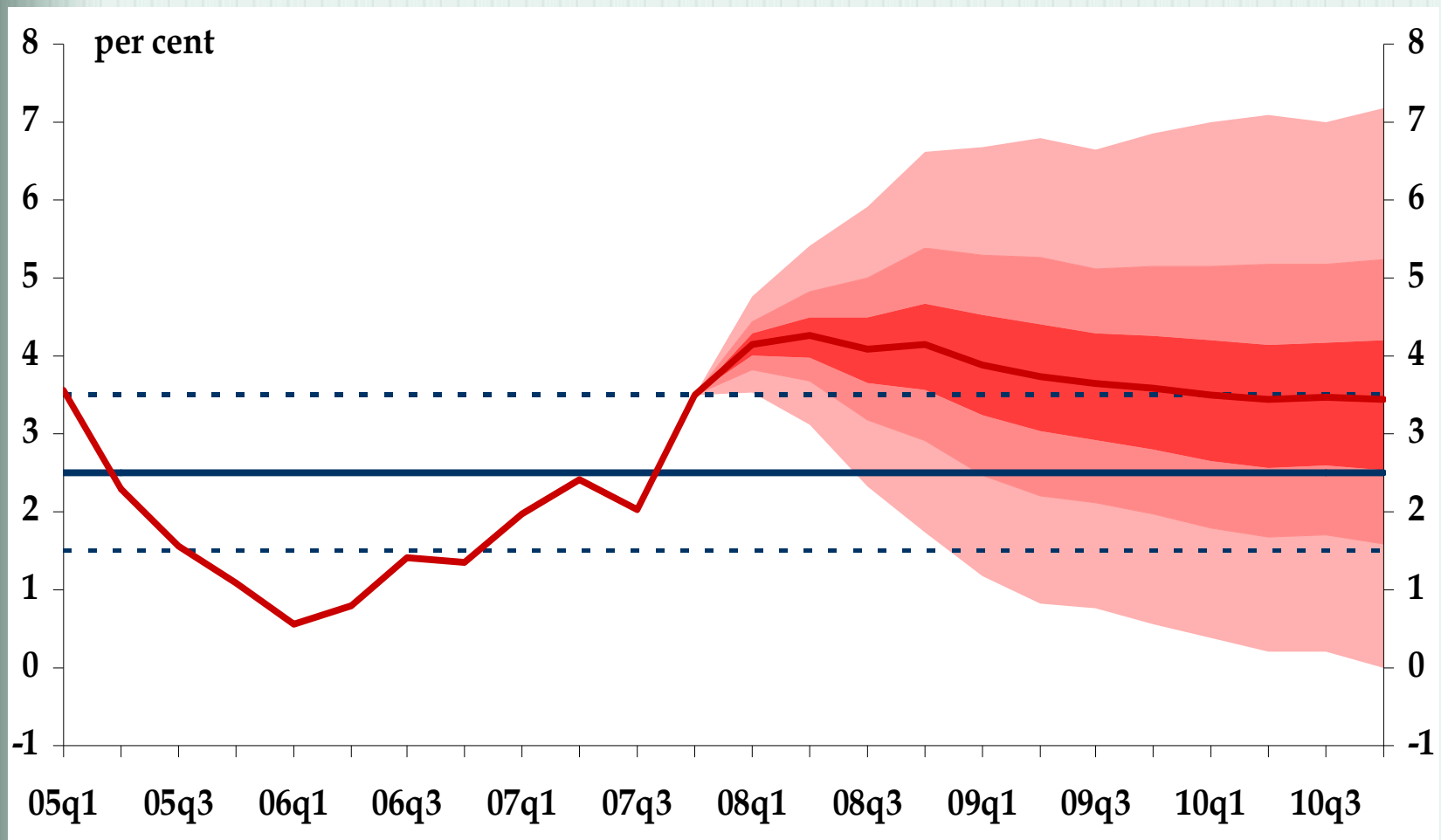


**Inflation projection
of the National Bank of Poland
based on the ECMOD model**

February 2008

Inflation projection – February 2008



Source: Economic Institute

Presentation plan

- **Central projection**
 - Starting point compared to the October projection
 - Macroeconomic projection for 2008-2010
 - The February projection compared to the October projection
 - Decomposition of the inflation deviation from the previous projection
 - Expert adjustments
- **Analysis of inflation projection uncertainty**
 - Factors accounted for in the model – fan charts
 - Factors unaccounted for in the model

Central projection

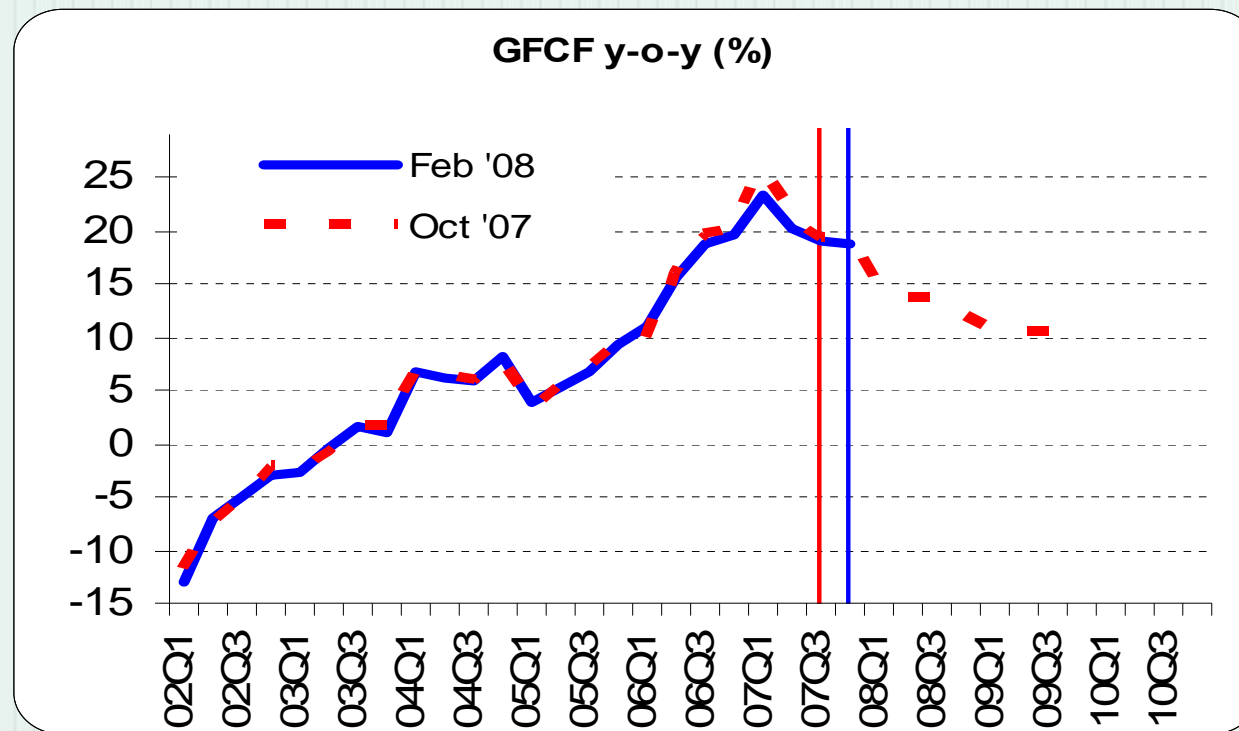
Starting point compared to the October projection

- GDP and its components
- Labour market
- Inflation

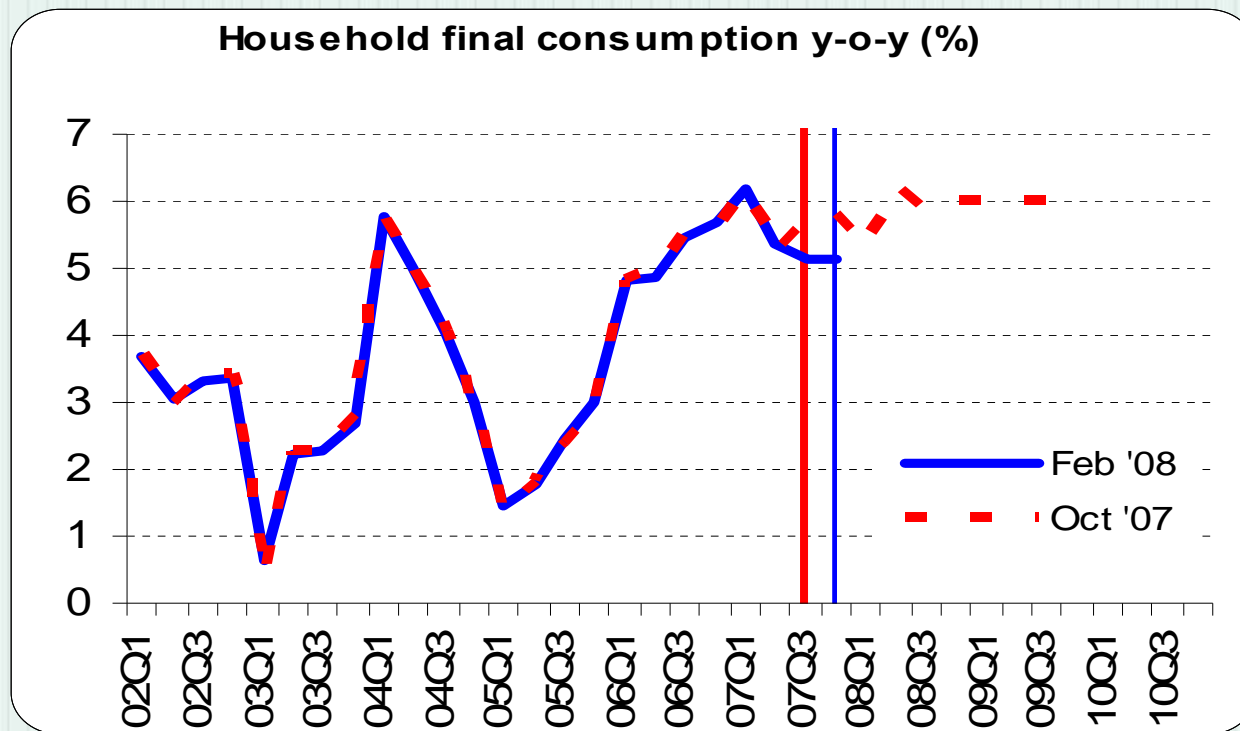
GDP and its components

Starting point

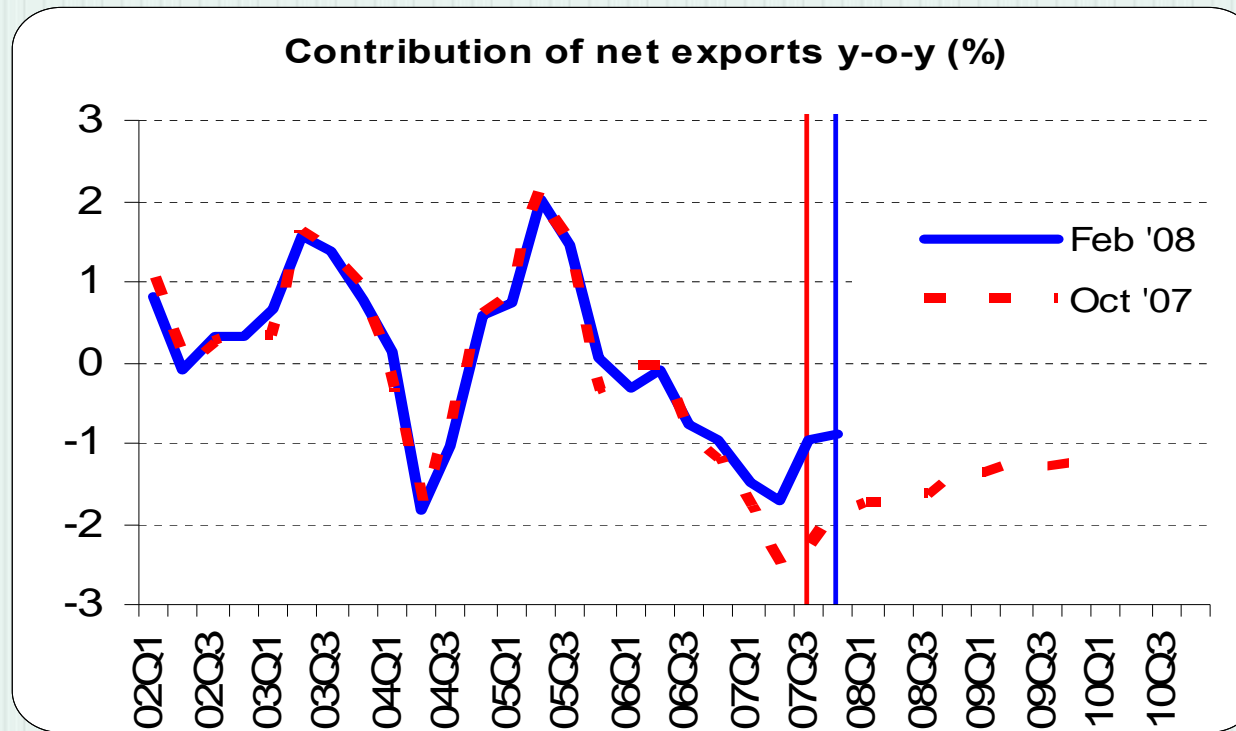
Gross fixed capital formation: slightly lower



