Short- to medium term forecasting

David Havrlant

Macroeconomic Forecasting Division

Near Term Forecasting Unit (NTF)

david.havrlant@cnb.cz

INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Objectives of the Presentation

- Role of NTF within the macroeconomic projection exercise
- Importance of coherent framework
- Interpreting economic development in a consistent way
- Brief insight into particular forecasting procedures

Main NTF Tasks

- Experts as regards the Czech economy
  - Empirical data, structures, institutional and regulation framework
- Based on theoretical background consistent with
  - Conduct of MP within IT regime
  - Usage of the core projection model (G3)
- Discussion on initial state of the economy
- Comparative benchmark for core model projection
- Providing disaggregated economic outlook
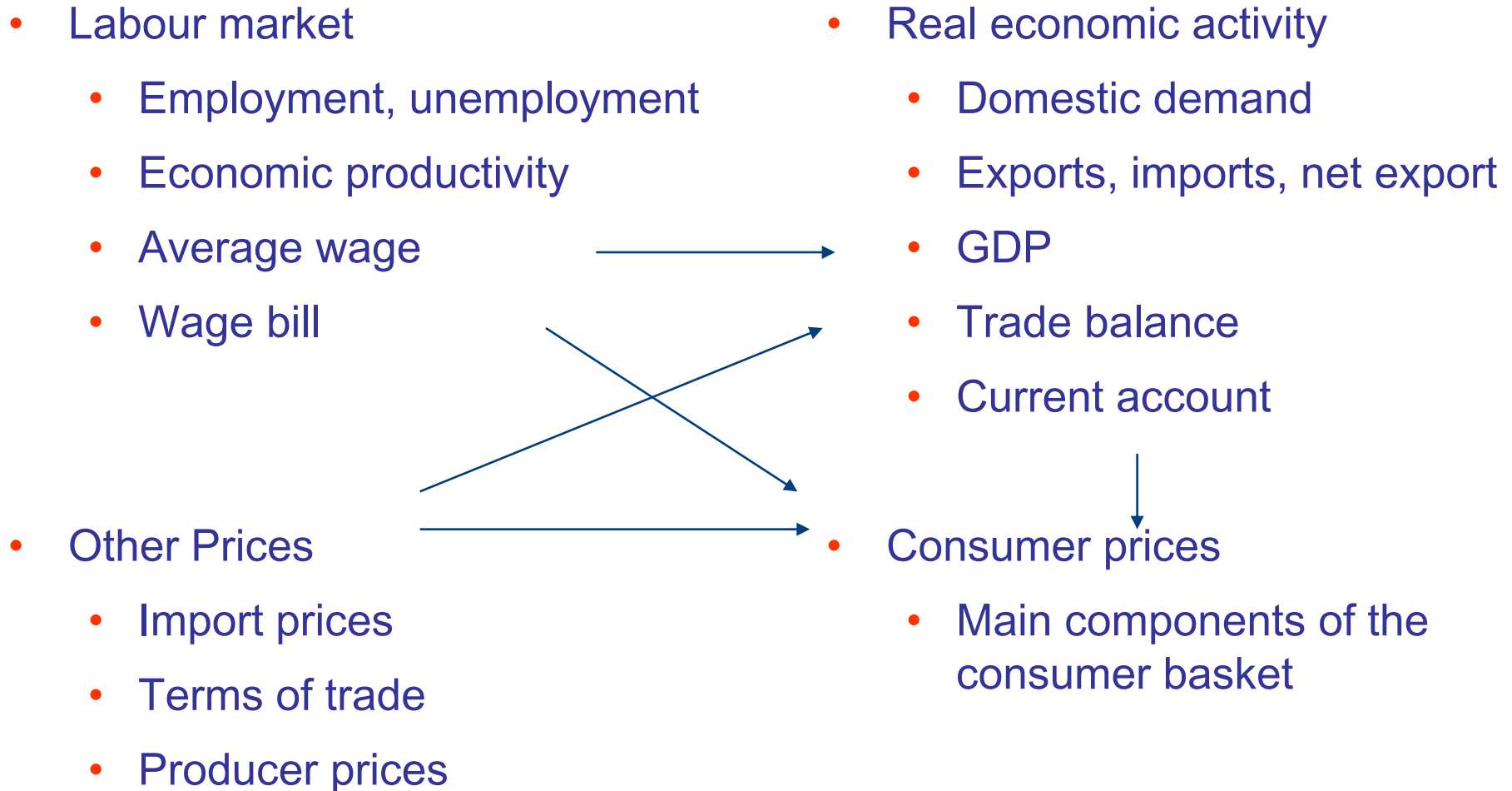- Cyclical decomposition of the variables
- Research activities

- One model is risky - set of methods is better
- Economic theory as basis of analysis
- Emphasis on statistical data
  - Respecting not only economic theory, but also statistical data
- Expert approach : possible corrections
  - Structural changes in economy
  - Theory vs. measurements
  - Revisions of data

