

# *Forecasting and Policy Analysis System in the Czech National Bank*

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INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ


# *Outline*

- The motivation for FPAS and main objectives
- The elements of the system
- The forecasting process and its organization
- Conclusion

## The motivation for FPAS and main *objectives* (i)

- FPAS is most importantly a *system!*
- Its main goals:
  1. All know-how at department level should be channeled into the analysis and forecast
  2. Clear division of responsibilities
  3. Effective execution of specialized tasks but...emphasis on high quality synthesis
  4. Good coordination of mutually linked activities
  5. Transforming the technical results into a digestible story
  6. Meeting tight deadlines

## The motivation for FPAS and main *objectives* (ii)

- The difference between forecasting in a CB compared, for instance, with the academia:
  1. Individual vs. Team work
  2. Own views vs. Communication within the forecasting team and with policy makers
  3. Snap-shot vs. Regular task 
  4. Medium-term research vs. Real-time pressures
  5. “No memory” vs. Last forecast relative to the actual one
  6. Broad picture vs. Details
  7. Technical language vs. Macroeconomic story
  8. Target groups for “external” communication are different

## The motivation for FPAS and main *objectives* (iii)

- Medium-term approach
- Reactive MP and unconditional inflation forecast
- Insight into decision making of economic agents and monetary authority
- The process organized around a relatively simple (QMP) resp. less simple (g3) core structural model:
  - How important it is to have a state-of-the art core model?
  - Communication aspects
- Departmental forecasting team: responsible for the successful conduct of the process and co-operation of all divisions

## The motivation for FPAS and main *objectives* (iv)

- To have consistent and clear methodology to derive a consistent macroeconomic forecast
- To shape inflation expectations and behave systematically in line with the inflation forecast
- To communicate the basic message of the forecast:
  - where the economy is and what the current trends are
  - what is the likely evolution in the future
  - what are the implicit risks
  - what are the underlying pressures in terms of MP

## The Elements of the System (i)

### Short-term forecasting methods

phase-in

QPM

phase-out

phase-in

g3

Jan. 1998

Jan. 2001

July 2002

Jan. 2007

July 2008

- CNB relied on near-term methods when the IT introduced
- QPM introduced into forecasting in mid-2002
- Switch from constant IRs assumption to endogenous IRs
- Successful switch to 'g3' in mid-2008
- Integration with near-term forecast
  - nowcasting + robustness check + expert judgments

## *The Elements of the System (ii)*



- Core model (g3)
- Multisectoral SOE model
- *No ad-hoc detrending*, explicit treatment of sectoral trends
- BGP with constant nominal expenditure shares and trends in relative prices
  
- Cascade of price and wage rigidities
- Real frictions (habit formation, new vs. old capital, ...)
- Imperfect exchange rate pass-through
- Import intensity of exports, increase in trade openness
- Regulated prices included



## *The Elements of the System (iii)*

- Core model (g3) (cont.)
  - Definition of the key features of the economy
  - The structure of the model ▶
  - Stock-flow equilibrium
  - Calibration
  - Kalman filtering, identification of structural shocks ▶
  - The model generates an interest rates trajectory consistent with the overall projection ▶
  - Some other use: alternative scenarios, MP experiments, stochastic simulations of shocks etc. ▶

## *The Elements of the System (iv)*

- Near-term forecast (NTF)
  - Model (g3) mechanisms are valid for medium-term horizon
  - The nowcast and 1Q ahead forecast are based on a wide range of high frequency information
  - Identification of short-run idiosyncratic shocks
  - High degree of detail and structural insight
  - Economic intuition based on accumulated expert knowledge 
  - An important role of empirical evidence, statistical data and econometric methods
  - Irreplaceable task: NTF benchmark for the model forecast
  - Example (Kalman filter based forecast decomposition) 


## *The Elements of the System (v)*

- Departmental forecasting team:
  - Why a separate forecasting team?
  - Forecast is made by the staff not by the model
  - Inclusivity and collective view are essential
  - Responsible for a conduct of the forecasting process
  - Specifies deadlines and responsibilities
  - Disposes with technical background with a seamless database - and prediction system

## *The Elements of the System (vi)*

- Composition of the forecasting team (FT):
  - Head of the forecasting team, representative of the Macroeconomic Forecasting Division (MAFD)
  - Representative of the near-term forecasting team (MAFD)
  - 2 representatives of Monetary Policy and Strategy Division (Editor + Fiscal expert)
  - Representative of External Economic Relations Divisions
  - 1 model operator (MAFD)
  - Potentially some other members of the department (training)

## *Forecasting Process and Its Organisation (i)*

- The process 
- Departmental forecasting team builds up a macroeconomic forecast as a main support for MP decision
- Provides an unconditional medium term forecast using the model, NTF and own judgment
- Incorporating out-of-model information (fiscal policy, indirect taxes, structural insight etc.)
- The main goal: a macroeconomic story consistent with economic theory, empirical evidence and judgment

## Forecasting Process and Its Organisation (ii)

- Issues meeting **W1**
- Meeting on forecasting techniques **W2**
- **Meeting with the BB** on initial cond. and IT fulfillment **W3**
- **Meeting with the BB**: first version of the forecast + alter.  
Meeting on the final approval of the forecast **W4**
- Drafting of the Inflation Report **W5**
- **Official MP BB meeting** ⇒ **MP decision** **W6**
- Post mortem meeting **W7**

## *Forecasting Process and Its Organisation (iii)*


- Issues Meeting:
  - Collective and intuitive view among the staff where the economy is and what the current economic issues are
  - Designed to address a wide range of questions
  - Broad participation of the staff encouraged
  - Examples

## *Forecasting Process and Its Organisation (iv)*

- Meeting on Forecasting Techniques:
  - Properties of main forecasting tools are reintroduced and re-examined
  - Opportunity to introduce changes and assess their significance
  - Refreshes the staff's and forecasting team's familiarity with the techniques
  - Examples (change in the model calibration, extension of the model, etc.)