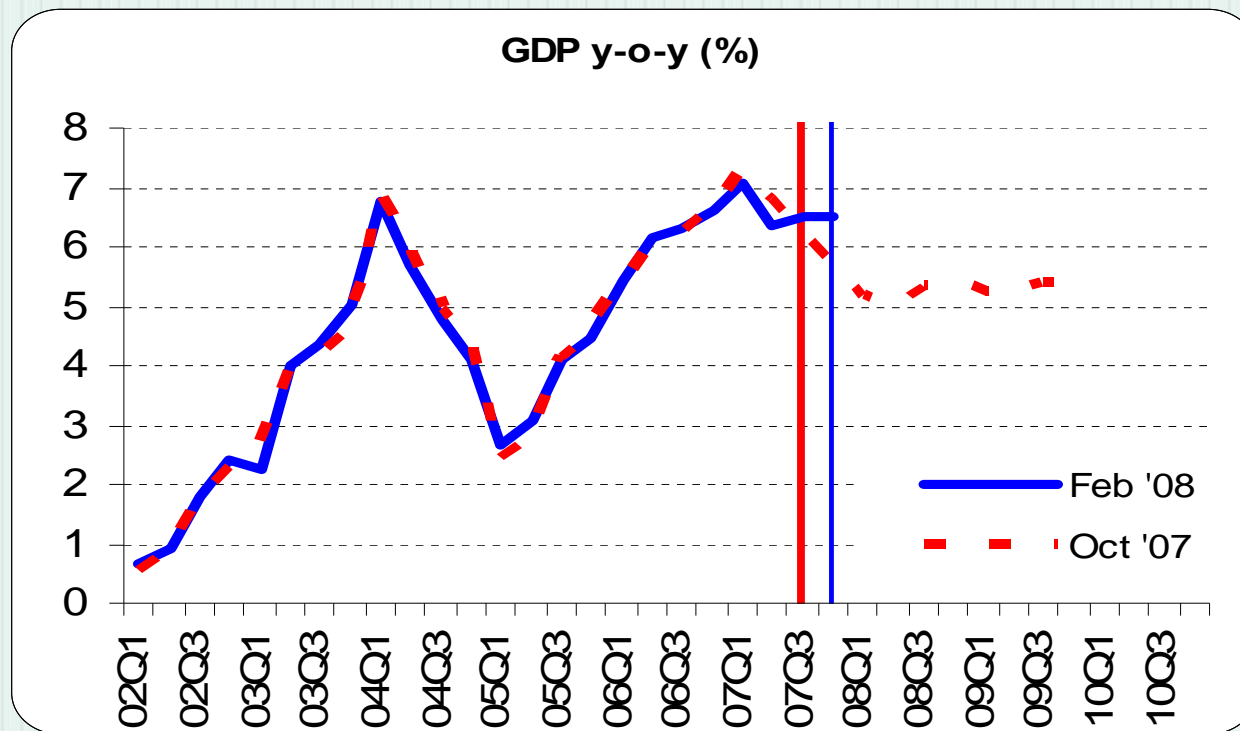
Household final consumption: slower growth rate



Contribution of net exports: higher



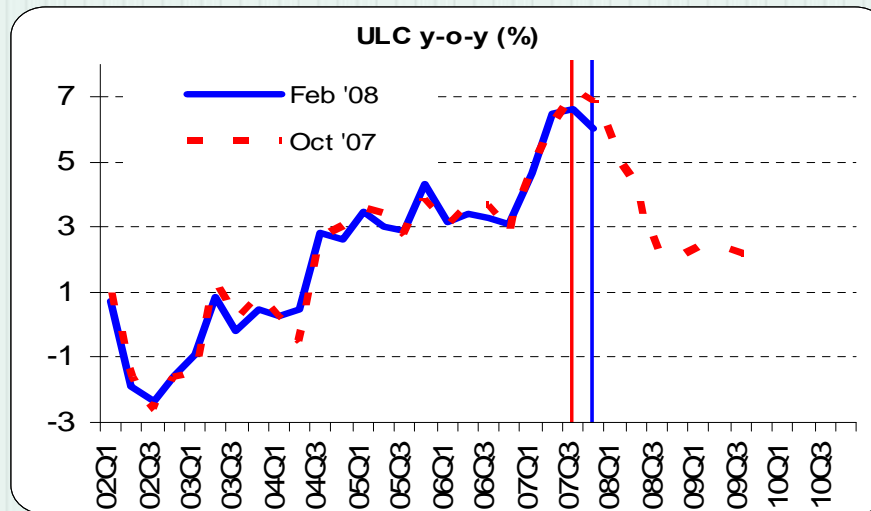
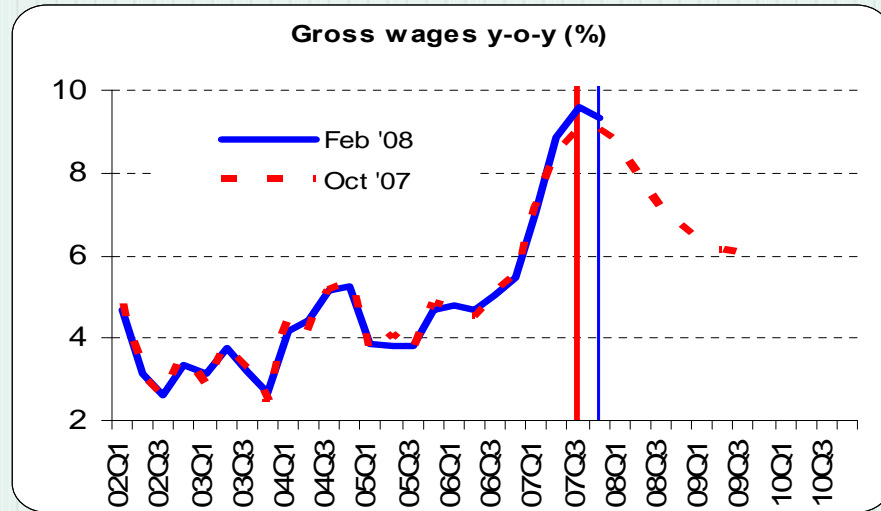
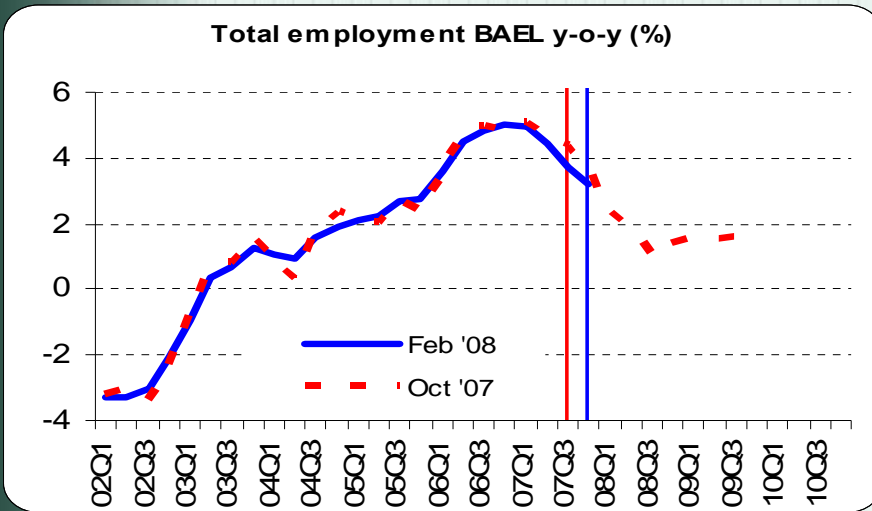
GDP: higher growth rate