Near Term Forecast (NTF)

- Conditional forecast

  - Foreign macroeconomic outlook from The Consensus Forecast

  - CPI, PPI, GDP – effective indices (relevance for Czech economy)

  - World energy and food prices, exchange rate USD/EUR

  - Standardized source – no arbitrarily changes, potential for alternative scenarios

- Near term forecast – 1Q, 2Q ahead with high precision

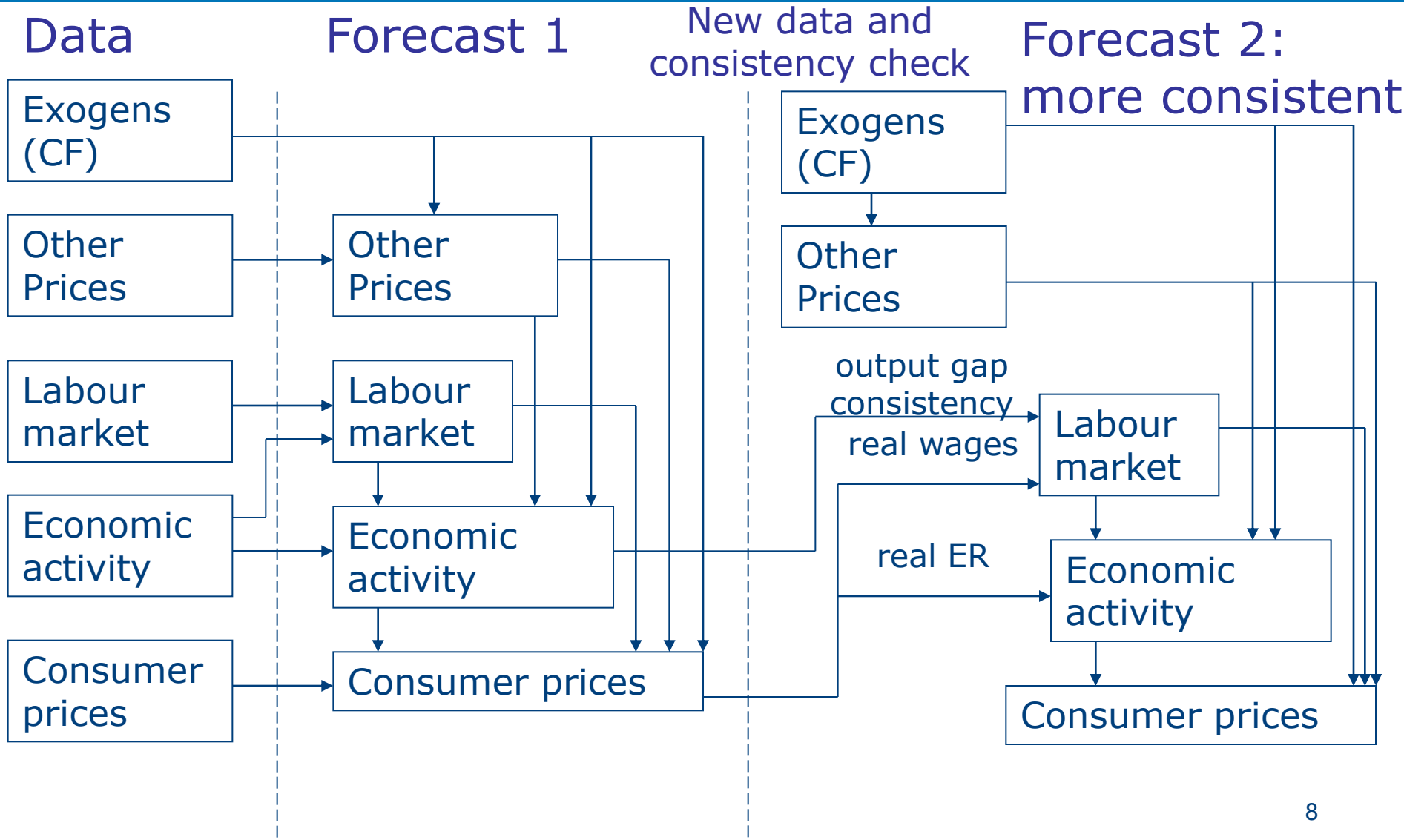- Empirical check in mid-term horizon for the core model

- Labour market
  - Employment, unemployment
  - Economic productivity
  - Average wage
  - Wage bill

- Other Prices
  - Import prices
  - Terms of trade
  - Producer prices

- Real economic activity
  - Domestic demand
  - Exports, imports, net export
  - GDP
  - Trade balance
  - Current account

- Consumer prices
  - Main components of the consumer basket

Consistence through Iteration

- NTF is in principle not an interconnected system

  - Threat of inconsistency of the complex forecast

- Consistence is achieved through:

