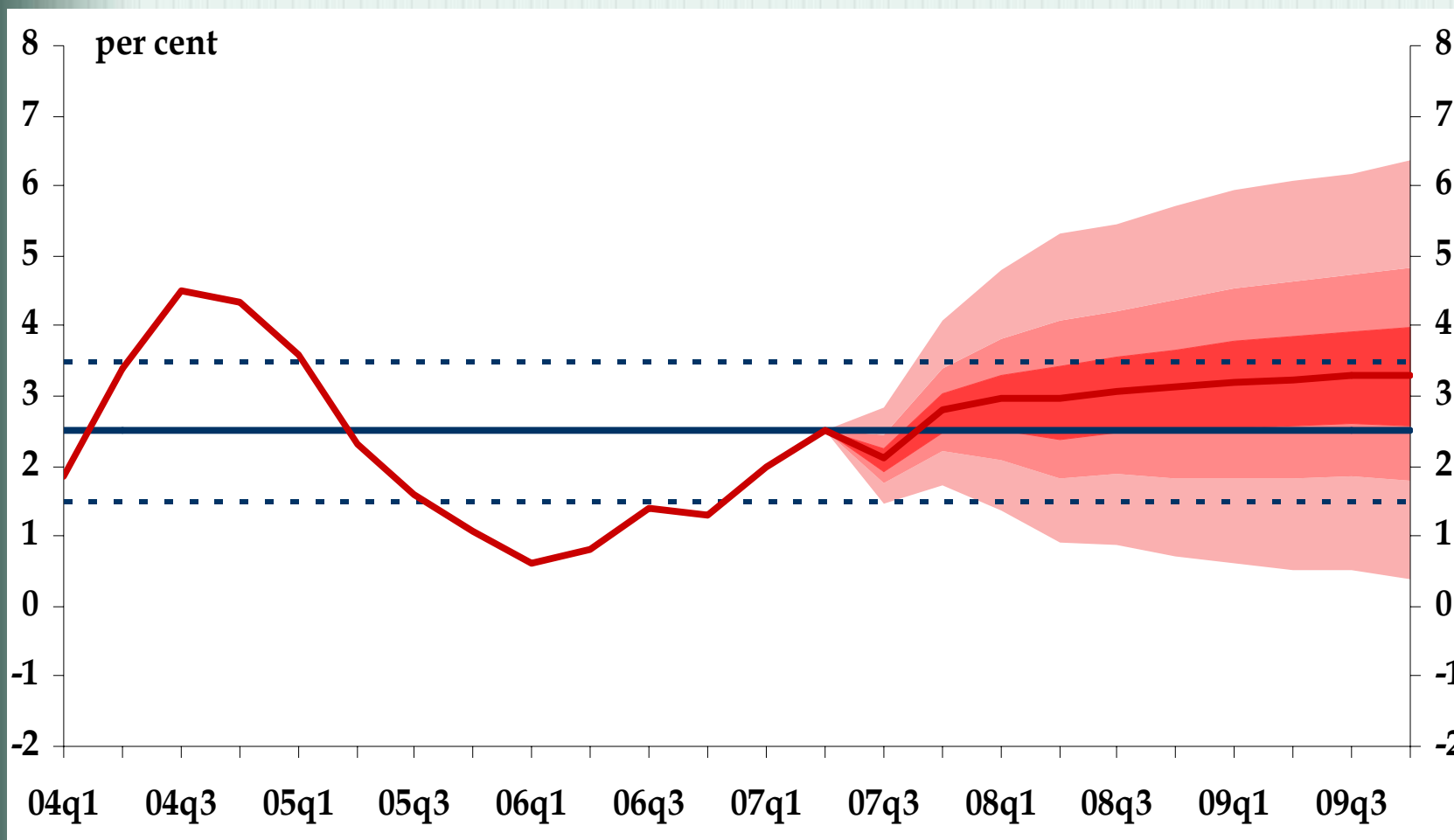


**Inflation projection
of the National Bank of Poland
based on ECMOD model**

July 2007

Inflation projection – July 2007



Source: Macroeconomic and Structural Analyses Department

Presentation plan

- Model
 - Changes introduced to the model after the April projection
 - Comparison of impulses in the April and July versions of the model