Labour market

Starting point

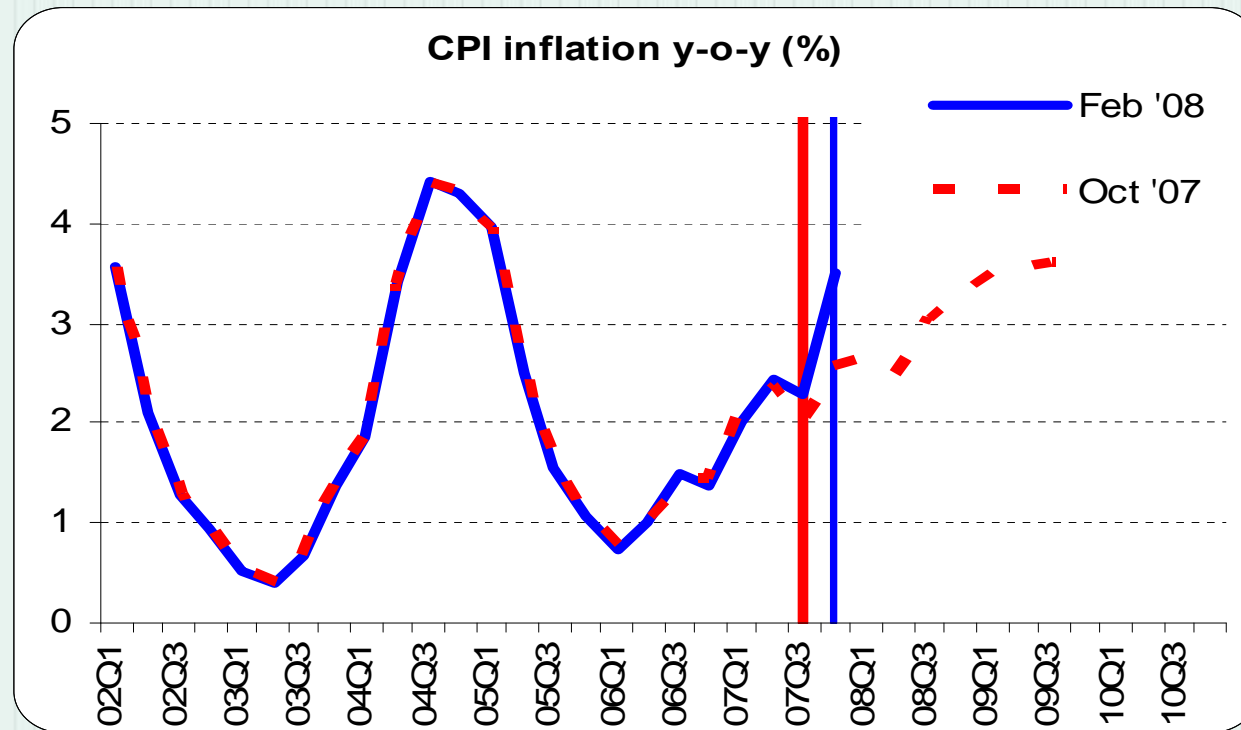
ULC: slightly lower growth rate



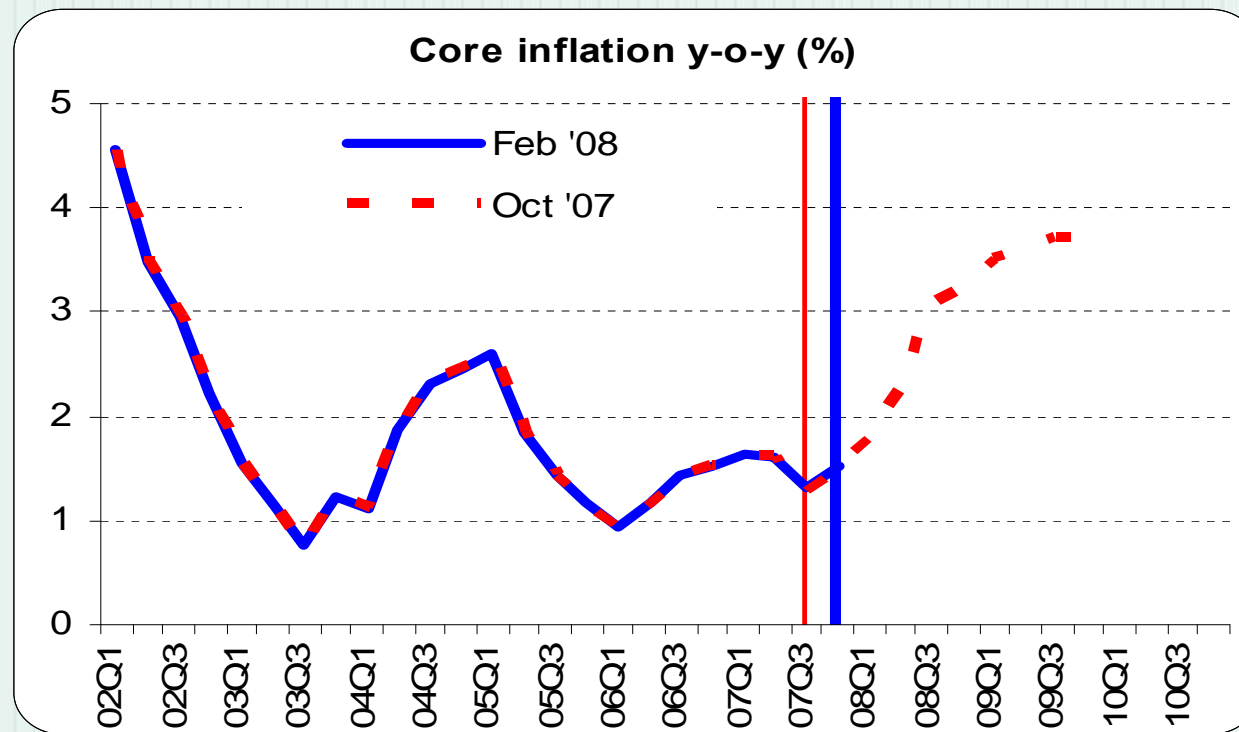
Inflation

Starting point

Inflation: higher



Core inflation: in line with expectations



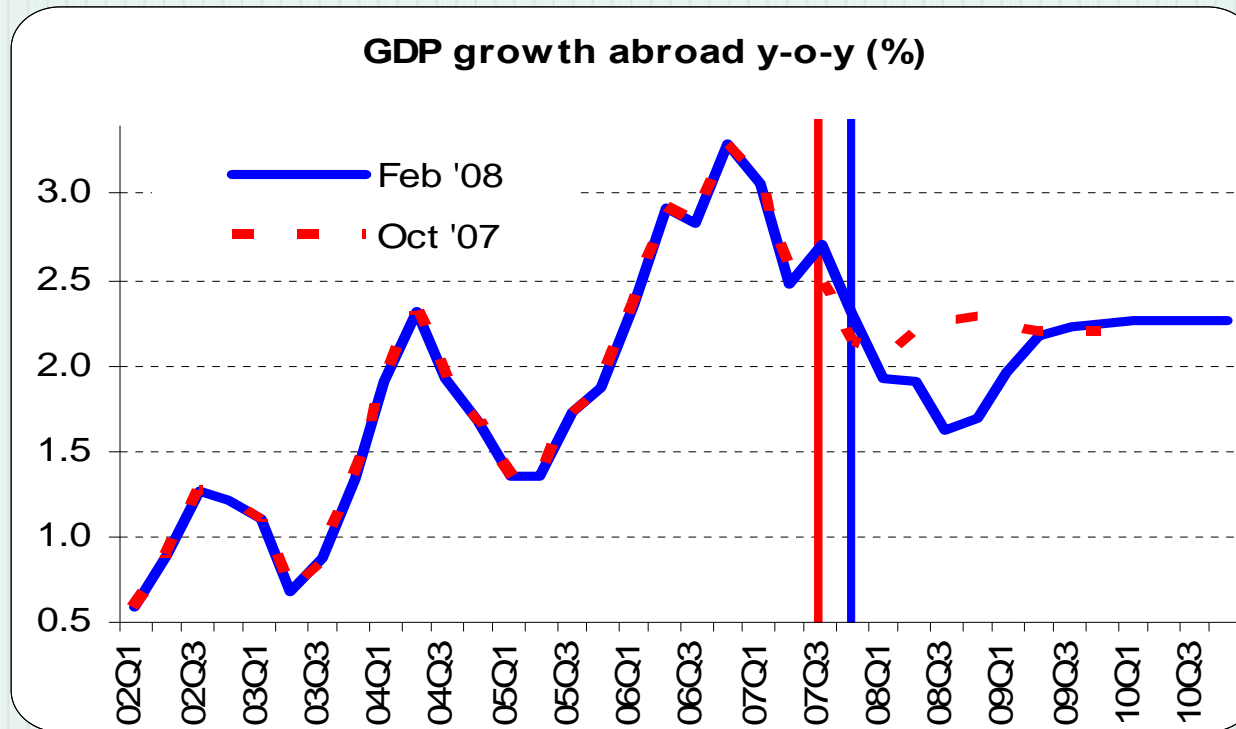
**Macroeconomic projection
for 2008-2010**

Constant interest rates

Assumptions

Macroeconomic projection

Growth abroad: lower until mid-2009



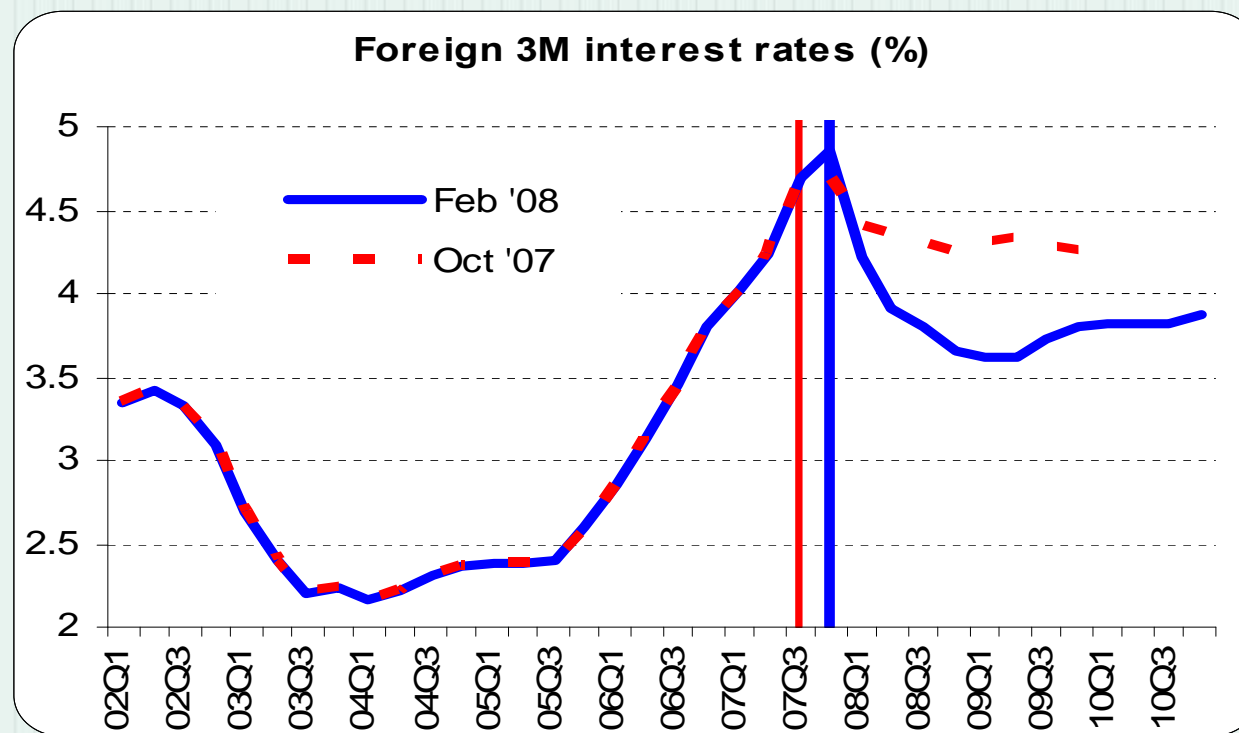
In the ECMOD model, the foreign sector is represented by three economies (weights in brackets):

- **euro area** (87.8%)
- **United Kingdom** (7.2%)
- **United States** (5.0%)

Economic growth abroad in comparison to the October projection

- in the United States: **lower** both in 2008 and in 2009 by 0.8 and 0.5 pp, respectively
- in the euro area: **lower** by 0.4 pp in 2008 and **similar** in 2009
- in the United Kingdom: **lower** both in 2008 and in 2009 by 0.8 and 0.2 pp, respectively

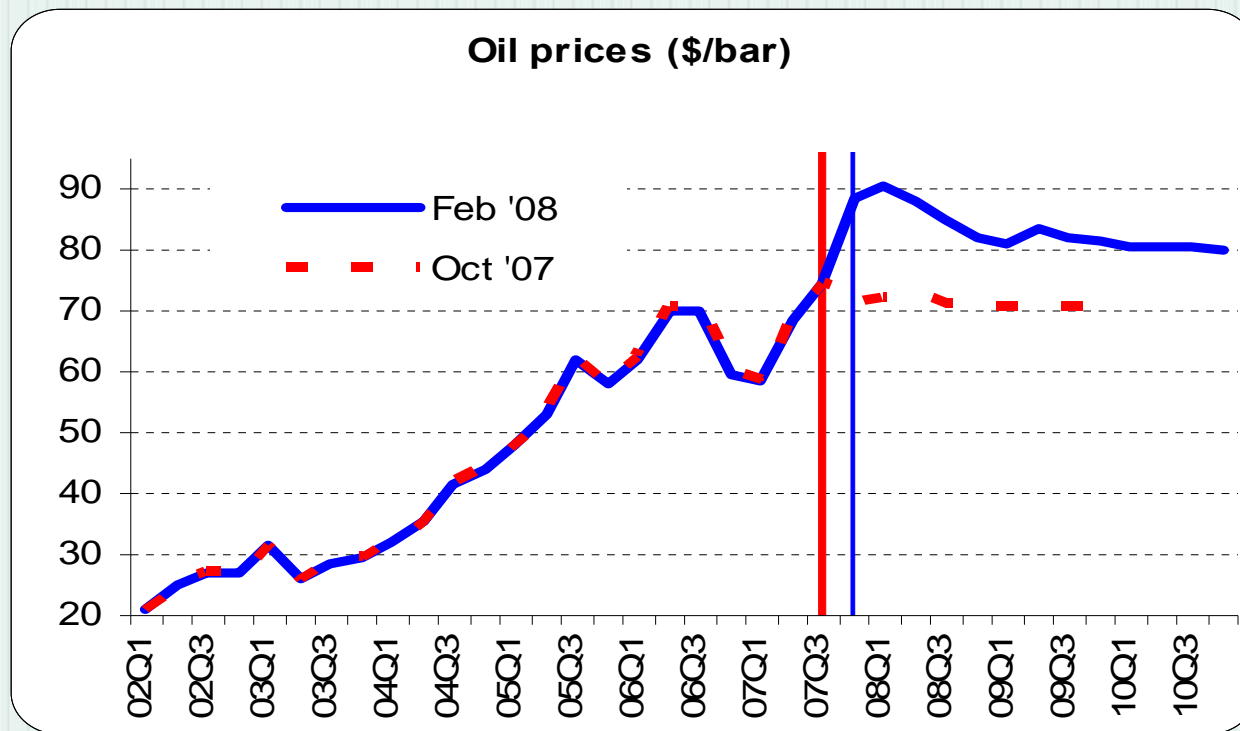
Foreign interest rates: lower in 2008-2009