# *Forecasting Process and Its Organisation (v)*

- Meeting on Initial Conditions and Inflation Forecast Fulfillment
  - Identification of structural shocks 
  - Out-of-model information (examples)
  - Is there any significant change in underlying sectoral productivity trends?
  - External assumptions (CF) and their expected impact on the forecast
  - Initial exchange rate scenario for NTF - mix of model consistent UIP and order flow forecast (BoP)
  - Inflation forecast fulfillment
  - Meeting on “Initial Conditions” with the Bank Board
  - Examples

## *Forecasting Process and Its Organisation (vi)*

- 1. Forecast Round:
  - NTF is already incorporated into the model forecast (residuals)
  - The first draft of the forecast introduced
  - Response of management and experts
  - Room for modification or tuning the message of the baseline scenario
  - Discussing the motivation for alternatives
  - Meeting with the Bank Board on alternative scenarios: which risks are to be quantified

## *Forecasting Process and Its Organisation (vii)*

- Final Forecast Round:
  - Approval of the baseline scenario of the forecast
  - Final consistency check and fine-tuning
  - Preparing alternatives and MP experiments

## *Forecasting Process and Its Organisation (viii)*

- Post Mortem Meeting:
  - Opportunity to systematically assess what went wrong and what should be improved (technically vs. in terms of organization of the process)
  - Broad participation of the department is encouraged
  - Efficient tool to transform fresh emotions into immediate measures for the next time
  - Examples

# Forecasting Process and Its Organisation (ix)

2nd SR 2011 and 3rd SR 2011 schedule				Documents	
24-III.	Thu	5P 123 5P 123	9:00 2nd Situation Report - Bank Board meeting 13:00 Issue meeting 3rd Situation Report 14:00 Meeting: exchange rate near-term forecast, fulfilment of the inflation target		
25-III.	Fri				
28-III.	Mo			16:00	Text distribution: Fulfilment of the inflation target
29-III.	Tu				
30-III.	We	4P 321	13:00 Meeting - techniques of forecast and fulfilment of the inflation target		
31-III.	Thu				
1-IV.	Fri				
4-IV.	Mo	4P 321	13:00 Presentation - Near Term Forecast (412 dep.)		
5-IV.	Tu				
6-IV.	We	4P 321	13:00 Initial conditions meeting		
7-IV.	Thu	4P 321	15:30 Meeting: Boxes and annexes for 3rd SR / II.Inflation Report		
8-IV.	Fri		10:00 <i>Consensus Forecasts</i>	12:00	Documents for Bank Board: Initial conditions, Fulfilment of the inflation target, external scenarios
11-IV.	Mo	2P 318	9:00 <i>Inflation (march 2011)</i> 14:00 Initial meeting with Bank Board: Initial conditions, Fulfilment of the inflation target, external scenarios		
12-IV.	Tu				
13-IV.	We	4P 321	14:00 1st version of forecast, briefing with NTF team and BoP experts		
14-IV.	Thu				
15-IV.	Fri		9:00 <i>Foreign trade prices (February 2011)</i> 13:00 Second exchange rate near-term forecast meeting	12:00	Documents for Bank Board: choice of alternatives and sensitivity scenarios
18-IV.	Mo	2P 318	14:00 Meeting with Bank Board - choice of alternatives and sensitivity scenarios	16:00	Final text. II.1 to editors
19-IV.	Tu				
20-IV.	We	4P 321	13:00 Forecast approval	16:00	Final boxes and annexes to editors
21-IV.	Thu			16:00	Final text. II.2 to editors
22-IV.	Fri			15:00	Final text. II.3 and II.4 to editors
25-IV.	Mo			15:00	Distribution chapter III. in M&S dept.
26-IV.	Tu	4P 321	8:30 Discussion in M&S dept.: Chapter III.	15:00	Distribution chapter I II.1-3 a II.5 in M&S dept.
27-IV.	We	4P 321	8:30 Discussion in M&S dept.: Chapter II.1-3 a II.5	15:00	Distribution chapter I. a II.4 in M&S dept.
28-IV.	Thu	4P 321	8:30 Discussion in M&S dept.: Chapter I. and II.4	17:00	3rd Situation Report delivery to M&S dept. director
29-IV.	Fri			13:00	3rd Situation Report delivery to Bank Board (9:00 in M&S dept.)
2-V.	Mo				
3-V.	Tu	4P 320	10:30 M&S dept. Directors meeting - Monetary Policy Recommendation		
4-V.	We	2P 318	14:00 Macrofinancial panel		
5-V.	Thu		3. Situation Report - Bank Board meeting		
6-V.	Fri		9:00 <i>ILO employment and unemployment (1.Q 2011)</i>		

# *Conclusion*

- Structured debate about risks and policy issues enabled due to common language
- Forecast with active MP (includes rates trajectory consistent with forecast)
- Involvement of MSD resources but manageable discussion: FT
- Consistently incorporated judgment
- Real time pressures well tackled due to automatisations
- Story-centered discussion
- High level of transparency



Thank you for your attention !

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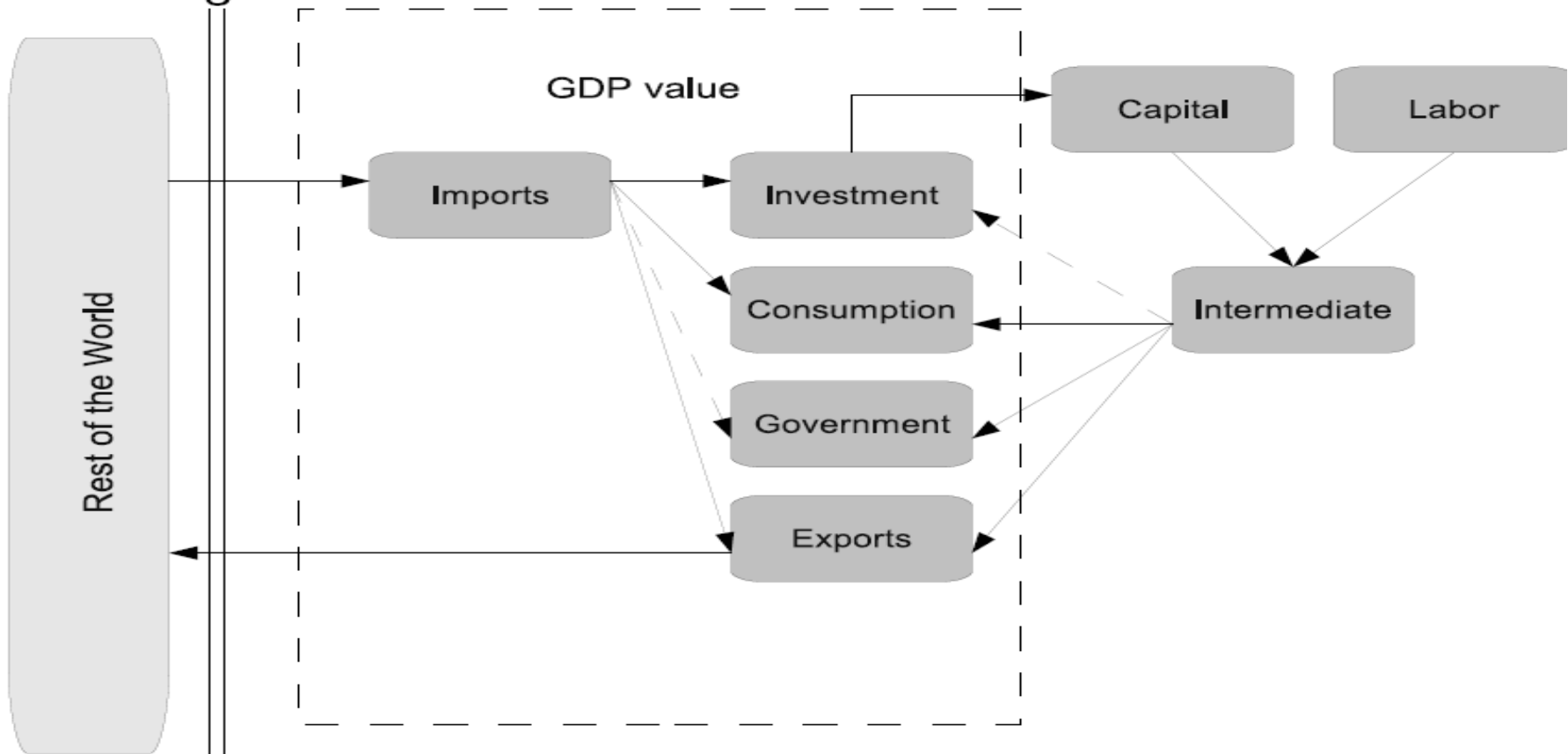


