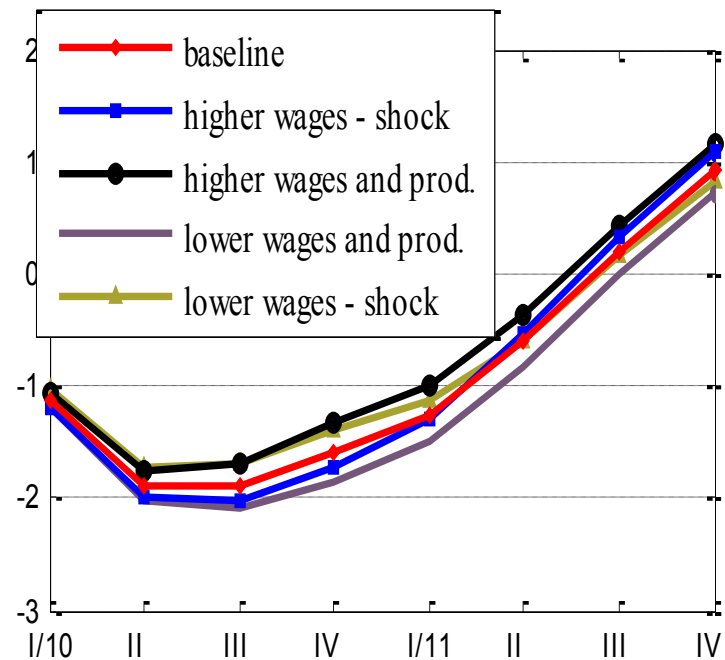
Real GDP growth (y-o-y, %)

Sensitivity to nominal wages and productivity

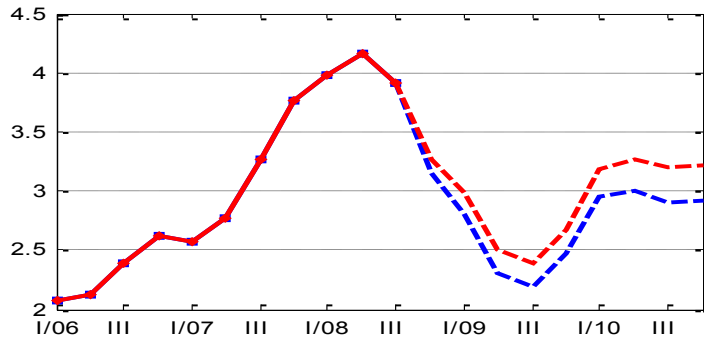**Nominal wages growth (y-o-y, %)**
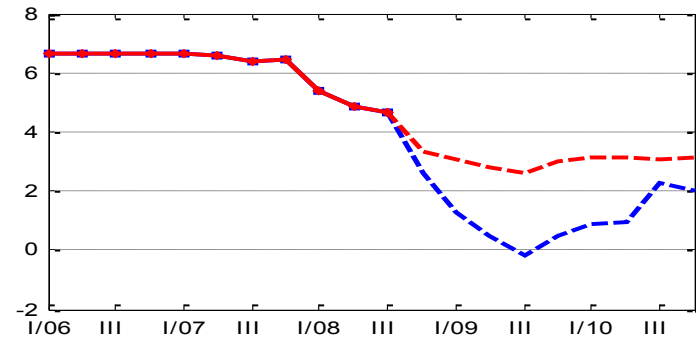
Tempo růstu reálné spotřeby (y-o-y, %)
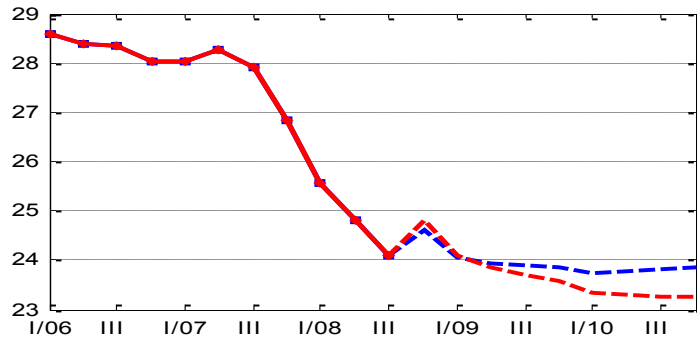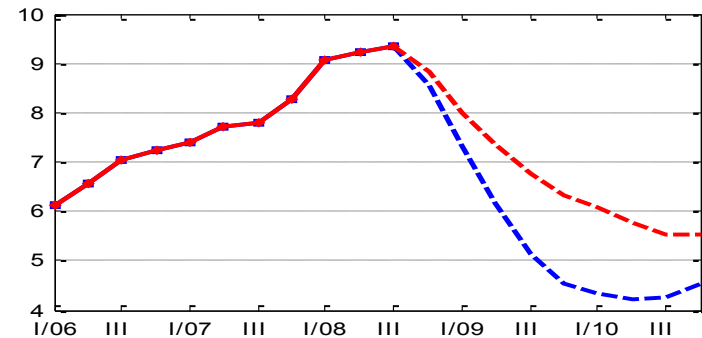
Sensitivity to foreign demand

PRIBOR 3M (%, p.a.)

Real GDP growth (y-o-y, %)

Nominal exchange rate (CZK/EUR)

Nominal wages growth (y-o-y, %)

Sensitivity to energy prices

Sensitivity scenario of oil prices in deviations from baseline

	III/09	IV/09	I/10	II/10	III/10	IV/10	I/11
Oil prices growth (y-o-y, %)	6.6	18.8	22.8	16.1	1.7	-3.5	-3.0
Gas prices growth (y-o-y, %)	2.2	4.2	7.4	18.3	18.7	10.2	3.0
Foreign inflation PPI (y-o-y, %)	0.6	0.6	0.6	0.5	0.2	0.2	-0.1
Regulated prices inflation (y-o-y, %)	0.1	0.3	0.7	1.0	1.1	0.9	0.4
Inflation CPI (y-o-y, %)	0.0	0.0	0.1	0.2	0.3	0.2	0.1
3M PRIBOR (%)	0.2	0.3	0.4	0.3	0.2	0.1	0.0
Nominal exchange rate (CZK/EUR)	0.0	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1
Real GDP growth (y-o-y, %)	0.2	0.1	0.0	-0.2	-0.3	-0.1	-0.2

Sensitivity to exchange rate

Sensitivity scenario in deviations from baseline

	I/10	II/10	III/10	IV/10	I/11	II/11	III/11
Inflation CPI (y-o-y, %)	0.0	0.0	-0.1	-0.2	-0.2	-0.1	0.0
3M PRIBOR (%)	0.0	-0.3	-0.3	-0.3	-0.1	-0.1	0.1
HDP (y-o-y, %)	-0.2	-0.2	-0.1	0.0	0.2	0.3	0.2
Nominal exchange rate (CZK/EUR)	-0.8	-0.2	-0.1	0.0	-0.1	-0.1	-0.1