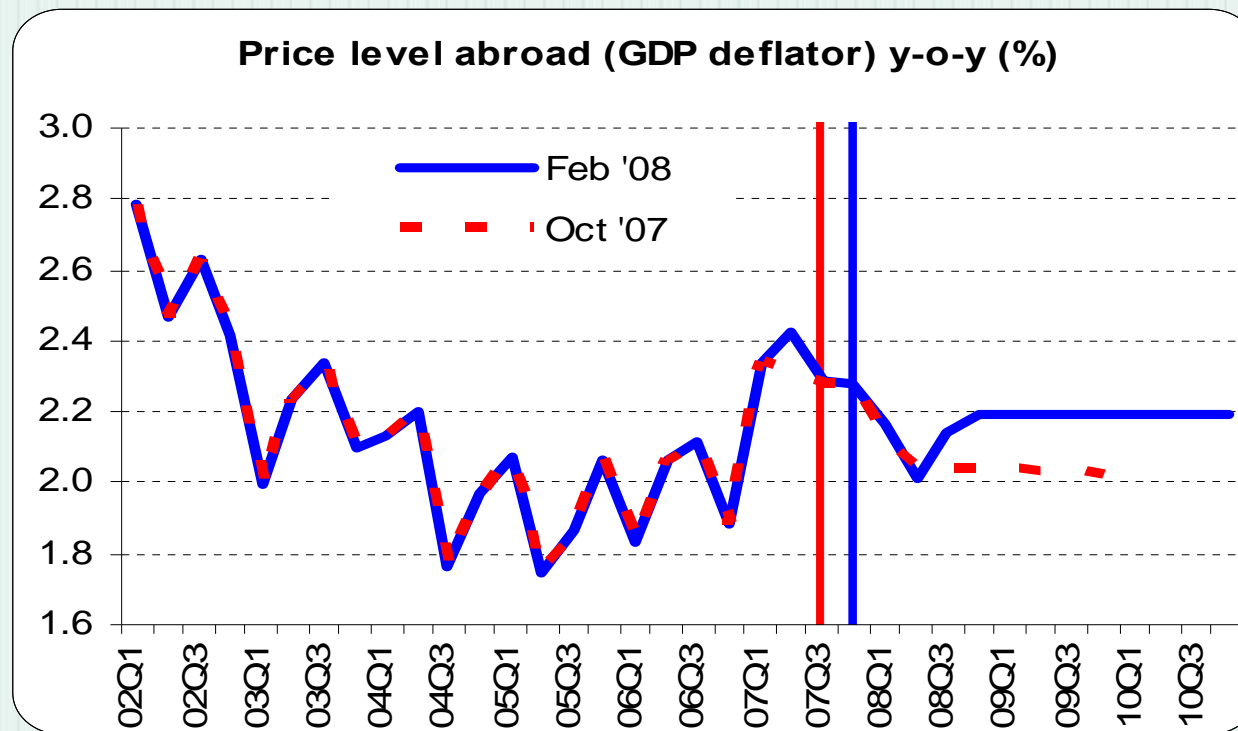
Market interest rates abroad lower in comparison to the October projection

- in the United States: by approx. 1.9 pp on average
- in the euro area: by approx. 0.4 pp on average
- in the United Kingdom: by approx. 0.7 pp on average

Oil prices: higher throughout the projection horizon



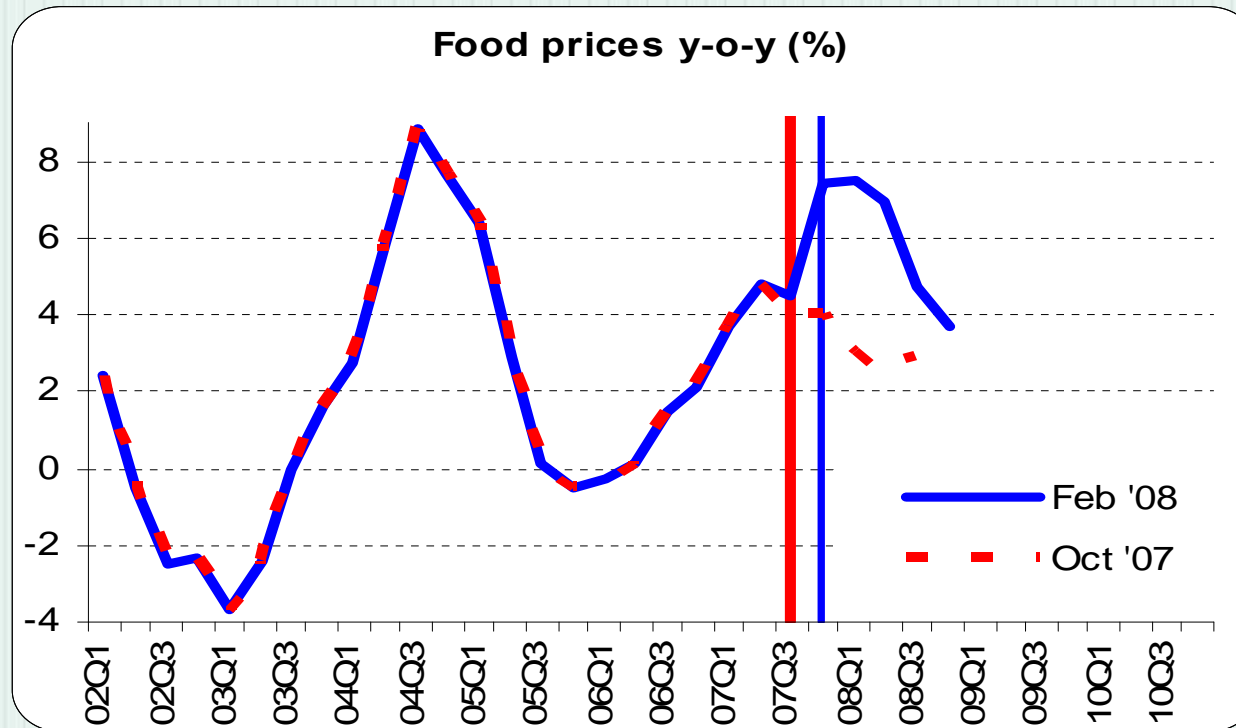
Inflation abroad: slightly higher GDP deflator inflation starting from 2008 Q3



GDP deflator inflation abroad in comparison to the October projection

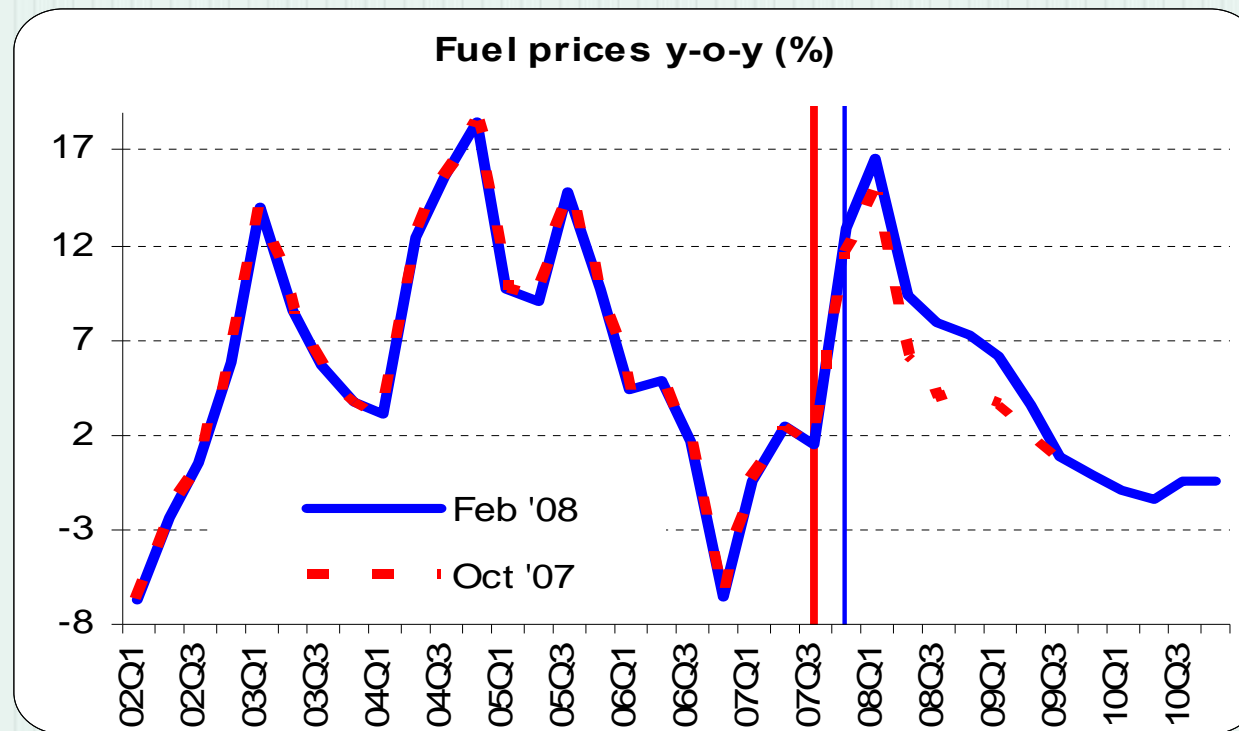
- in the United States: **lower** both in 2008 and in 2009 by 0.3 and 0.1 pp, respectively
- in the euro area: **higher** both in 2008 and in 2009 by 0.1 and 0.2 pp, respectively
- in the United Kingdom: **lower** both in 2008 and in 2009 by 0.2 pp

Food prices y-o-y: considerably higher growth at the turn of 2007 and 2008



- Decreasing impact of expert-set food prices on inflation (subsiding after 4 quarters)
- Food price inflation "converges" to core inflation (no sequence of shocks is forecast that would make food price inflation deviate from core inflation)

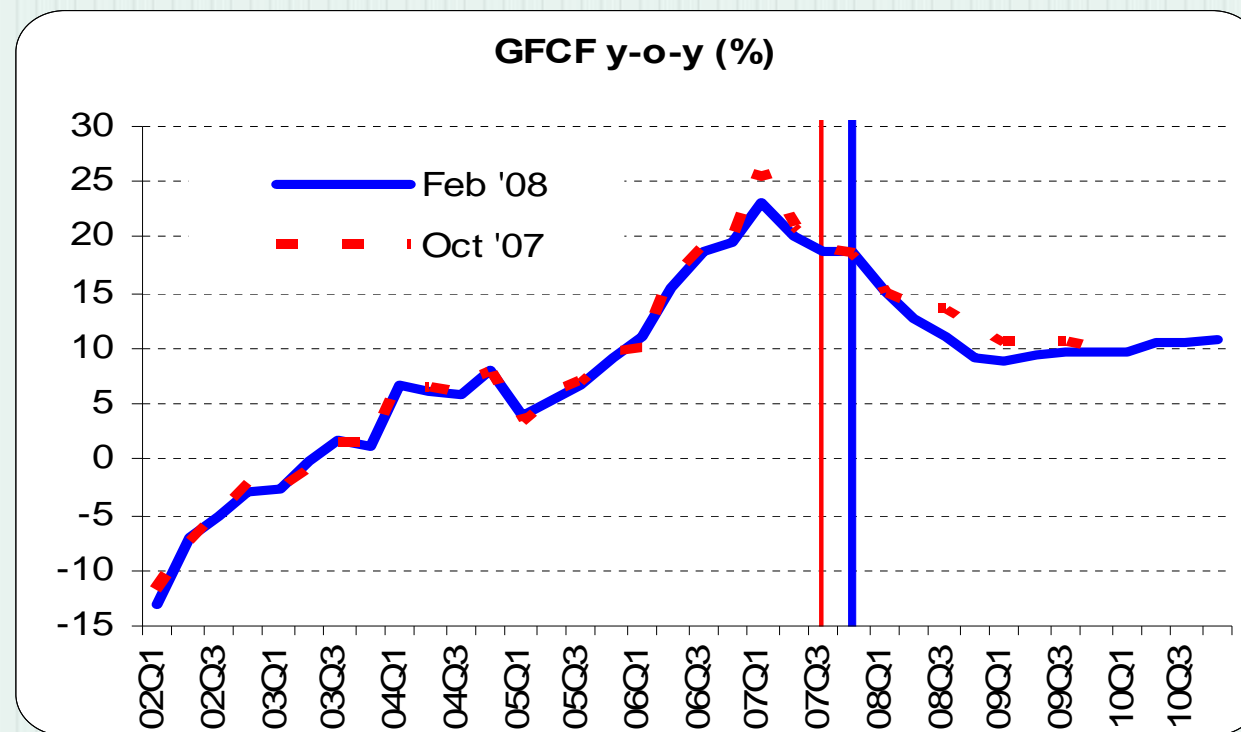
Fuel prices y-o-y: higher growth rate in the short projection horizon