Backup slides



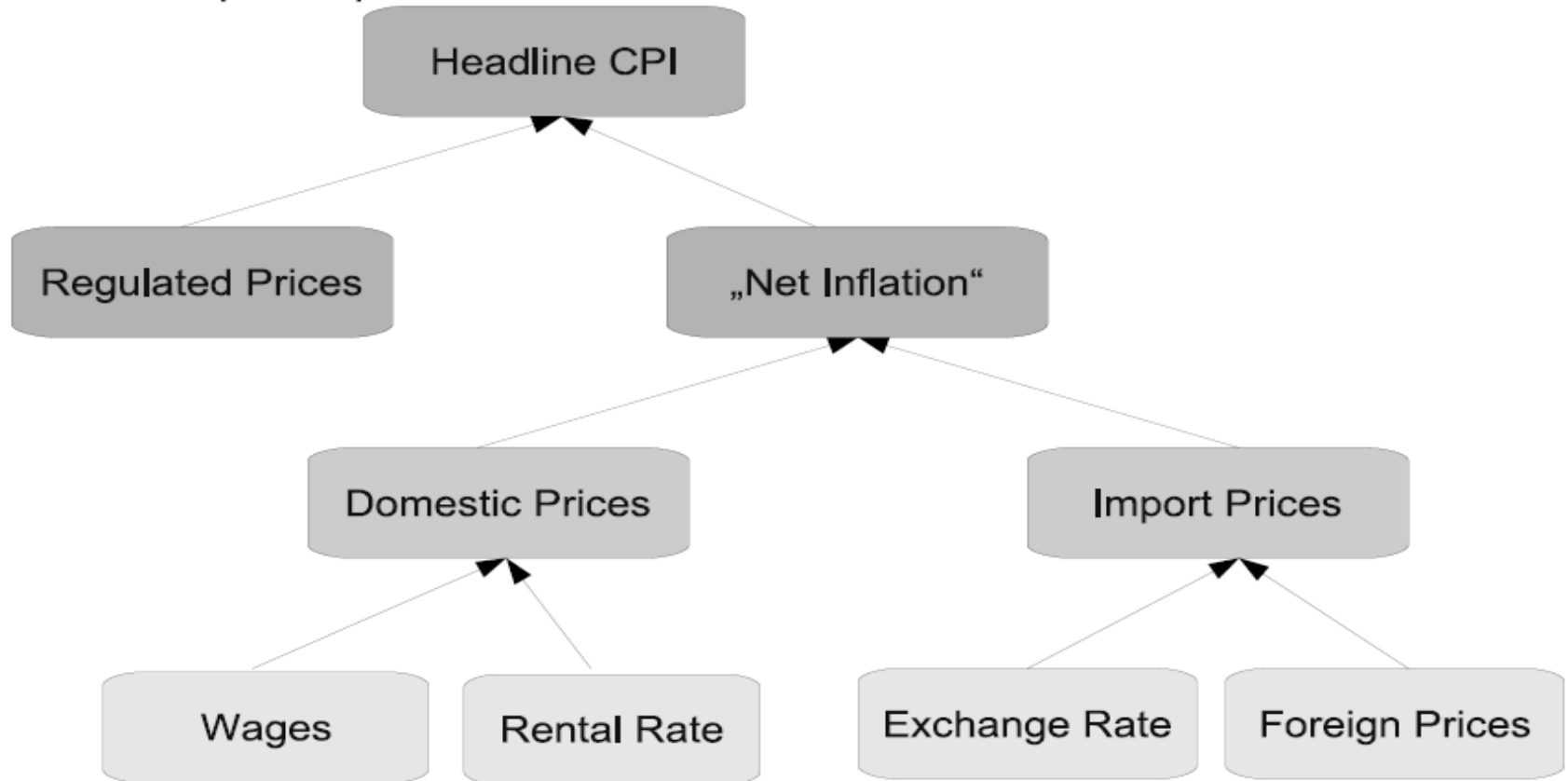
# Production structure – g3

## Flow of goods & services

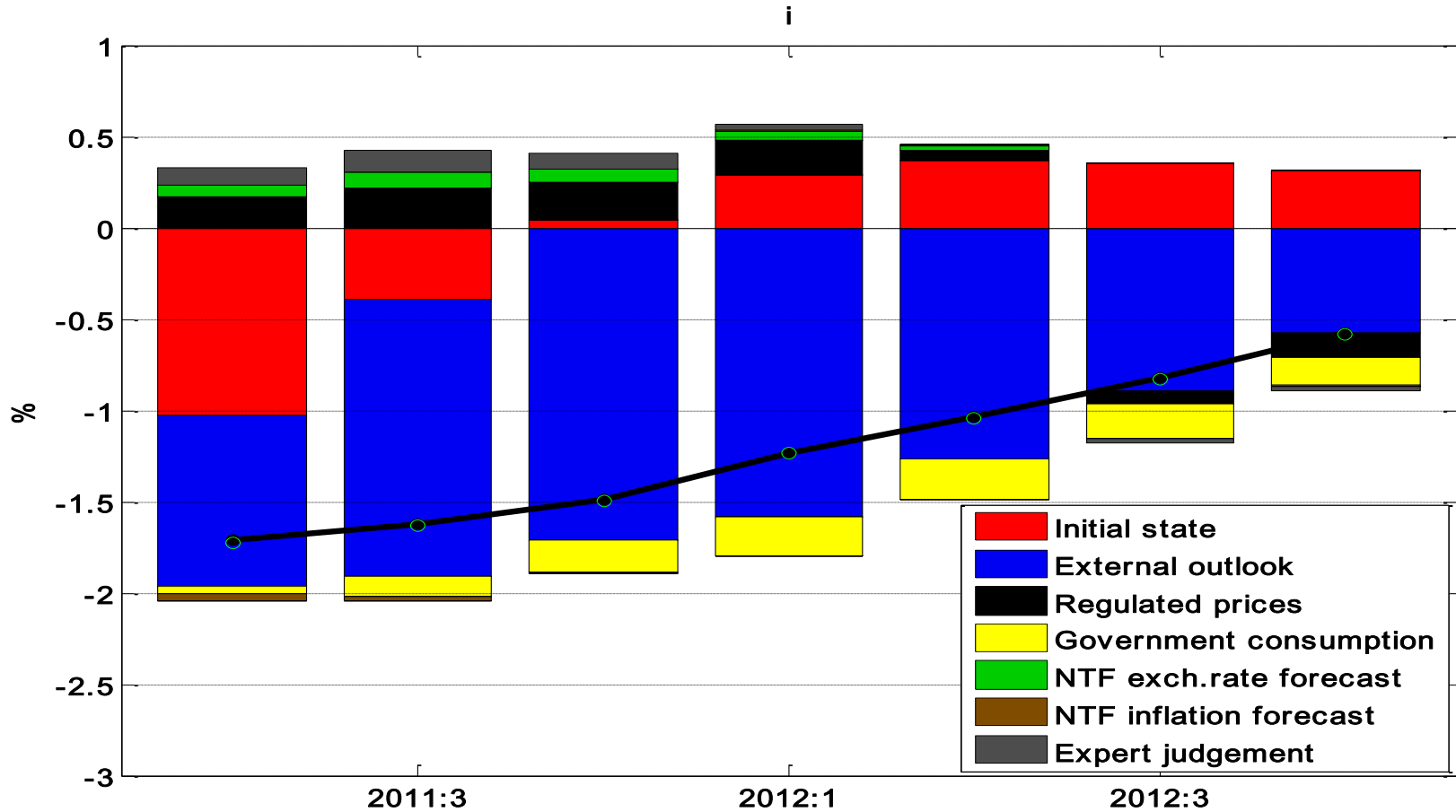


# Price structure – g3

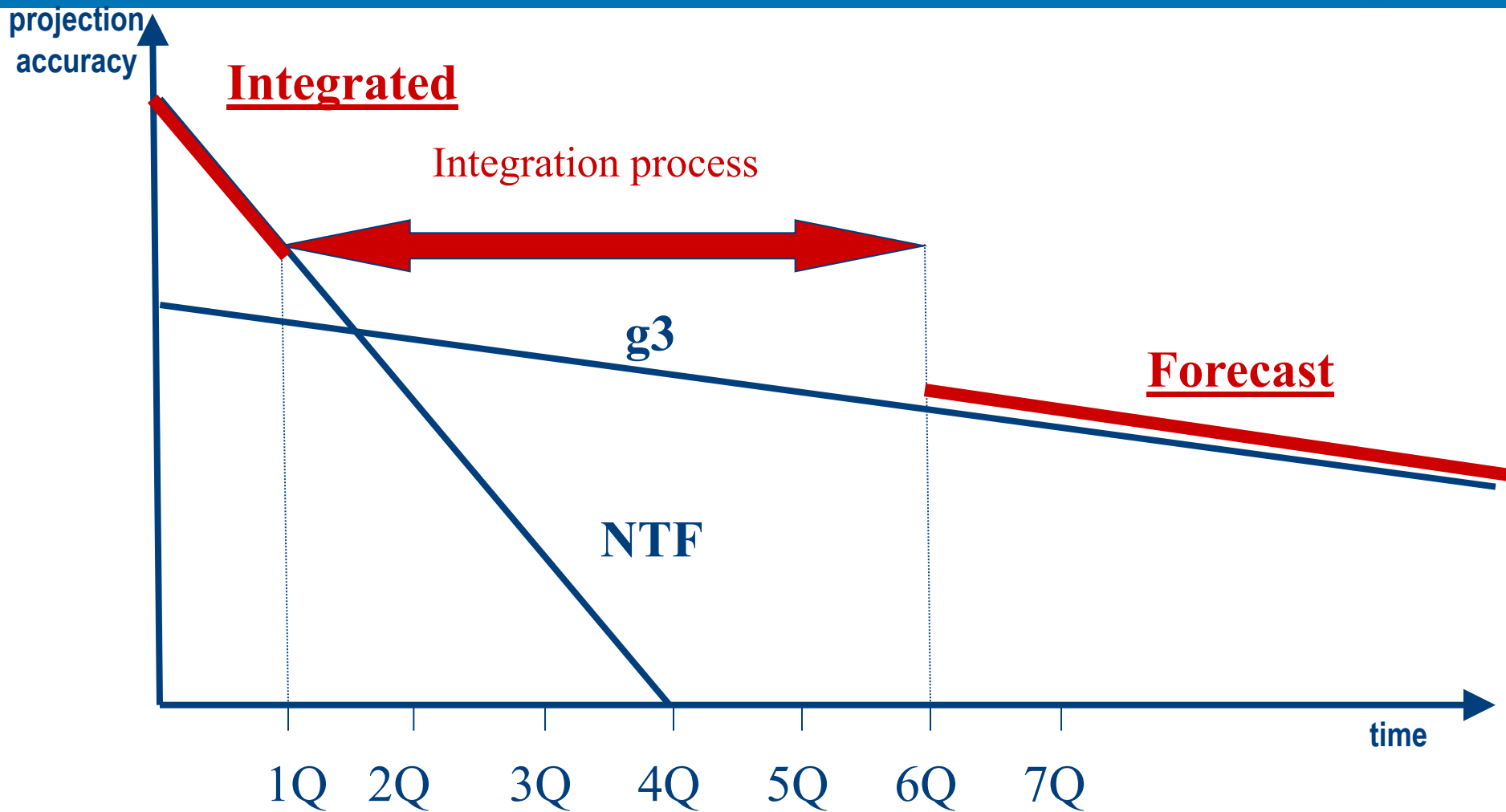