- Quasi-interconnection

  - One forecast is the input of other forecasts

- Iteration

  - Consistency check

  - New forecasting round if necessary

  - Race against time

Multistage Forecast

Data	Forecast 1	New data and consistency check	Forecast 2: more consistent

Exogens (CF)

Other Prices

Labour market

Economic activity

Consumer prices

Other Prices

Labour market

Economic activity

Consumer prices

Exogens (CF)

Other Prices

output gap consistency
real wages

real ER

Labour market

Economic activity

Consumer prices

Import Prices

- Small opend economy – high importance of foreign prices

Dependent Variable: DLOG(DCADJ)
Sample (adjusted): 1998M03 2011M02
Included observations: 156 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000	0.000	0.167	0.867
DLOG(DCADJ(-1))	0.150	0.037	4.035	0.000
DLOG(EUR)	0.345	0.033	10.460	0.000
DLOG(USD)	0.143	0.015	9.371	0.000
DLOG(PPIEMU)	0.301	0.095	3.155	0.002
DLOG(BRENT)	0.018	0.005	3.986	0.000

R-squared	0.802	Mean dependent var		-0.001
Adjusted R-squared	0.796	S.D. dependent var		0.010
F-statistic	121.637	Durbin-Watson stat		1.938
Prob(F-statistic)	0.000			

DCADJ … import prices

EUR … exchange rate CZK/EUR

USD … exchange rate CZK/USD

PPIEMU … effective PPI in EU

BRENT … oil prices

Import Prices

- **All in CZK**

Dependent Variable: DLOG(DCADJ)
Sample (adjusted): 1998M03 2011M02
Included observations: 156 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000	0.000	-0.660	0.511
DLOG(DCADJ(-1))	0.207	0.044	4.665	0.000
DLOG(EUR*PPIEMU)	0.516	0.031	16.638	0.000
DLOG(USD*BRENT)	0.017	0.005	3.616	0.000

R-squared	0.704	Mean dependent var		-0.001
Adjusted R-squared	0.698	S.D. dependent var		0.010
F-statistic	120.625	Durbin-Watson stat		2.026
Prob(F-statistic)	0.000			

DCADJ … import prices

EUR … exchange rate CZK/EUR

USD … exchange rate CZK/USD

PPIEMU … effective PPI in EU

BRENT … oil prices

DCADJ - contributions of exogens (y-o-y pch.)

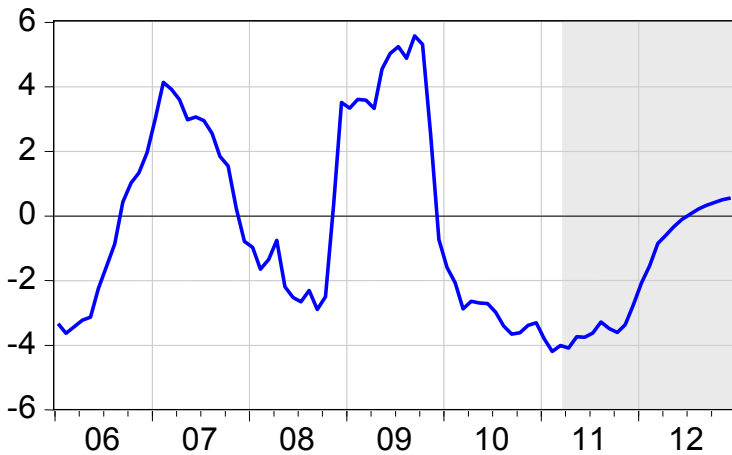Legend:
- Constant
- EUR
- USD
- PPIEMU
- BRENT
- Lag and residual