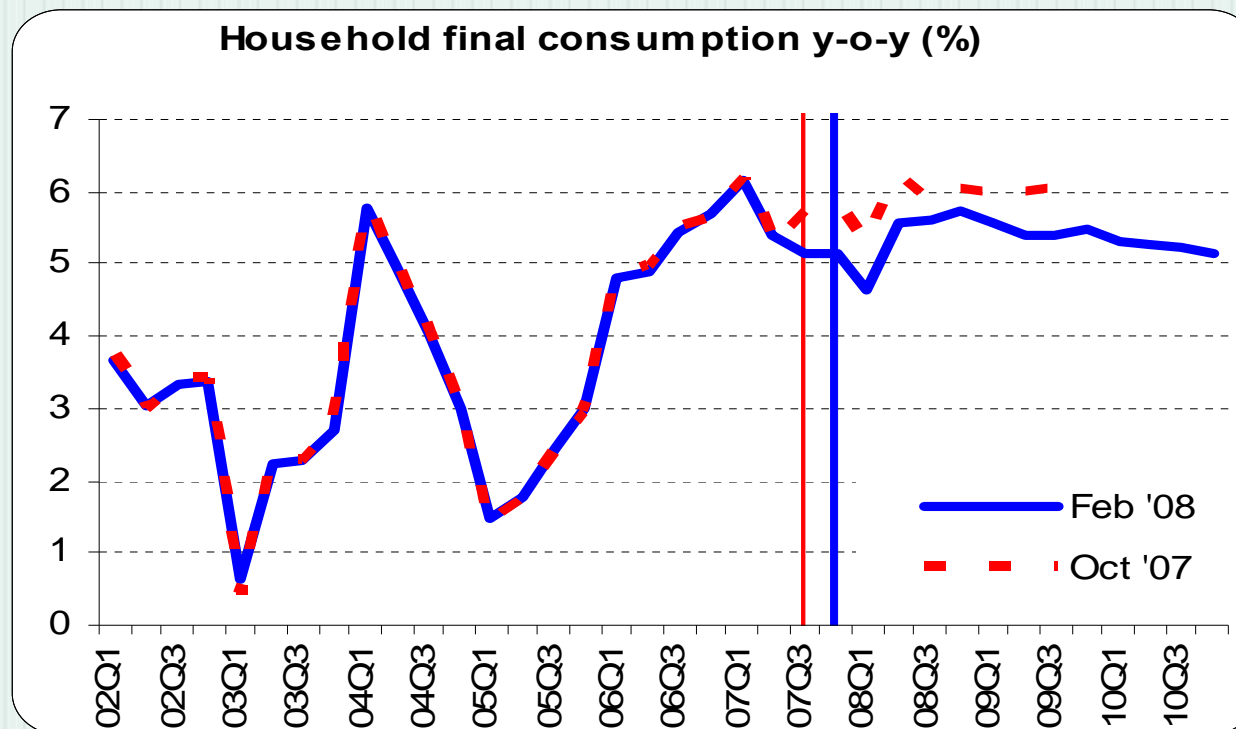
GDP and its components

Macroeconomic projection

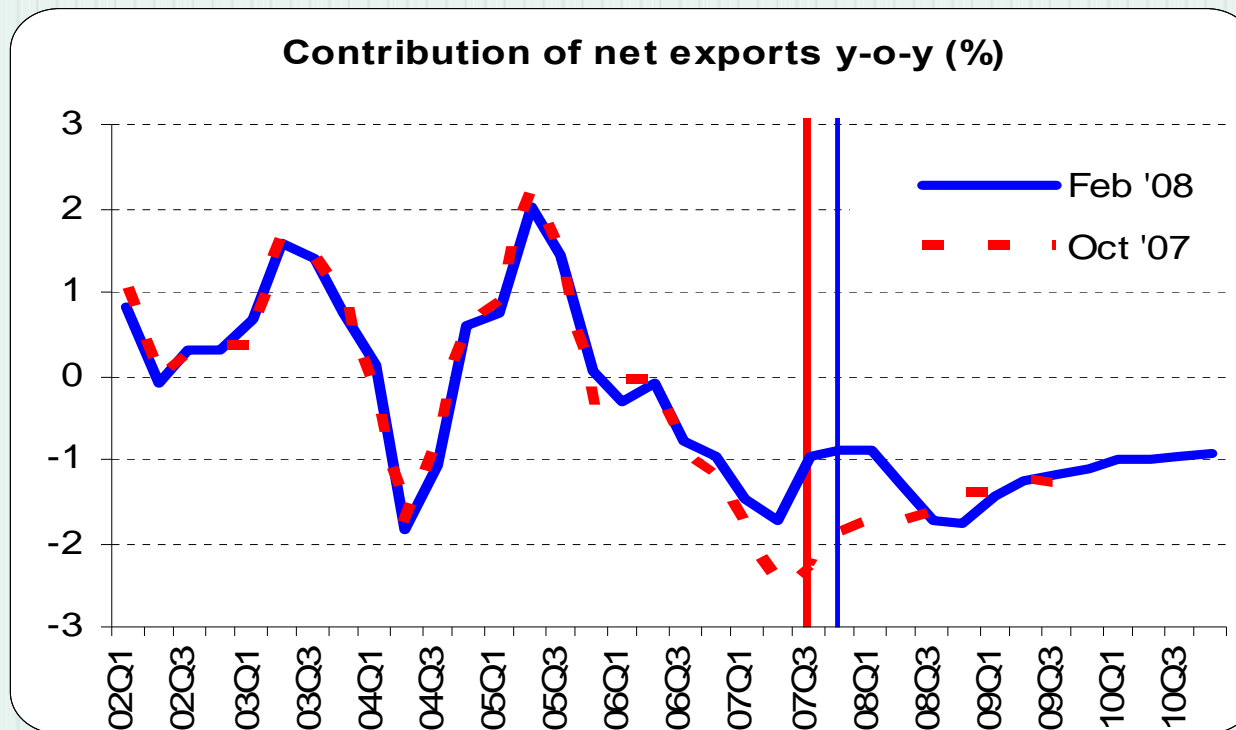
Gross fixed capital formation: slightly lower growth rate in 2008



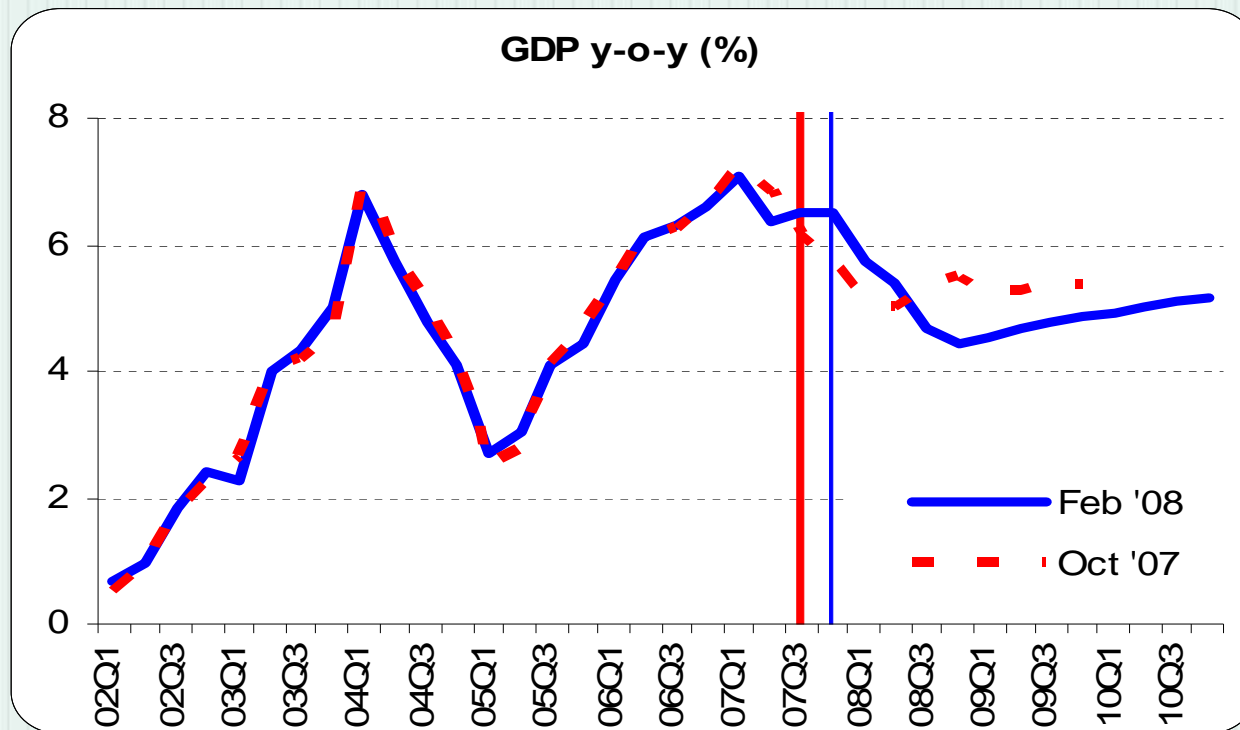
Individual consumption: lower growth rate throughout the projection horizon



Contribution of net exports: higher in 2008 Q1 and Q2



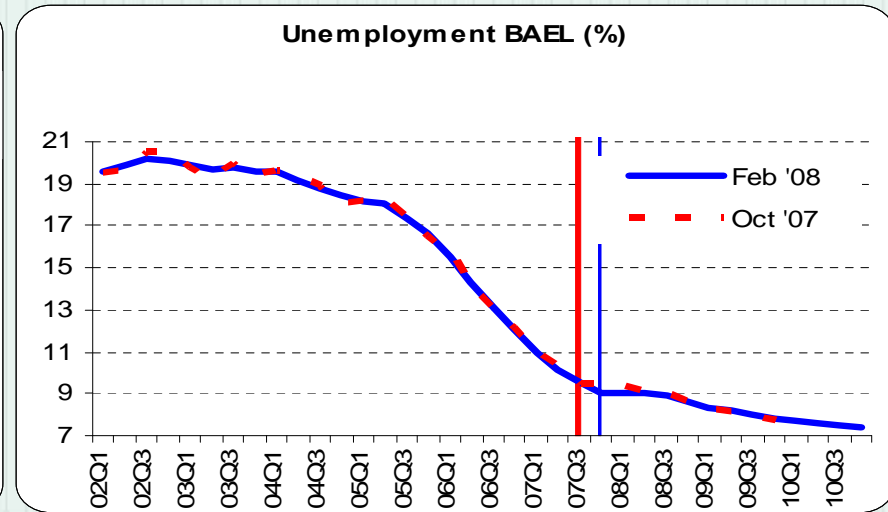
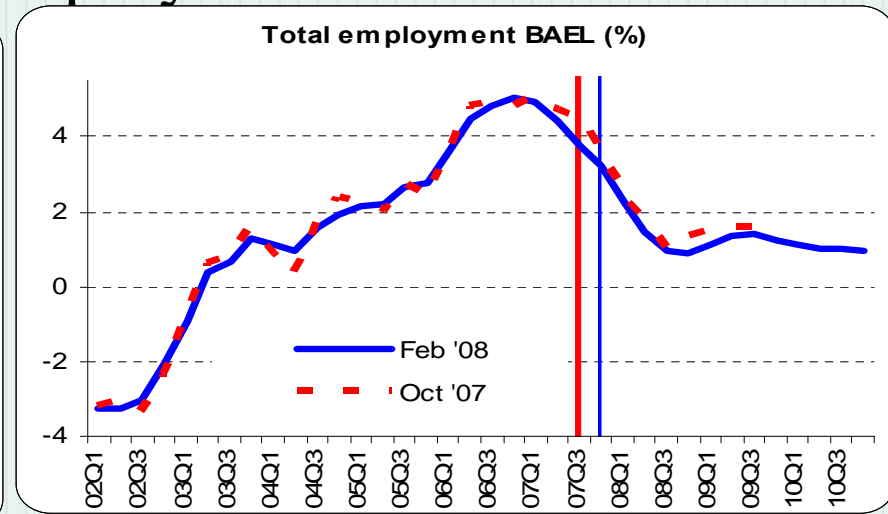
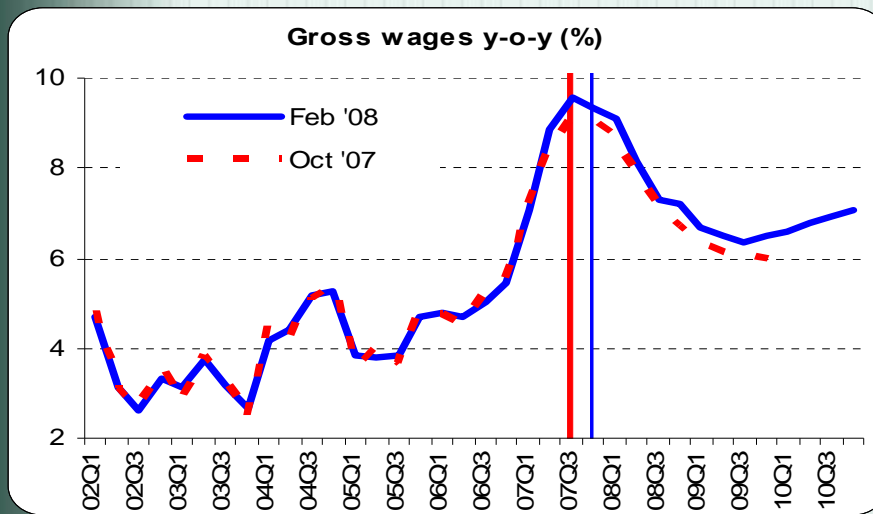
GDP: higher growth rate in 2008 H1, then below the October path