## Consumption prices – cost structure



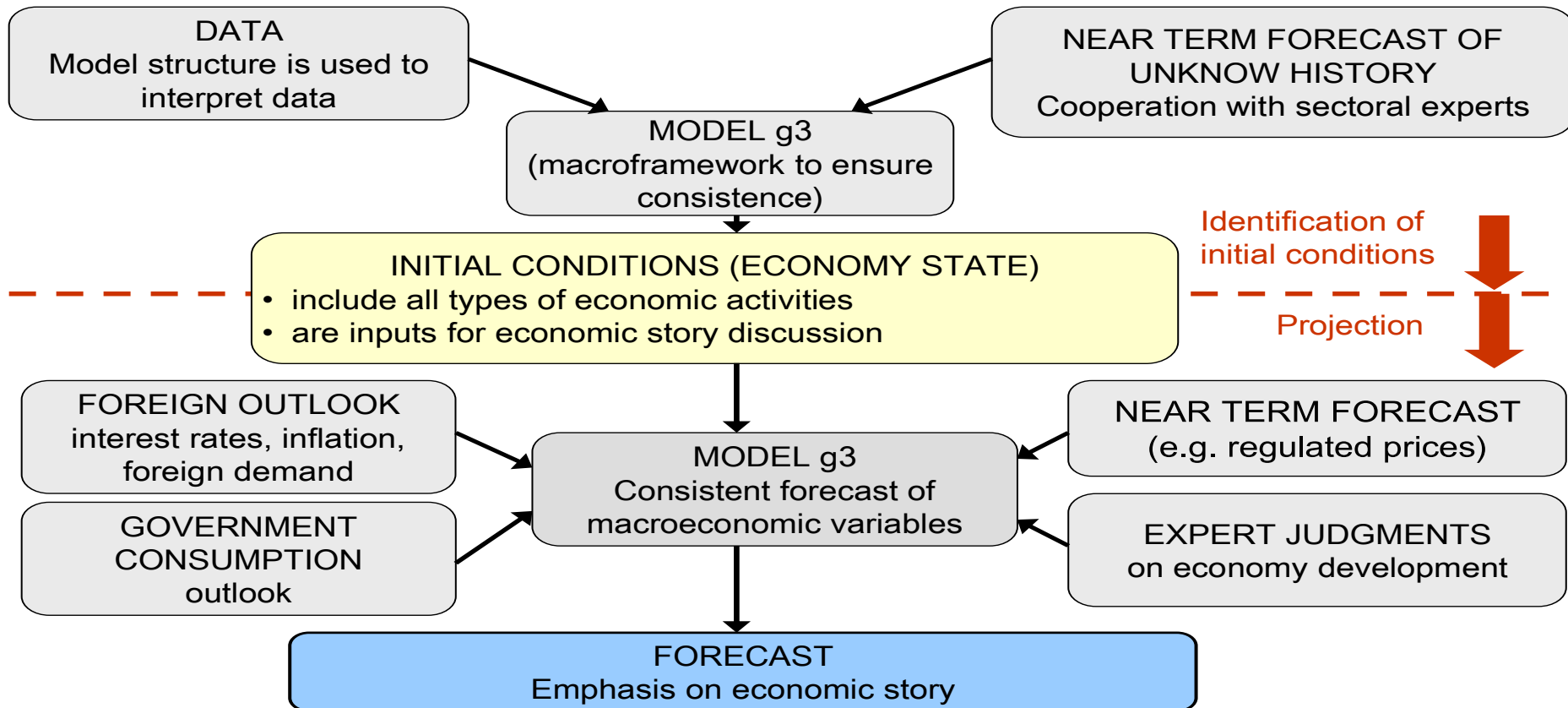
# Identification of structural shocks



# The forecasting process (i)

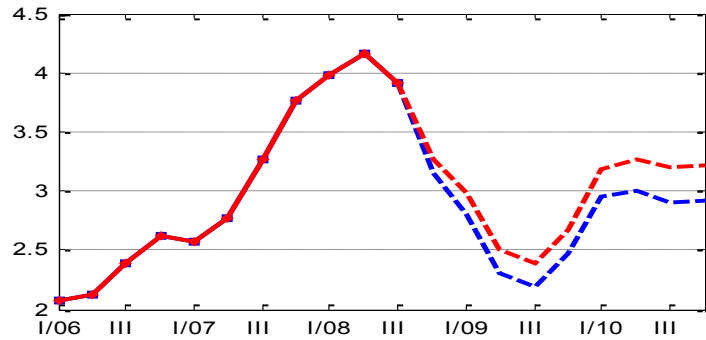