- Central projection
 - Starting point as compared to the April projection
 - Projection for 2007-2009
 - The July projection compared to the April projection
 - Expert adjustments

- Analysis of inflation projection uncertainty
 - Factors accounted for in the model – fan charts
 - Factors unaccounted for in the model

Model

Changes introduced to the model after the April projection (1)

- Re-estimation of consumption equation and property income equation connected with revision of data on disposable income for 2006
 - ❖ Consumption equation:
 - Decline in short-term disposable income elasticity of consumption
 - ❖ Property income equation:
 - Modification of long-term relationship: accounting for the impact of interest rates on this category of income
 - Faster return of property income to long-term relationship
 - In the short term, the condition of dynamic homogeneity of property income with respect to GDP was imposed and the impact of interest rate ignored

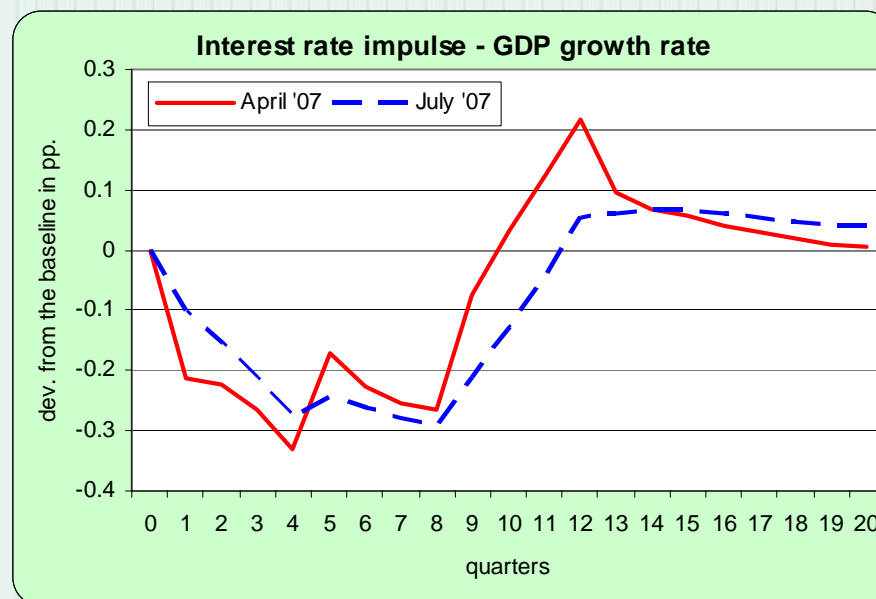
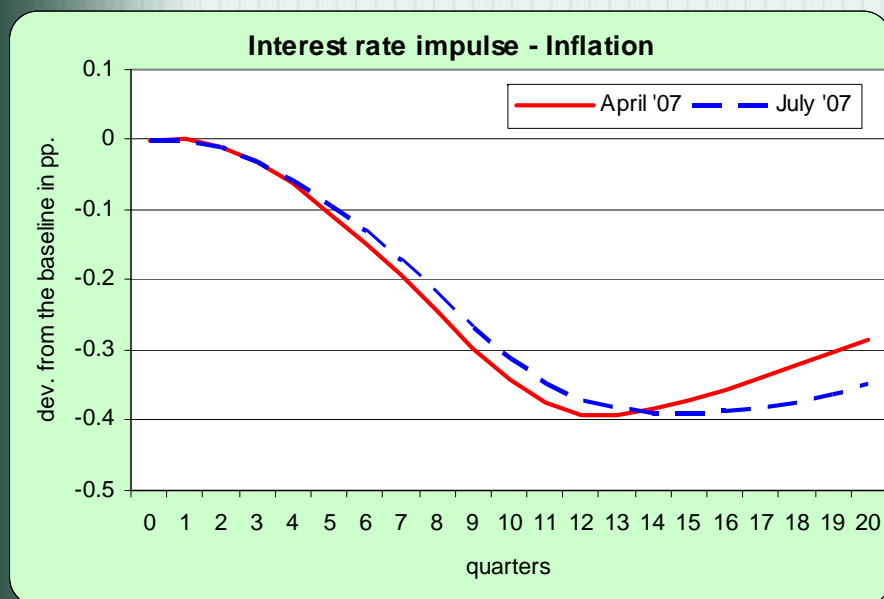
Changes introduced to the model after the April projection (2)