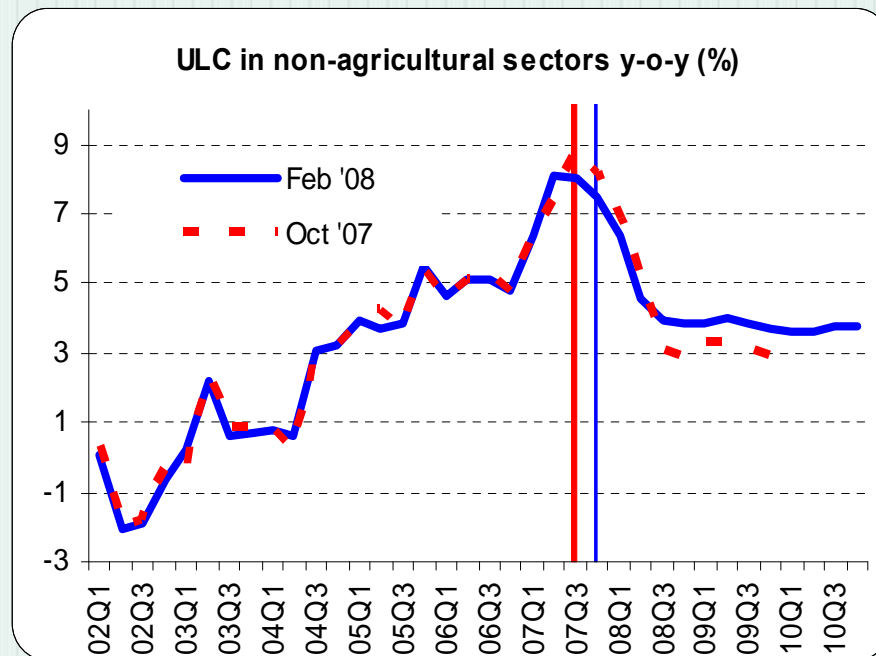
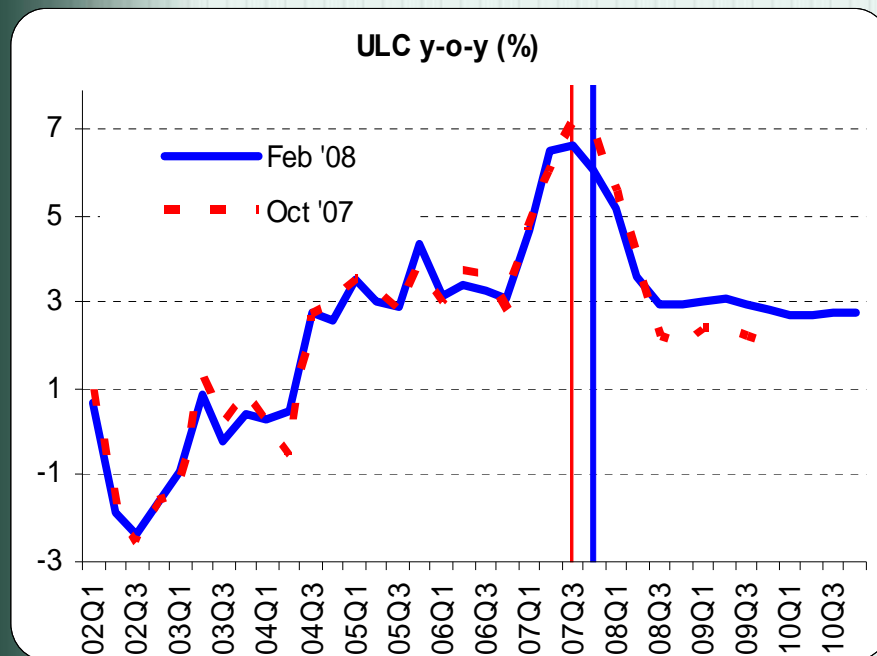
Labour market

Macroeconomic projection

Labour market: slightly faster wage growth, slower increase in employment



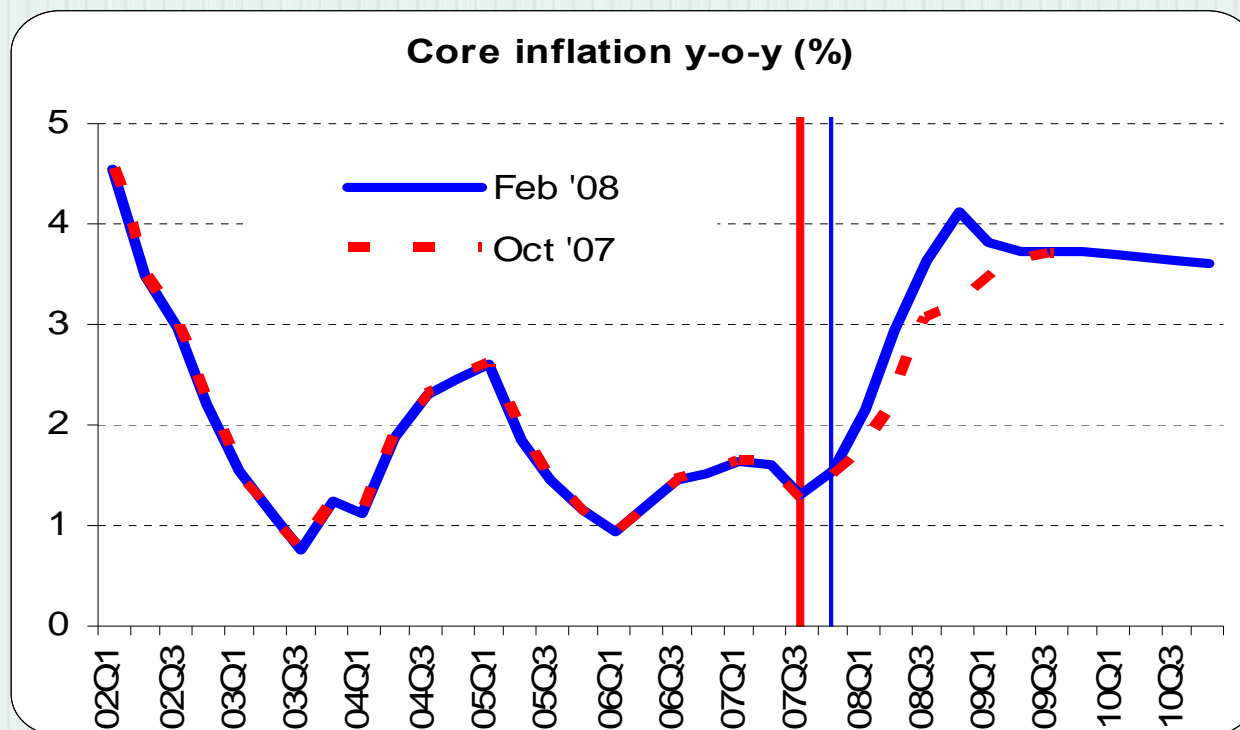
ULC: initially lower, then higher growth rate



Inflation

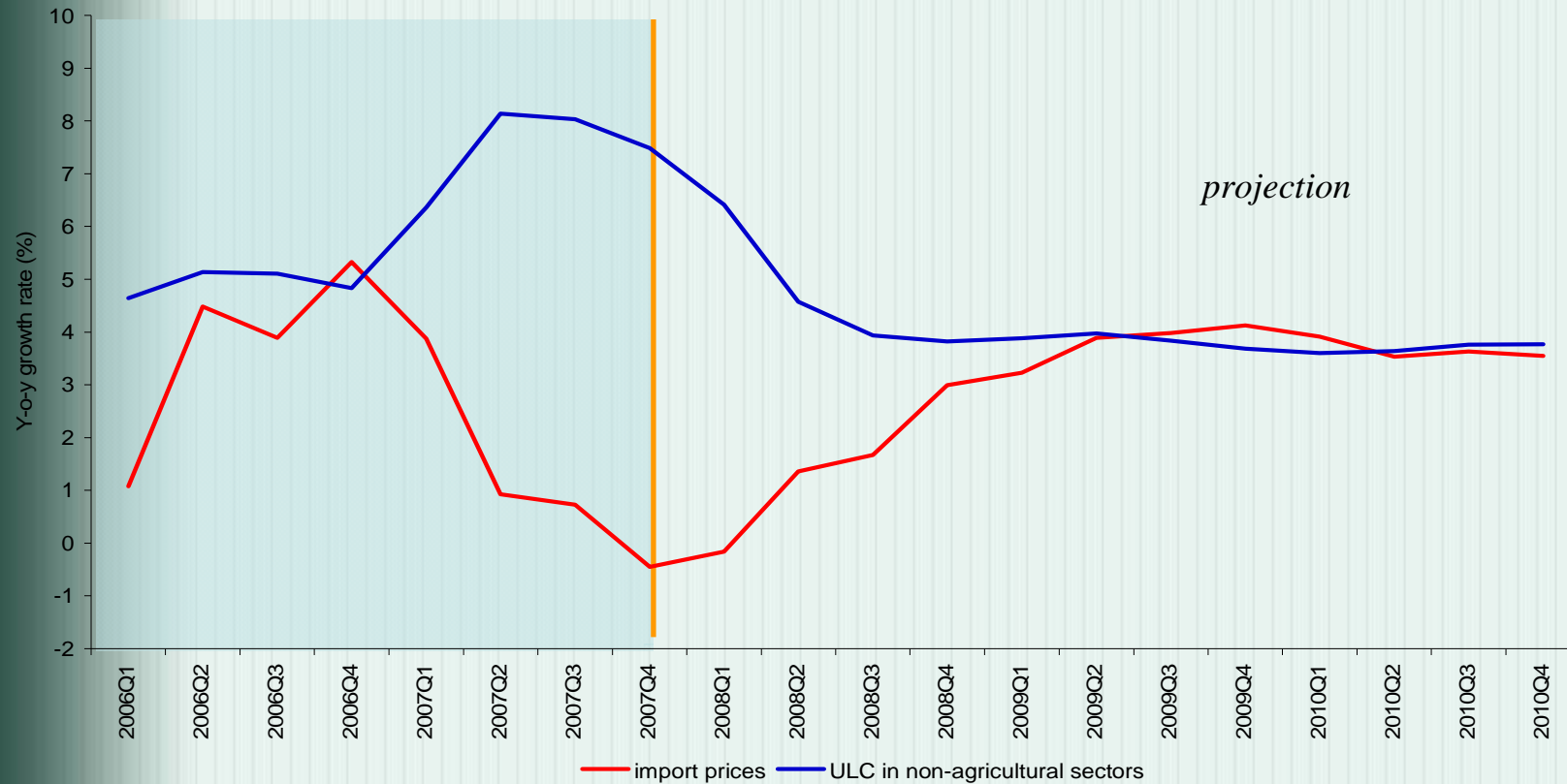
Macroeconomic projection

Core inflation: higher in the short projection horizon
(mainly due to high growth in prices of electricity)

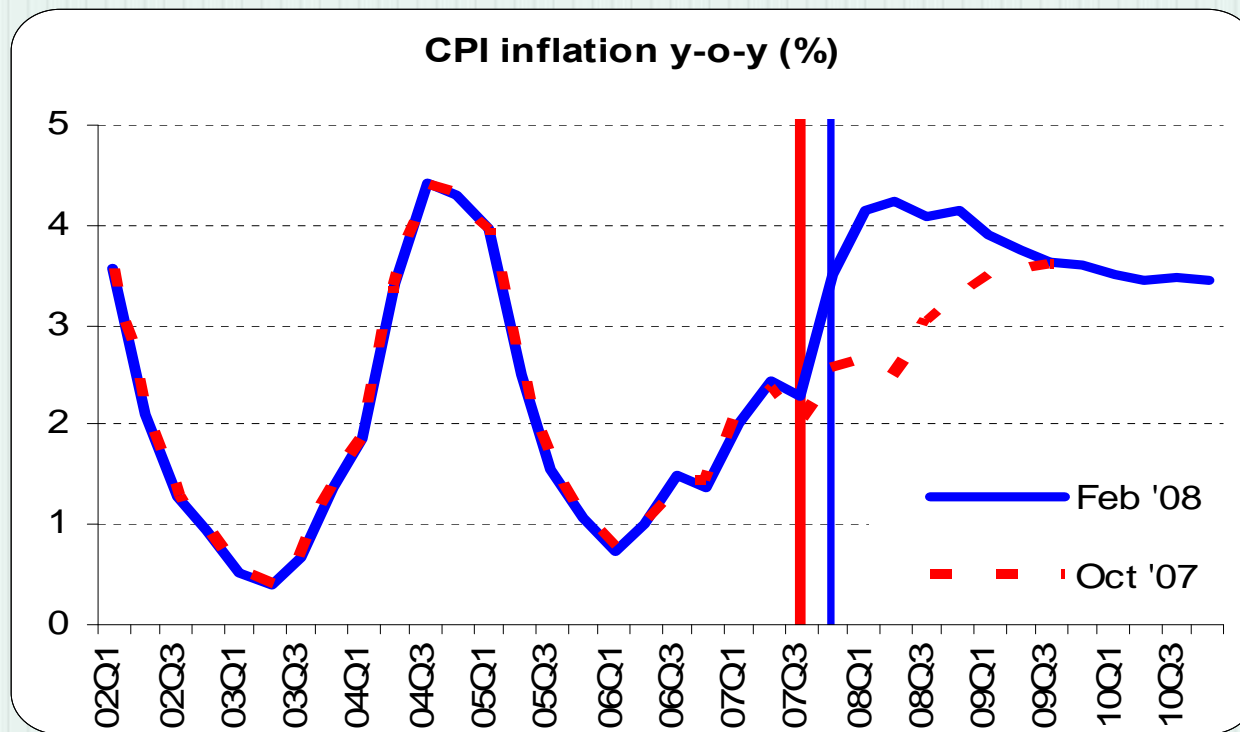


Core inflation derminants

Determinants of y-o-y core inflation (%)