# The forecasting process (ii)

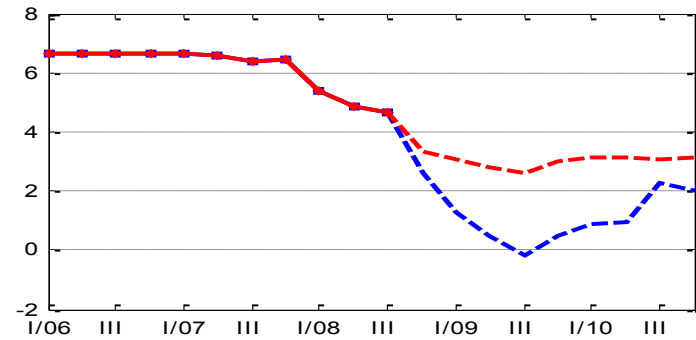


# Sensitivity to foreign demand assumption

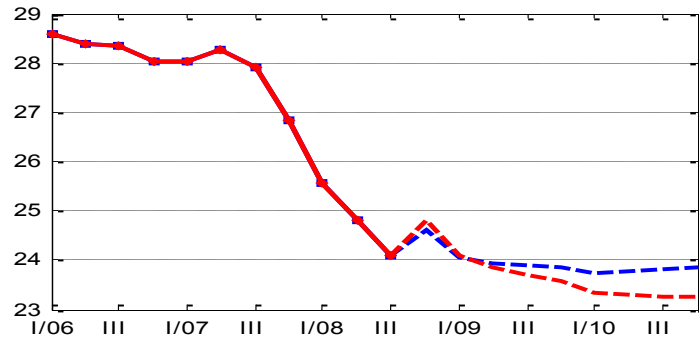
## PRIBOR 3M (% , p.a.)