DCADJ - contributions of exogens (y-o-y pch.)
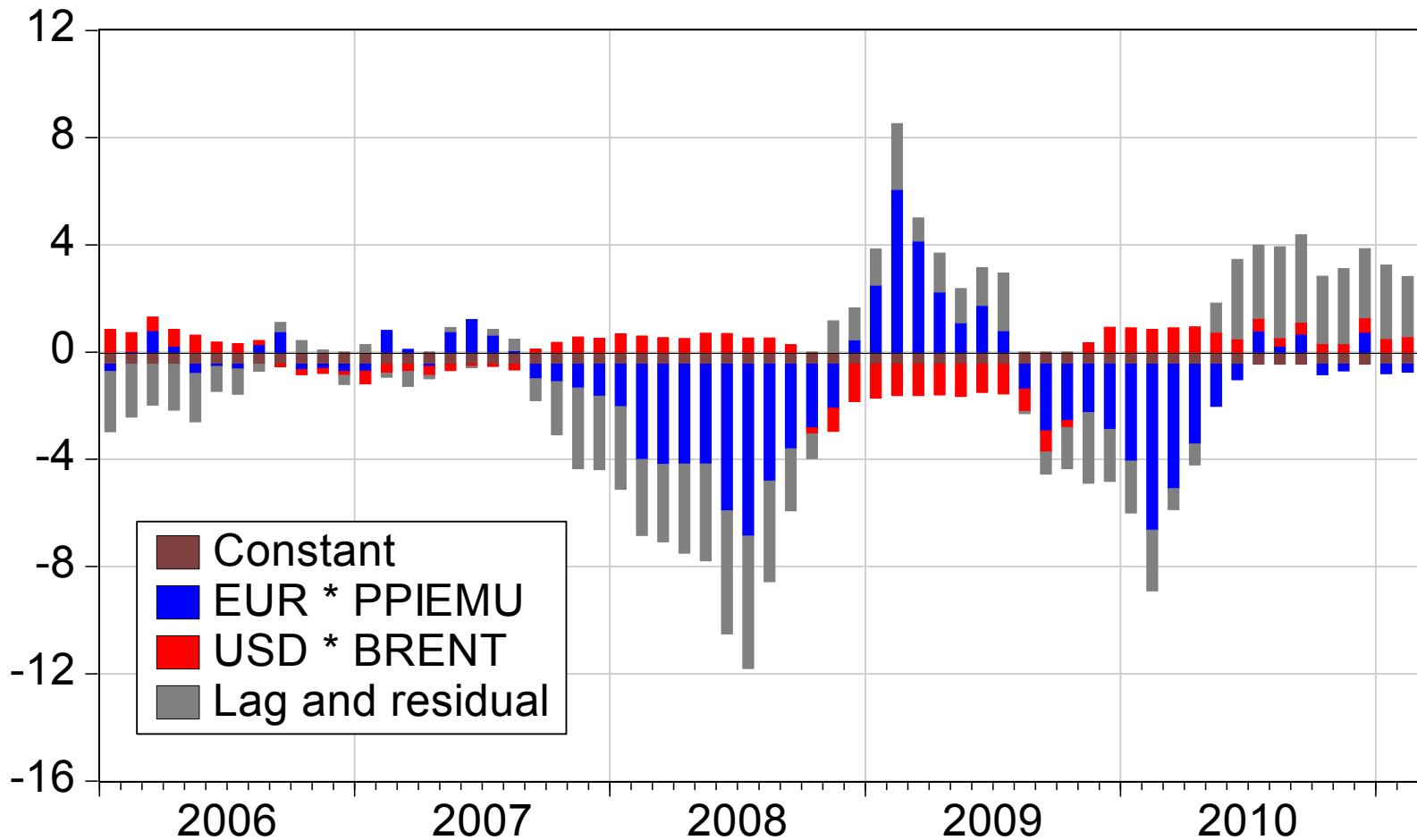
Import Prices

- Other prices and energy prices – impact on terms of trade
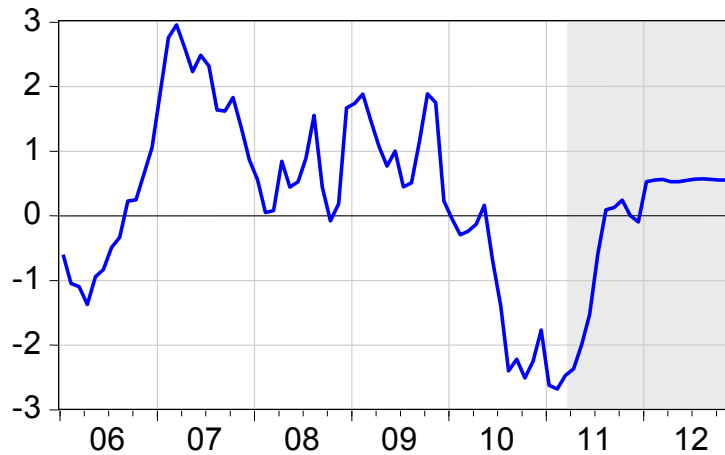
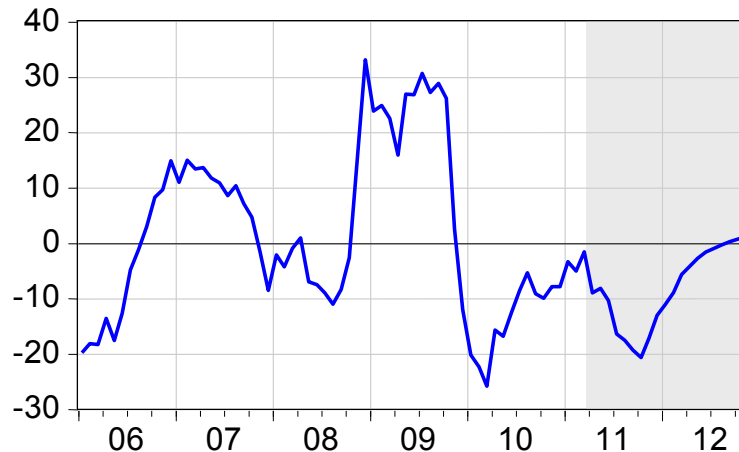- ## High importance of producer prices
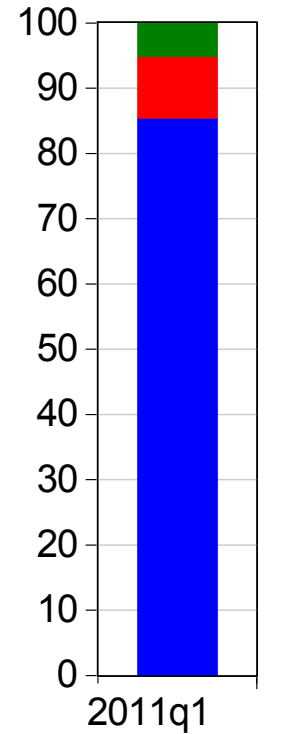
Dependent Variable: DLOG(PPIPRO)
Sample: 1998M01 2010M03
Included observations: 147