- Changes in export and import equations (in order to improve forecasting and simulation properties after introducing modifications in consumption equation and property income equation)
 - ❖ Export equation:
 - No change in the long-term relationship
 - Short-term dynamic was based exclusively on the change in the level of weighted GDP abroad
 - ❖ Import equation:
 - No change in the long-term relationship
 - In the short term, the equation returned to the specification in which import demand was based on GDP as a whole

Changes introduced to the model after the April projection

Monetary impulse

- Interest rate rise by 1pp for the period of 8 quarters. Starting from the ninth quarter interest rate follows monetary policy rule (i.e. Taylor's rule).

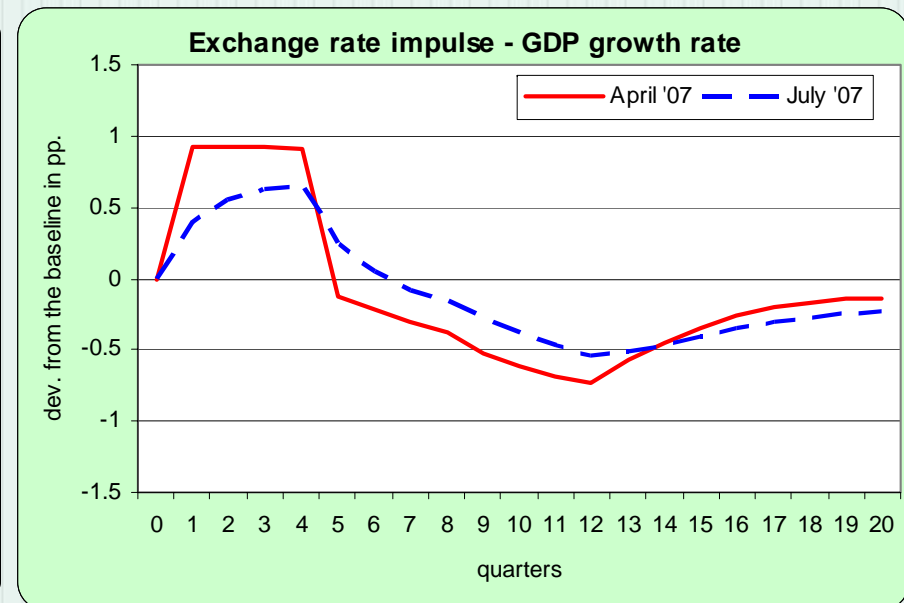
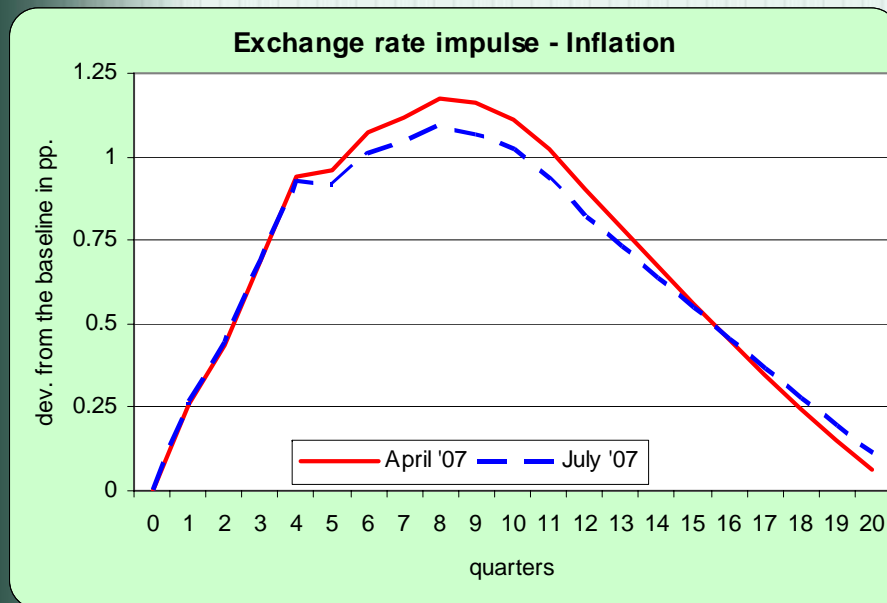