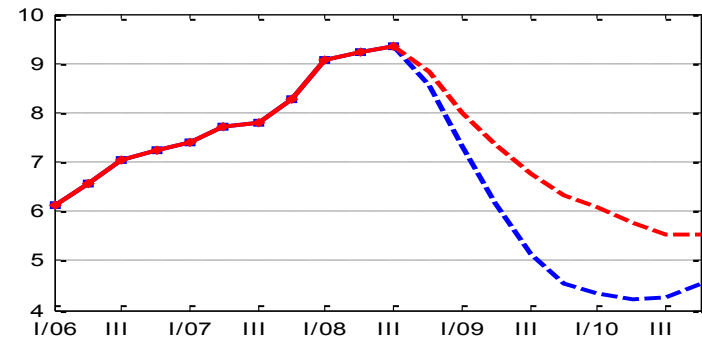
## Real GDP growth (y-o-y, %)



## Nominal exchange rate (CZK/EUR)

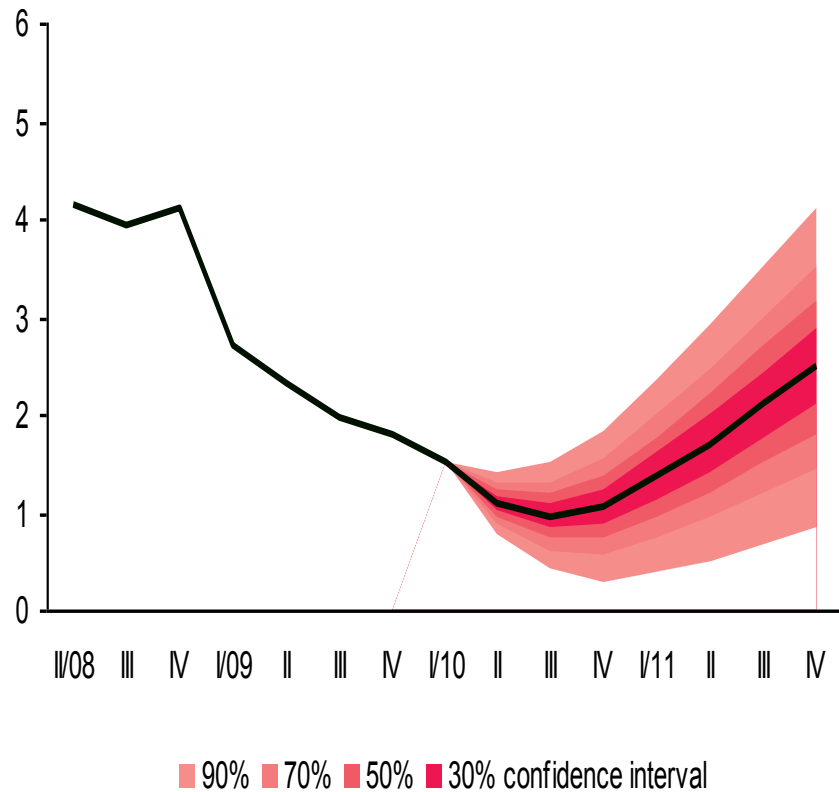


## Nominal wages growth (y-o-y, %)

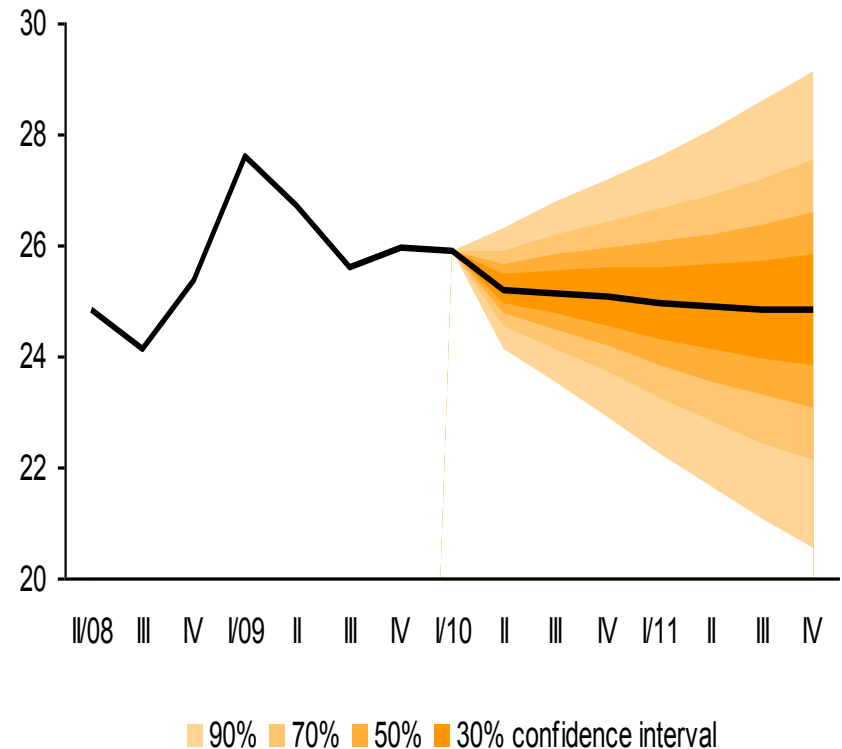


# Endogenous interest- and exchange rates

## 3M PRIBOR forecast

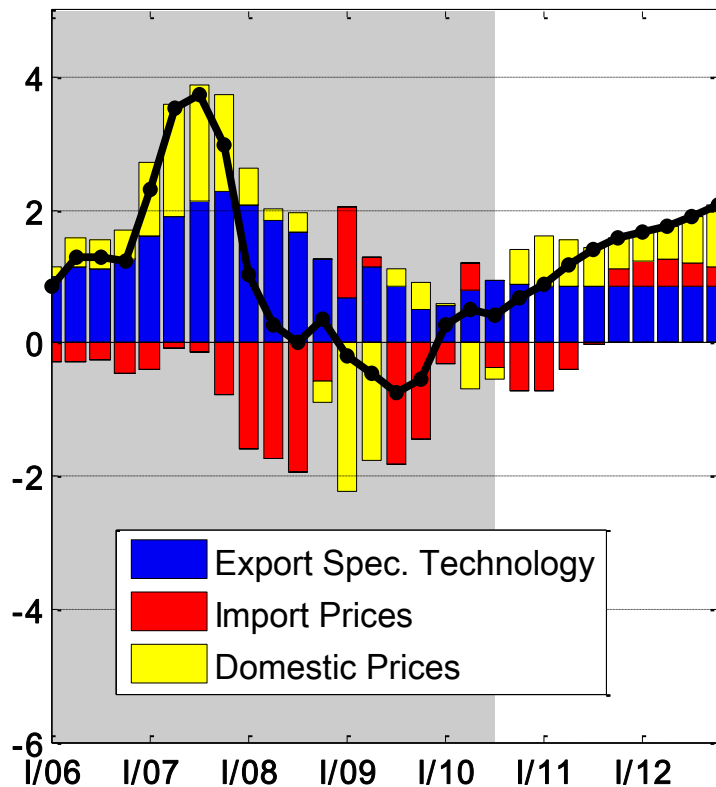


## Exchange rate forecast

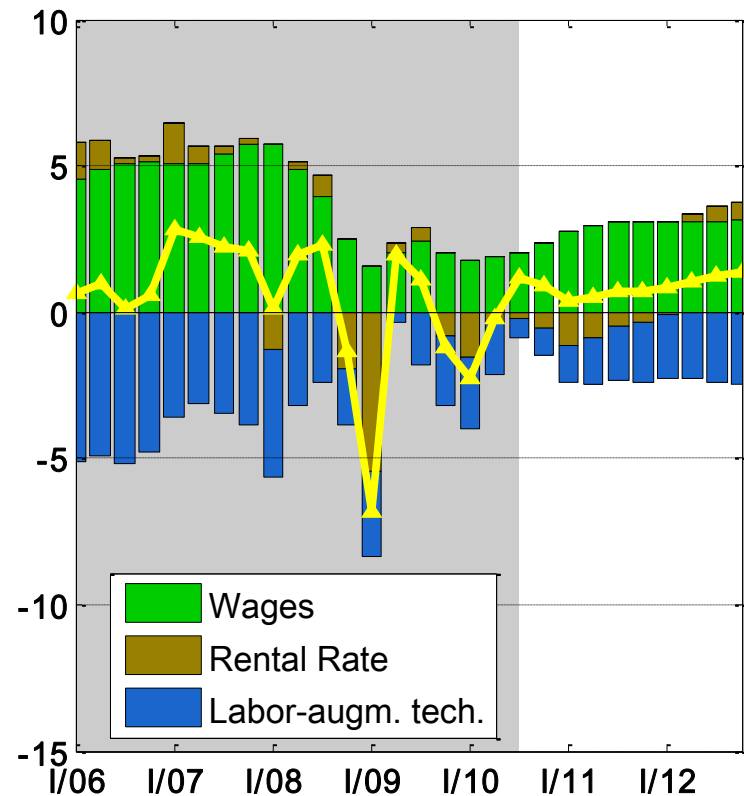