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000	0.000	0.360	0.719
DLOG(PPIPRO(-1))	0.361	0.067	5.367	0.000
DLOG(EUR)	0.047	0.022	2.172	0.032
DLOG(USD(-3))	0.014	0.010	1.403	0.163
DLOG(PPIEMU)	0.549	0.079	6.971	0.000
DLOG(BRENT(-1))	0.008	0.003	2.371	0.019

R-squared	0.536	Mean dependent var		0.001
Adjusted R-squared	0.520	S.D. dependent var		0.005
F-statistic	32.615	Durbin-Watson stat		1.879
Prob(F-statistic)	0.000			

PPIPRO … producer prices

EUR … exchange rate CZK/EUR
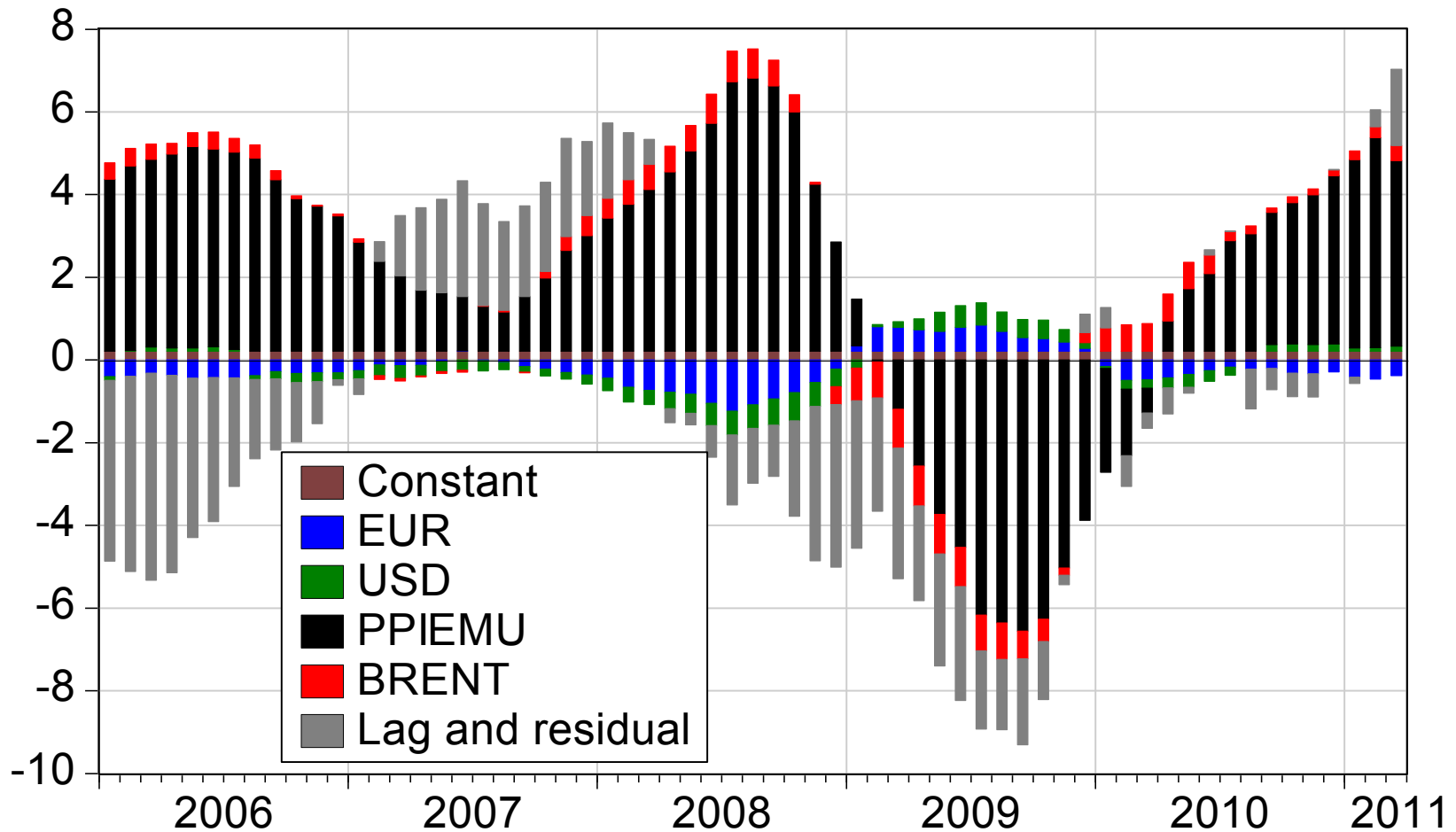
USD … exchange rate CZK/USD