- Slight delay of maximum inflation reaction with impulse depth unchanged
- Slight changes in reaction of GDP

Changes introduced to the model after the April projection

Exchange rate impulse

- 10-percent currency depreciation for the period of 8 quarters. Starting from the ninth quarter interest rate follows monetary policy rule (i.e. Taylor's rule) and the exchange rate equation is activated.

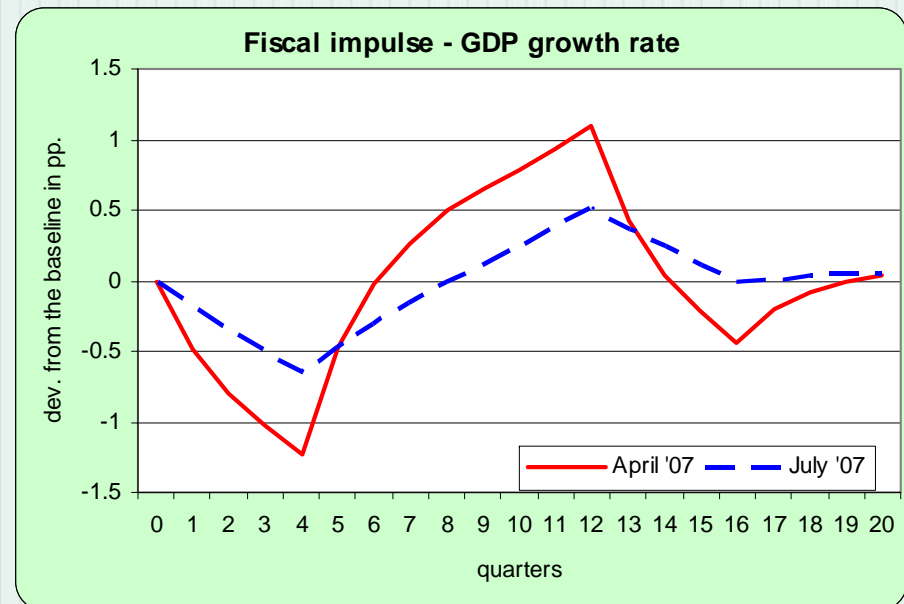
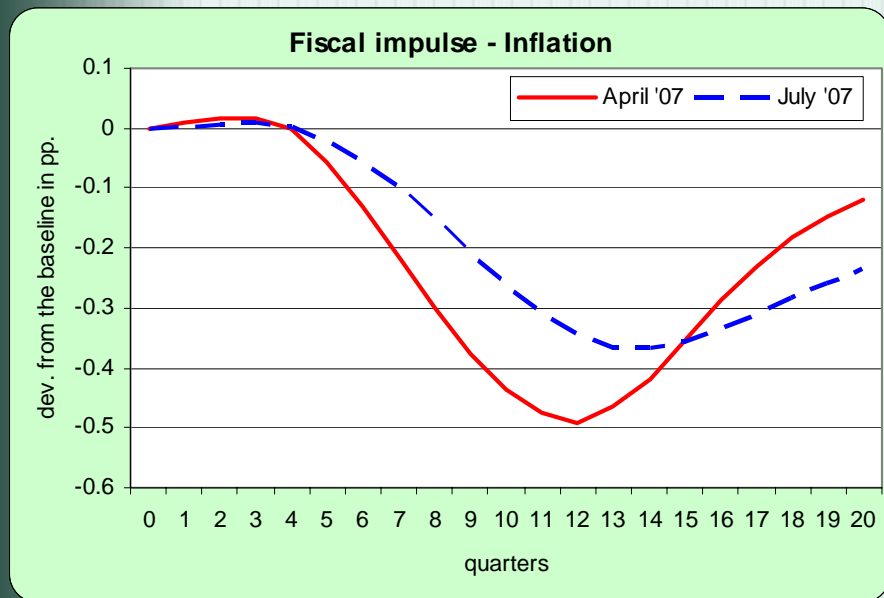