# Identification of structural shocks – initial conditions

Nominal Marginal Cost in Consumption Sector  
(q/q, in %, ann.)

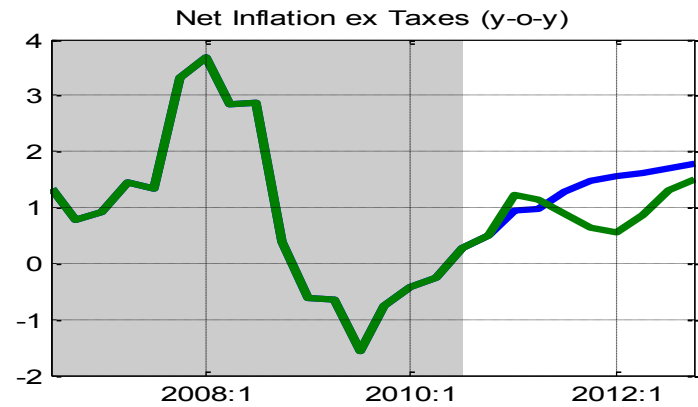
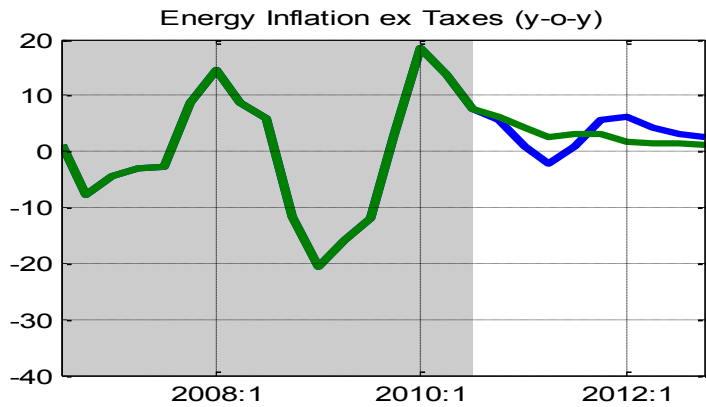
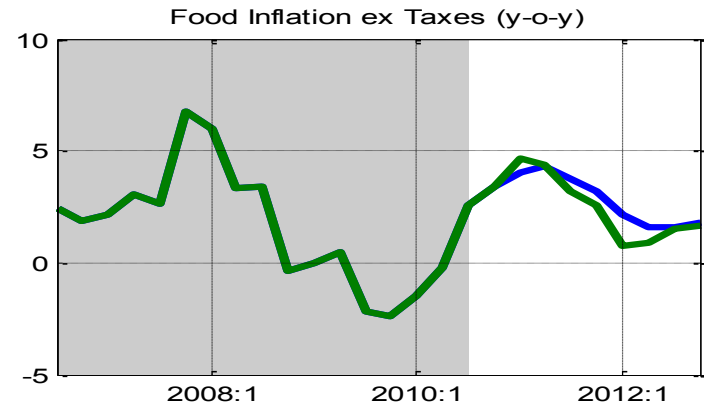
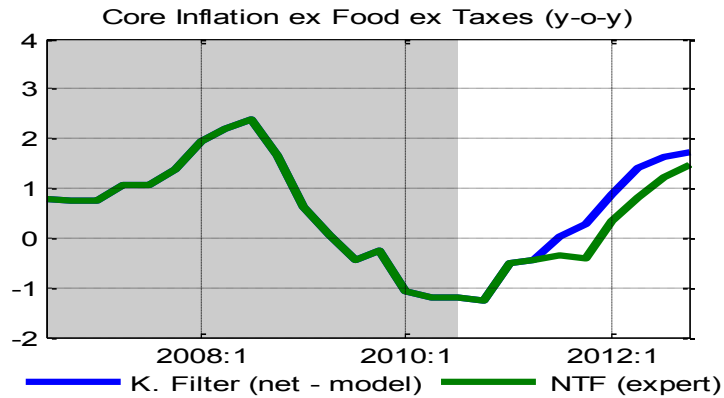


Nominal Marginal Cost in Domestic Sector  
(q/q, in %, ann.)