CPI inflation: markedly higher in 2008



The February projection compared to the October projection

Macroeconomic projection

The February projection compared to the October projection: CPI inflation

- CPI inflation remains clearly above the path of the October projection until mid-2009
- The higher path of inflation projection from mid-2009 results from:
 - higher food prices – first three quarters of 2008
 - higher core inflation (mainly due to electricity price hikes in February 2008) – until 2009 Q1
 - fuel prices growth rate – until mid-2009

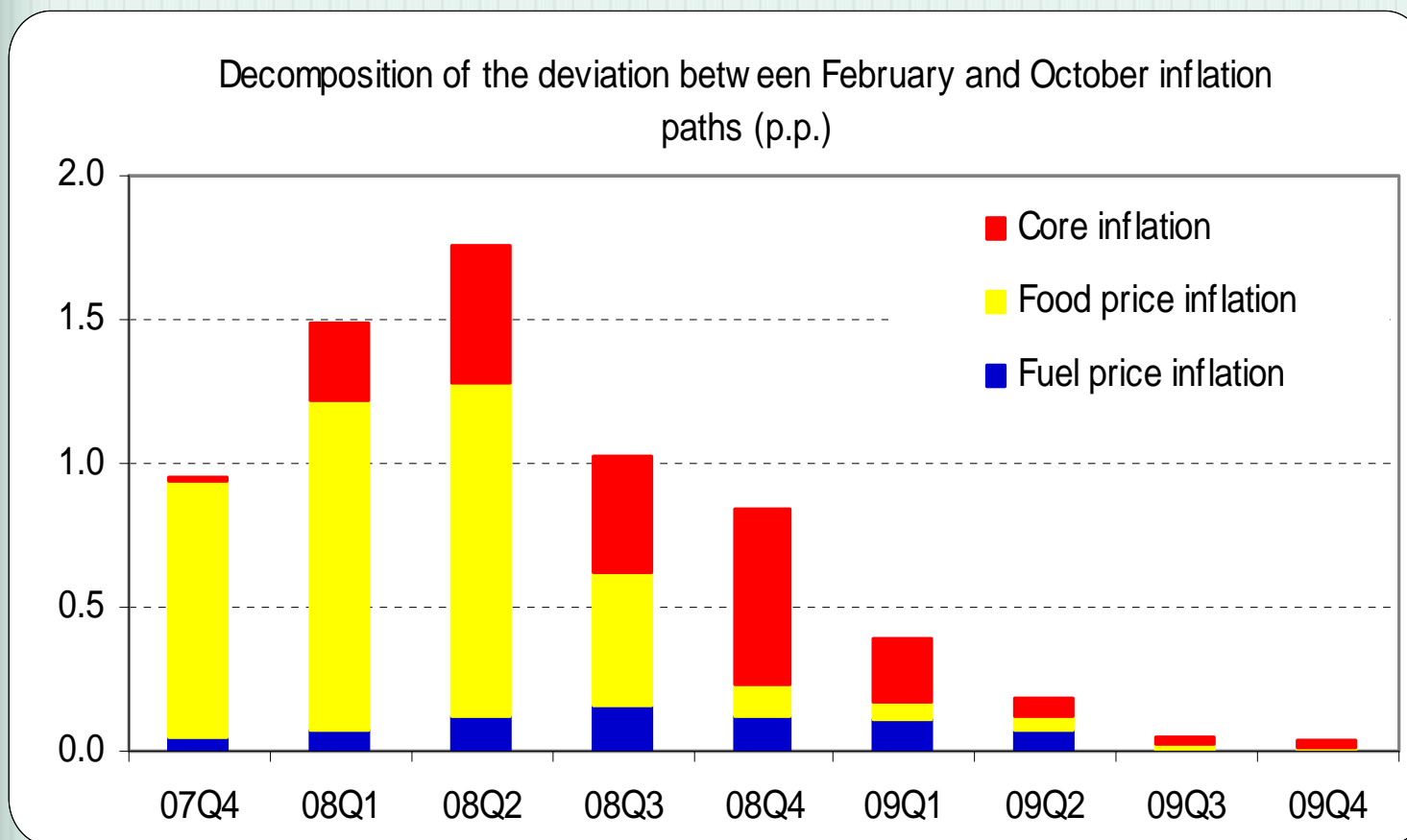
The February projection compared to the October projection: core inflation

- Net of the impact of energy price increases, core inflation in the February projection in the short projection horizon runs close to the path of the previous forecasting round
- The impact on inflation of ULC growth that is stronger than in the October projection is to a large extent offset by lower import prices

**Decomposition of the inflation
deviation from the previous projection**

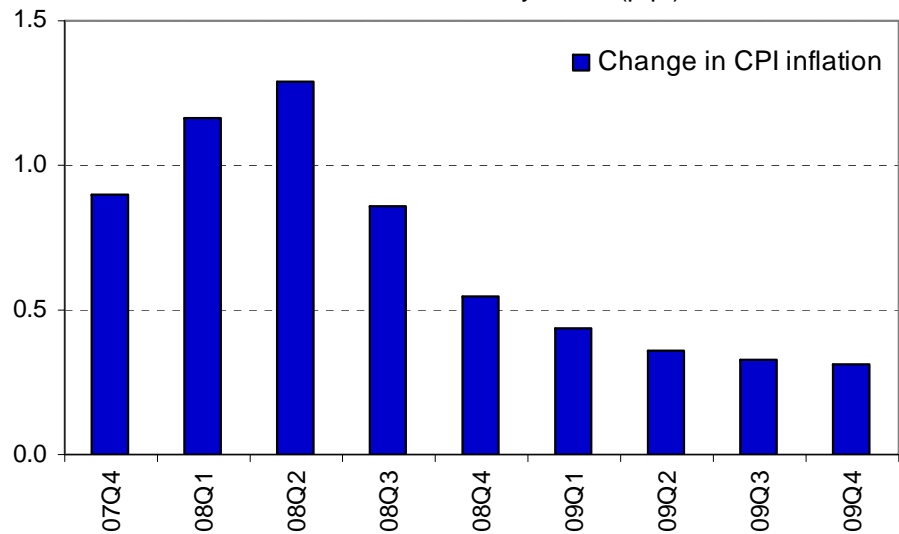
Macroeconomic projection

Decomposition of the deviation between the February and October inflation

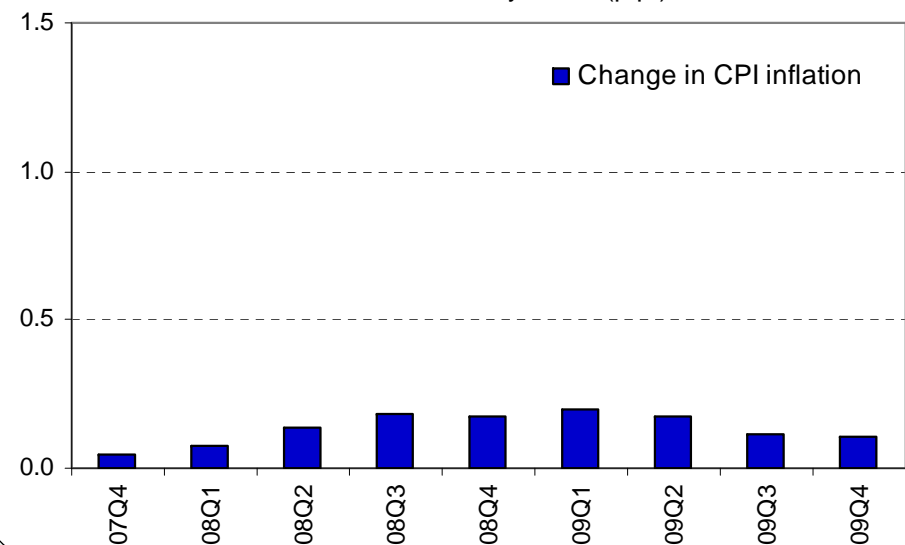


Food prices* and fuel prices

Deviation of the February CPI inflation projection as a result of the change in the assumed path of food prices between October and February round (p.p.)



Deviation of the February CPI inflation projection as a result of the change in the assumed path of fuel prices between October and February round (p.p.)



* Food prices **directly** affect the CPI in the first four quarters of the projection. In subsequent quarters, food prices affect the CPI **indirectly** through the mechanisms embedded in the model.

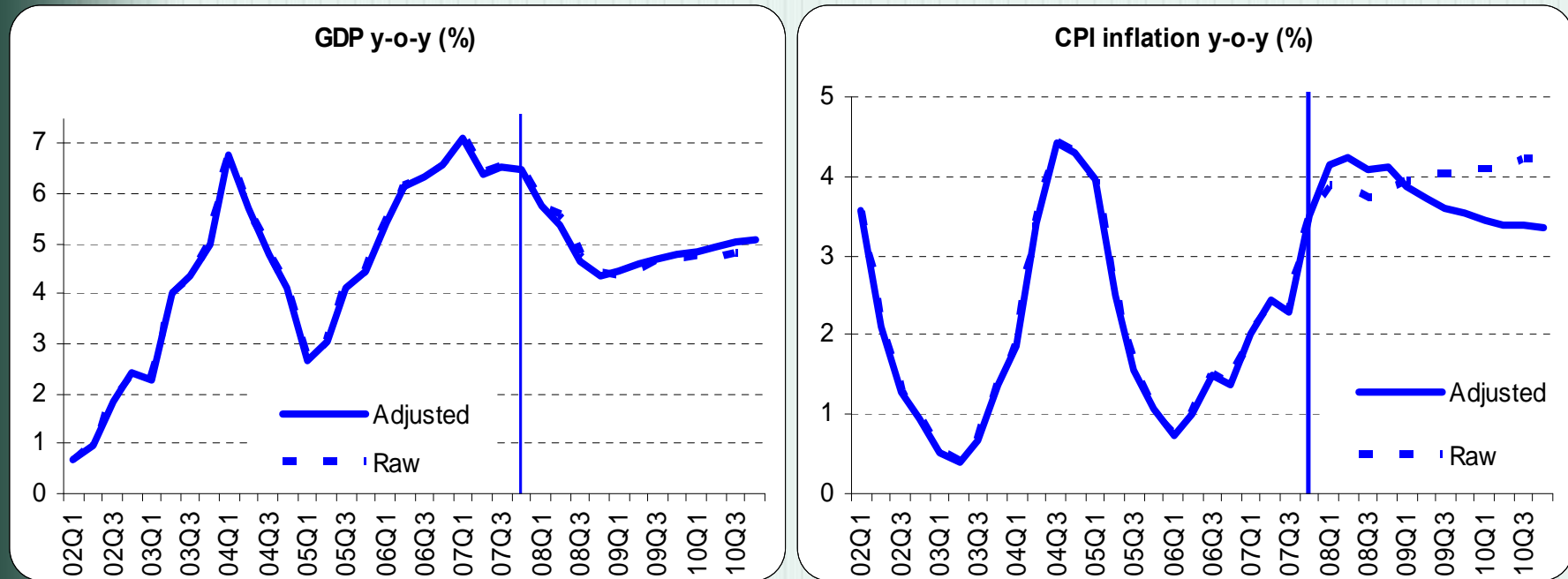
Expert adjustments

Macroeconomic projection

Expert adjustments

- Main areas of adjustments in the February forecasting round:
 - **Exchange rate:** appreciated path of the foreign exchange rate throughout the projection horizon. Adjustment accounts for the permanent nature of the recent exchange rate appreciation (observed exchange rate strengthening was not matched by any significant change in price competitiveness of foreign trade).
 - **Structure of GDP growth:** the nature and scope of adjustments similar to those from the previous forecasting rounds. The structure of GDP growth adjusted in order to increase the contribution of domestic demand and weaken the contribution of net exports.
 - **Core inflation:** adjustment accounting for electricity price hikes