- Slight changes in inflation reaction
- Weakened and delayed GDP reaction to the impulse

Changes introduced to the model after the April projection

Fiscal impulse

- Current spending of the public finance sector lowered by 1% of GDP. Starting from the ninth quarter interest rate follows monetary policy rule (i.e. Taylor's rule).



- Weakening of both inflation and GDP reactions
- Maximum inflation reaction delayed by 1 quarter

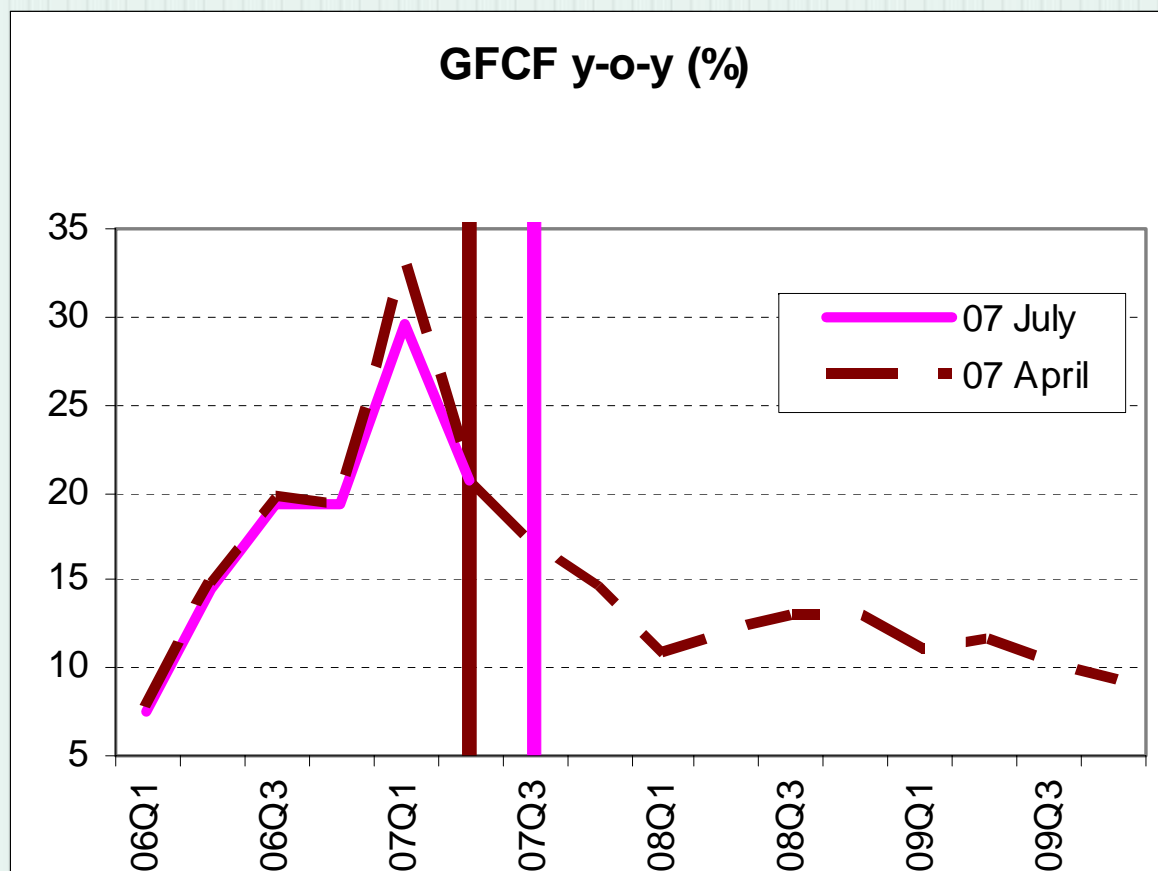
Central projection

Starting point of the July projection as compared to the April projection

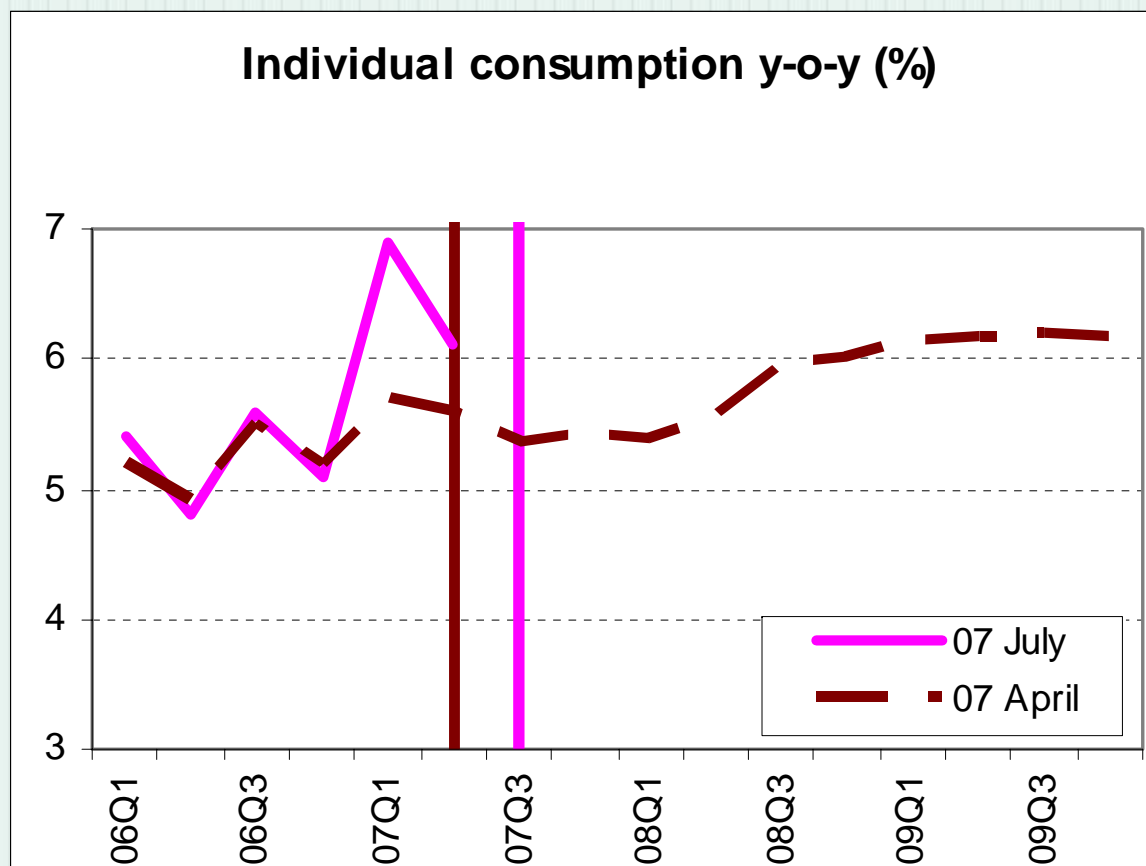
- GDP and its components
- Labour market
- CPI and core inflation