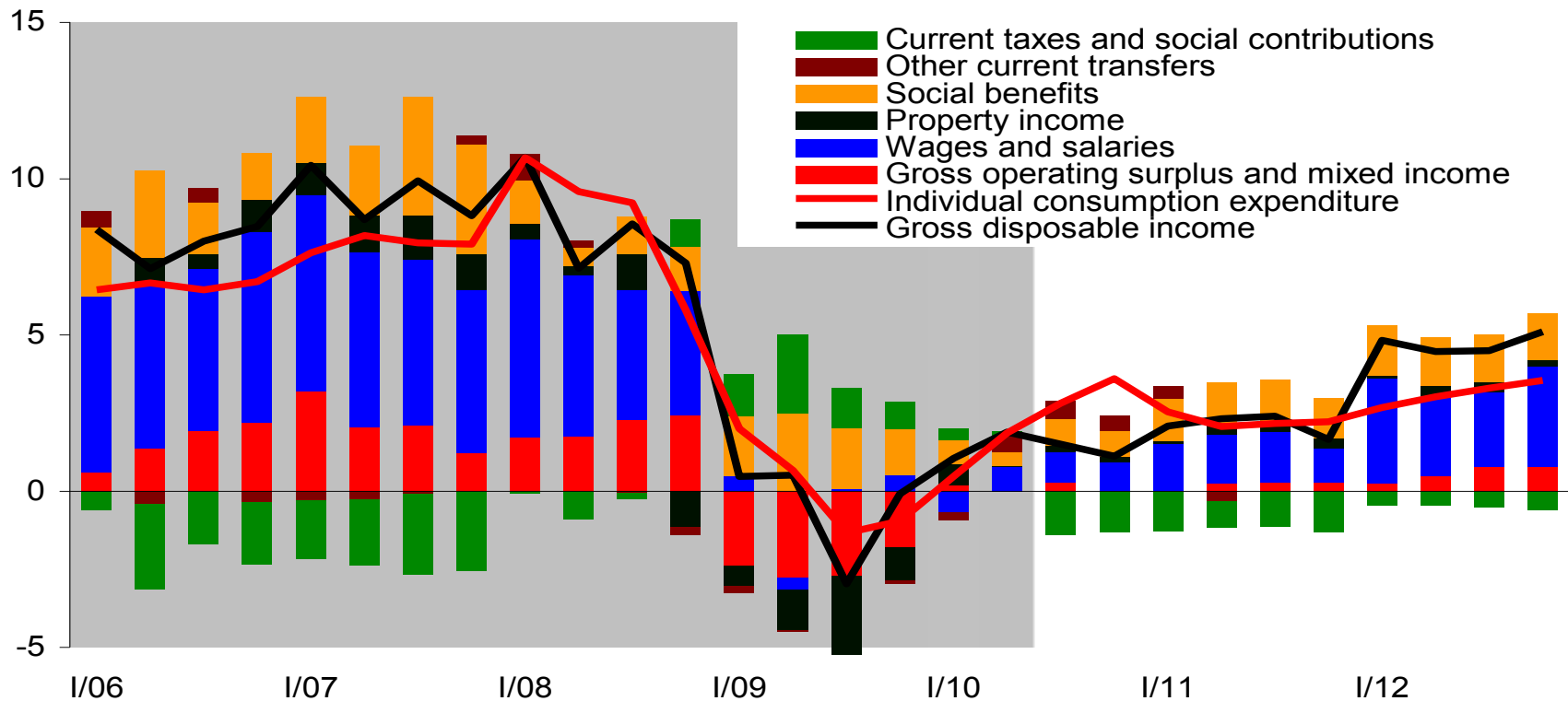


# Decomposition tools



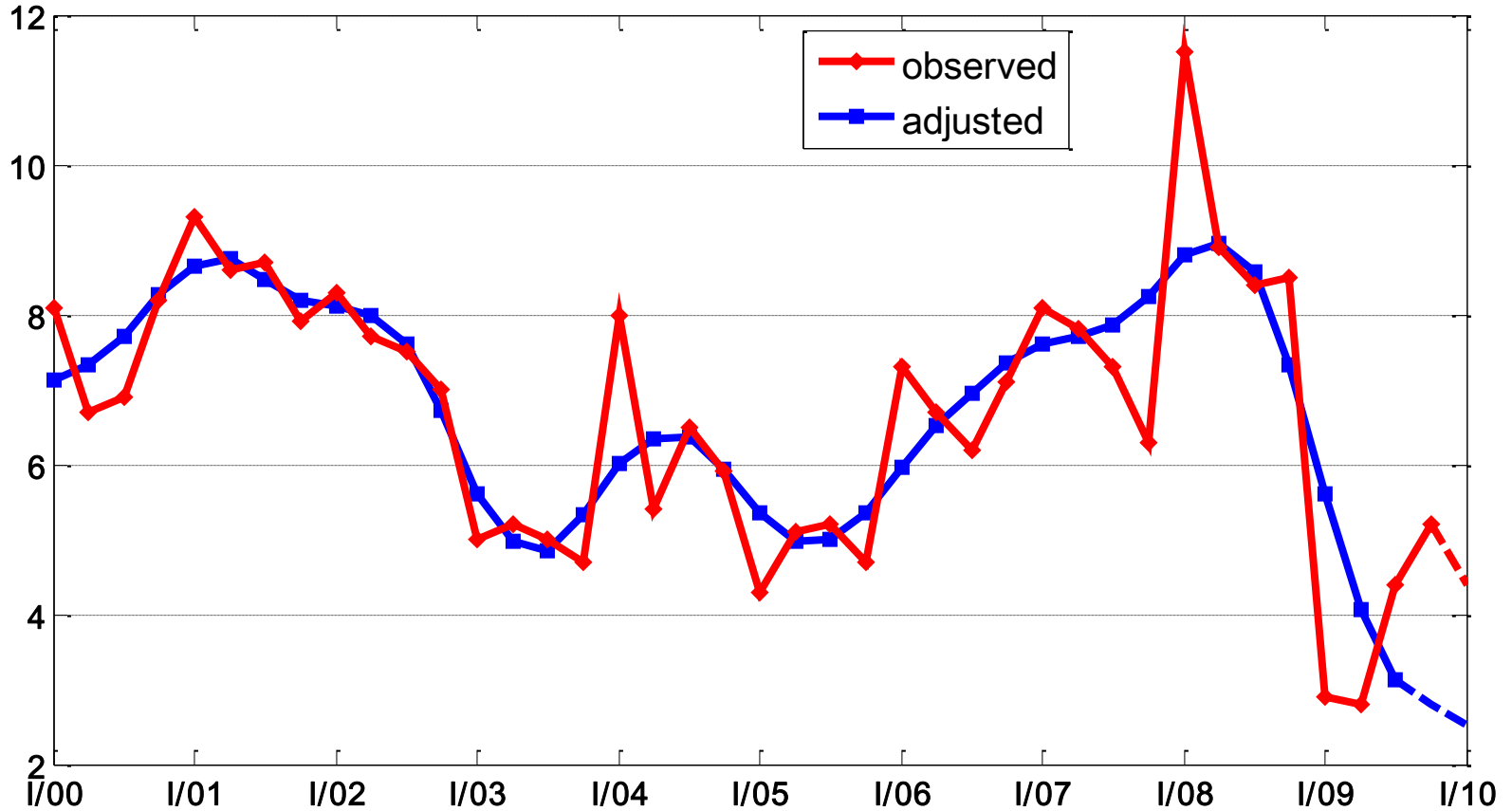
# The structure of nominal disposable income

Gross disposable income  
(annual percentage changes; contributions in percentage points)



# The analysis of nominal wage growth (i)

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



# The analysis of nominal wage growth (ii)