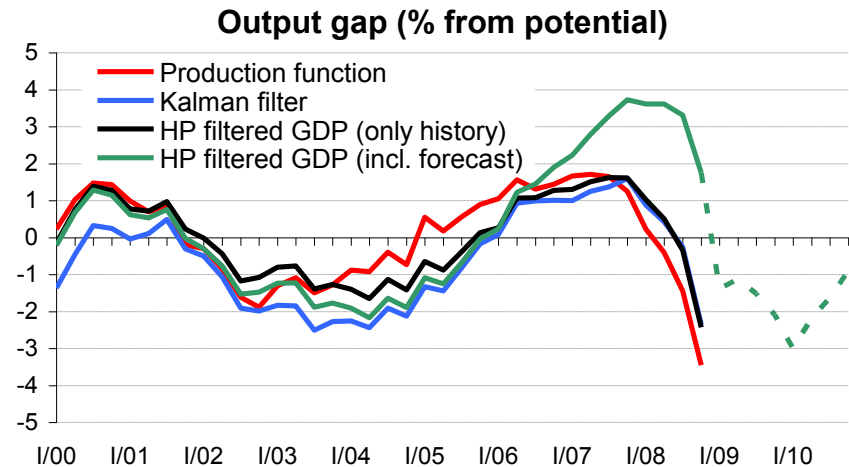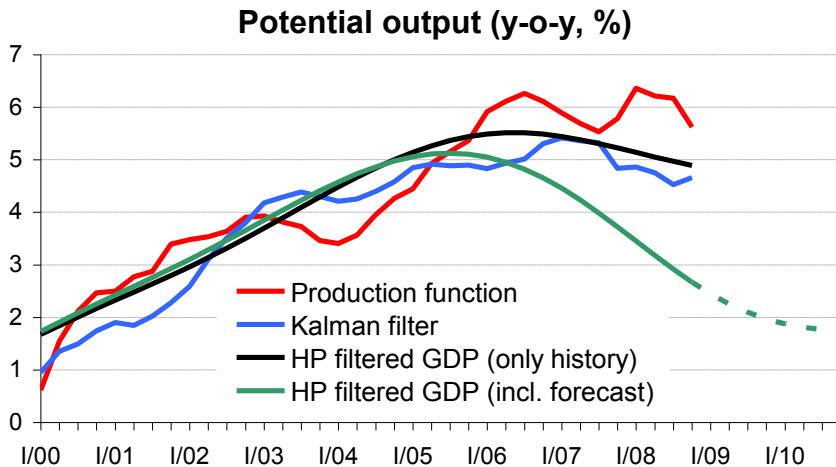PPIEMU … effective PPI in EU

BRENT … oil prices

PPIPRO - contributions of exogens (y-o-y pch.)

Legend:
- Constant
- EUR
- USD
- PPIEMU
- BRENT
- Lag and residual

Potential Output and Output Gap

- Cobb-Douglas production function

- HP filter

- Kalman filter

Potential output (y-o-y, %)

Legend:
- Production function
- Kalman filter
- HP filtered GDP (only history)
- HP filtered GDP (incl. forecast)

Output gap (% from potential)