Joint effect of the adjustments on inflation and GDP

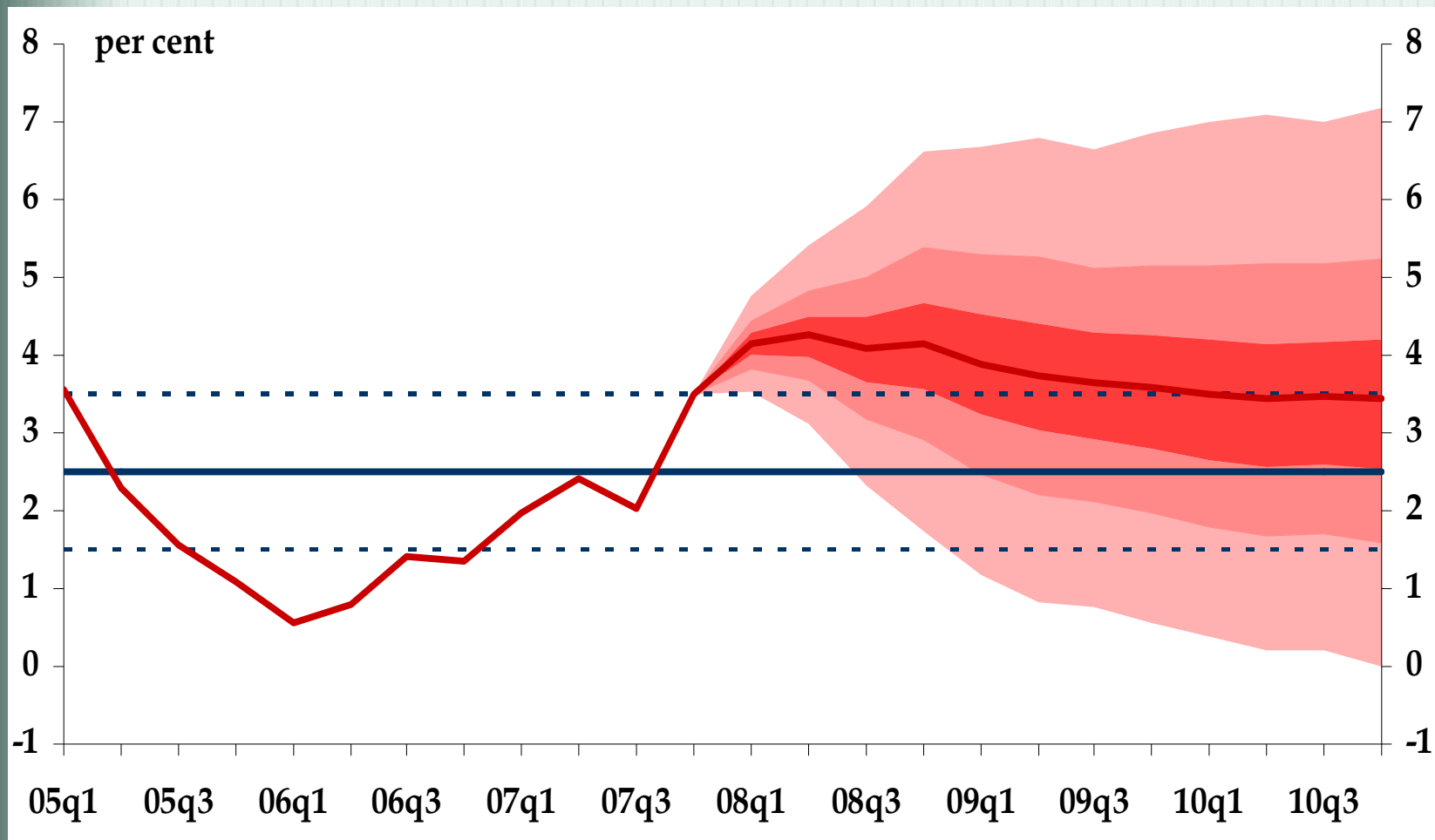


Uncertainty of inflation projection

**Uncertainty factors accounted for
in the model – fan chart**

Uncertainty of projection

Inflation projection – February 2008



Source: Economic Institute

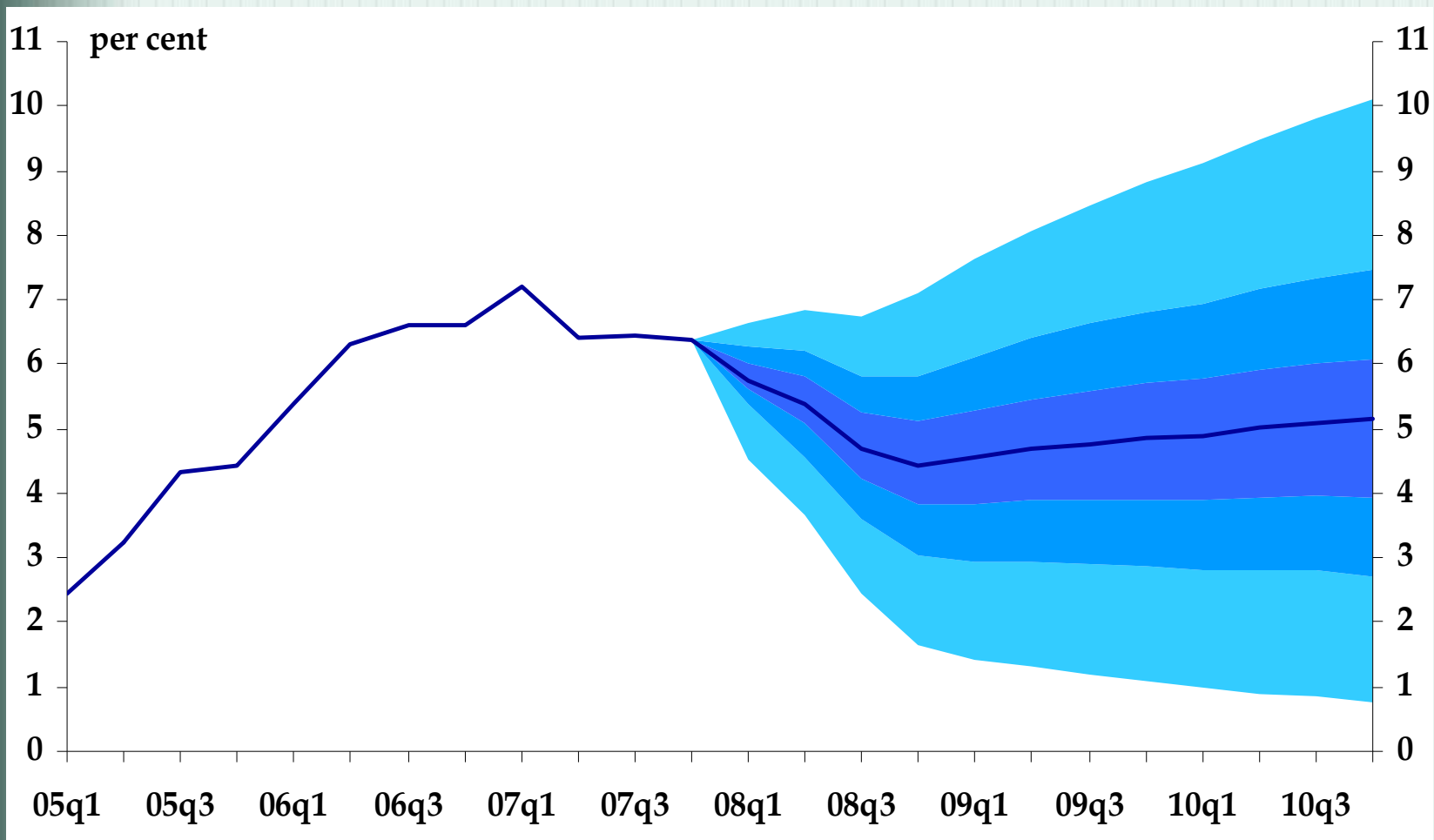
Decomposition of central path uncertainty (decomposition of the fan chart)

- **food prices** have dominant impact on the uncertainty of inflation projection **throughout the projection horizon**
- **in the short term:** additionally the uncertainty of inflation is connected with the core inflation, oil and fuel prices and the exchange rate
- **in the long term:** inflation uncertainty depends on the GDP deflator, import and export prices, the exchange rate and variables describing the labour market
- The fan chart does not account for uncertainty of the model (it is based on the assumption that model projections are not systematically biased)

Overview of probabilities for inflation

Probability of inflation running:					
	below 1.5%	below 2.5%	below 3.5%	below the central path	in the range (1.5%; 3.5%)
2008 Q1	0.000	0.000	0.044	0.507	0.044
2008 Q2	0.000	0.005	0.137	0.507	0.137
2008 Q3	0.007	0.072	0.297	0.506	0.290
2008 Q4	0.035	0.132	0.338	0.505	0.303
2009 Q1	0.074	0.205	0.412	0.506	0.338
2009 Q2	0.105	0.248	0.453	0.507	0.348
2009 Q3	0.114	0.267	0.478	0.509	0.364
2009 Q4	0.136	0.293	0.496	0.514	0.360
2010 Q1	0.158	0.319	0.519	0.520	0.361
2010 Q2	0.173	0.338	0.531	0.523	0.358
2010 Q3	0.169	0.331	0.525	0.518	0.355
2010 Q4	0.186	0.344	0.528	0.518	0.342

Projection of GDP growth– February 2008



Source: Economic Institute

Uncertainty factors unaccounted for in the model

Uncertainty of projection

1. Deeper slowdown in the global economy (Inflation ↓)

- deeper and more permanent slowdown in the US economy
- higher than accounted for in the projection impact of the US economic slowdown on the global economy and the euro area in particular

2. Assessment of labour market situation and cost pressure using the LFS data (Inflation ↓)

- overestimation of the LFS population (the CSO may fail to sufficiently account for migration outflows) may be conducive to overstating the historical growth rate of employment and the ULC and, consequently, to overestimating the cost pressure at the beginning of the projection
- significant drop in the LFS population in 2007 Q2 and Q3 contributed to the change of the forecast of the number of labour market participants throughout the projection horizon

3. Propensity of enterprises to pass rising production costs on prices amid globalisation (Inflation ↓)

- limited capacity of passing rising production costs on prices due to fiercer competitive pressure
- increased capacity of reducing non-labour production costs
- possibility to partially offset higher production costs by cutting profit margins (very good financial standing of enterprises)

4. Stronger tensions on the labour market (Inflation ↑)

- intensity and character of migration flows
- the impact of economic recovery and fiscal incentives (reduction of wage wedge) on the increase in effective labour supply
- the impact on the labour market of regulations on the minimum wage and early retirement
- higher wage demands in the public sector

5. Food prices (Inflation \leftrightarrow ↓)

- domestic food prices are increasingly dependent on trends in the global market
- long-term forecasts prepared by external institutions (including the World Bank and OECD) assume a slowdown in the growth of prices of staple food products starting from 2009
- currently high level of relative food prices may trigger supply-side adjustments
- continuously high growth in the demand for food from developing countries
- increase (decline) in subsidies to bio-fuels (especially in the USA)

6. Exchange rate (Inflation \leftrightarrow)

- problems in forecasting the zloty exchange rate translate into a high forecast uncertainty

7. Data released after the cut-off date

- External environment:
 - data available after the cut-off date confirm the risk of a considerable economic slowdown in the United States
 - increased risk of lower interest rates in the euro area and the United Kingdom in relation to projection assumptions
- Preliminary GDP estimate for 2007 (CSO, 30 January 2008):
 - implications for the starting point of the projection: GDP growth as expected, weaker consumption, higher investment, significantly lower foreign trade deficit
 - increased probability that the output gap will be closing faster in the coming quarters and the external imbalance will be rising at a slower pace than in the projection
- LFS data for 2007 Q4 (CSO, 25 February 2008):
 - implications for the starting point of the projection: higher increase in employment, deeper drop in the unemployment rate
 - increased probability of stronger cost pressure in the medium-term projection horizon
- Prices of fuels and natural gas
 - increased probability of lower prices of fuels in 2008 Q1 to those assumed in the projection
 - a motion submitted by the Polish Oil and Gas Company (PGNiG) to the Energy Regulatory Office (URE) suggests the risk of higher than expected growth in natural gas prices

Uncertainty factors – summary

Uncertainty of projection

Having considered non-model uncertainty factors, it can be assessed that:

- the risk of the projection is distributed symmetrically in the short-term horizon
- in the long-term horizon it is more probable that inflation will run below the path presented in the projection

Uncertainty of projection