Legend:
- Production function
- Kalman filter
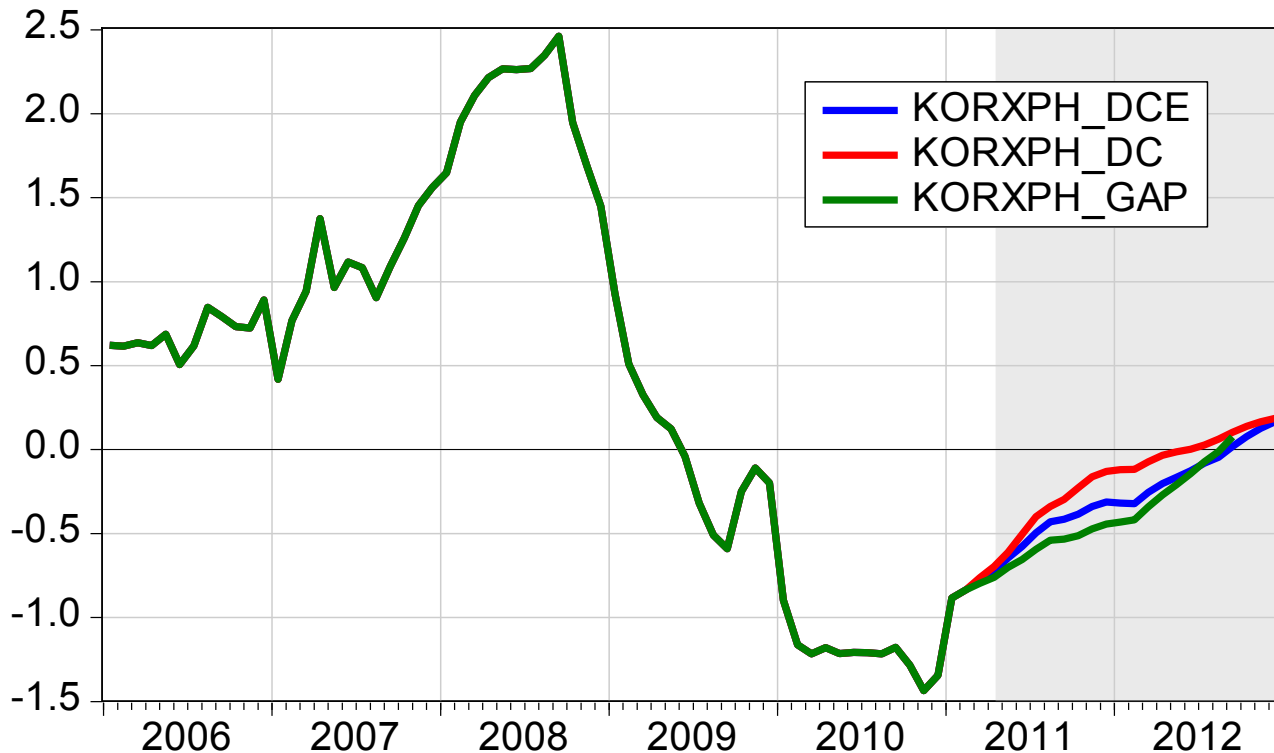- HP filtered GDP (only history)
- HP filtered GDP (incl. forecast)

- Expected inflation

- Labour productivity

- Position of the trade unions - collective bargaining

- Position of the economy in the business cycle

- Financial position of companies

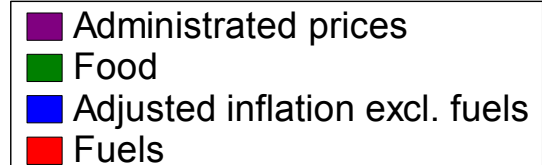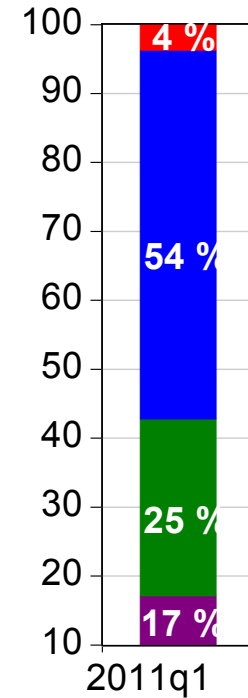- Development and expectations in industry and constructing

Adjusted Inflation

- Forecast of Adjusted inflation with different models, Y-O-Y

Adjusted inflation (y-o-y pch.)

Legend: KORXPH_DCE, KORXPH_DC, KORXPH_GAP

Weights in CPI

2011q1

- Administrated prices
- Food
- Adjusted inflation excl. fuels
- Fuels

Adjusted Inflation

- Model of adjusted inflation, Y-O-Y

Dependent Variable: SK_KORXPH_YOY_NOTXP
Sample (adjusted): 1999M05 2011M02
Included observations: 142 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.240	0.058	-4.142	0.000
KORXPH_YOY_NOTXP(-1)	0.894	0.024	37.655	0.000
EUR_YOY(-8)	0.008	0.003	2.420	0.017
CPIEMU_YOY	0.124	0.027	4.530	0.000
DCADJ_F_YOY(-4)	0.009	0.004	2.415	0.017
ULC_YOY	0.033	0.009	3.558	0.001

R-squared	0.973	Mean dependent var	1.143	
Adjusted R-squared	0.972	S.D. dependent var	1.184	
F-statistic	982.101	Durbin-Watson stat	1.878	
Prob(F-statistic)	0.000			

KORXPH … adjusted inflation

CPIEMU … effective CPI in EU

EUR … exchange rate CZK/EUR

DCADJ_F … import prices

ULC … unit labour cost

Set of models and expert judgment

Food Prices

- Set of models and expert judgment

- Example of NTF Food Prices Equation

FOOD_YOY_NOTXP … food prices inflation

CZV_YOY … agricultural producer prices

DCPOT_YOY … import prices of food com.

Dependent Variable: FOOD_YOY_NOTXP
Sample (adjusted): 2000M01 2011M03
Included observations: 135 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.296	0.081	3.634	0.000
FOOD_YOY_NOTXP(-1)	0.753	0.040	19.000	0.000
CZV_YOY	0.032	0.007	4.927	0.000
DCPOT_F_YOY	0.085	0.027	3.135	0.002

R-squared	0.918	Mean dependent var		1.366
Adjusted R-squared	0.916	S.D. dependent var		2.662
F-statistic	485.784	Durbin-Watson stat		1.318
Prob(F-statistic)	0.000			

Food Prices

- Set of models and expert judgment

Food prices inflation (y-o-y pch.)
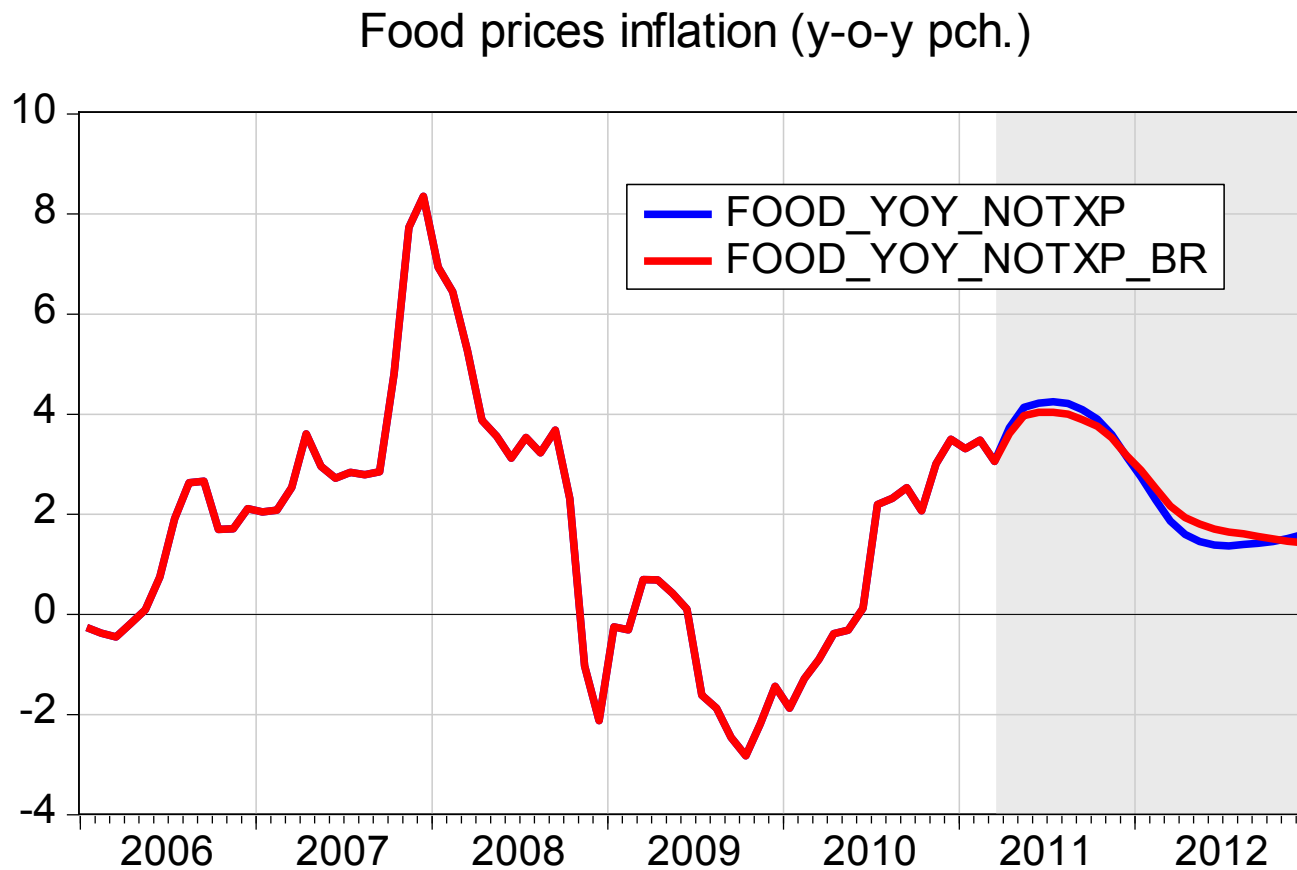
Net inflation

- Calibrated estimate of inflationary pressures

$$impcost = 0.9*(eur*ppiemu) + 0.1*(0.6*(usd*brent) + 0.4*(usd*gas))$$

$$cost = 0.4*gdp\_gap + 0.7*ulc(-1) + 0.3*impcost(-2)$$

Inflationary pressures (y-o-y pch.)

Inflationary pressures (y-o-y pch.)