GDP

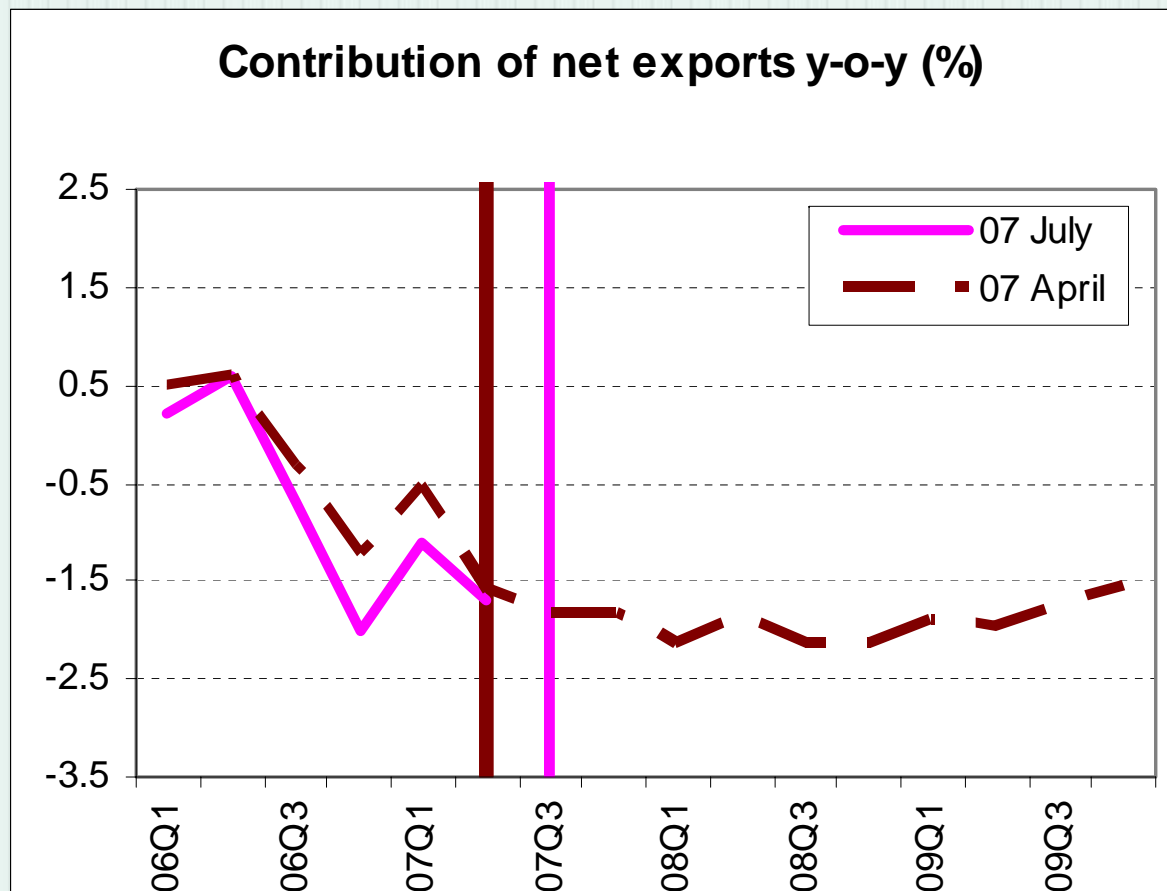
Gross fixed capital formation: no change



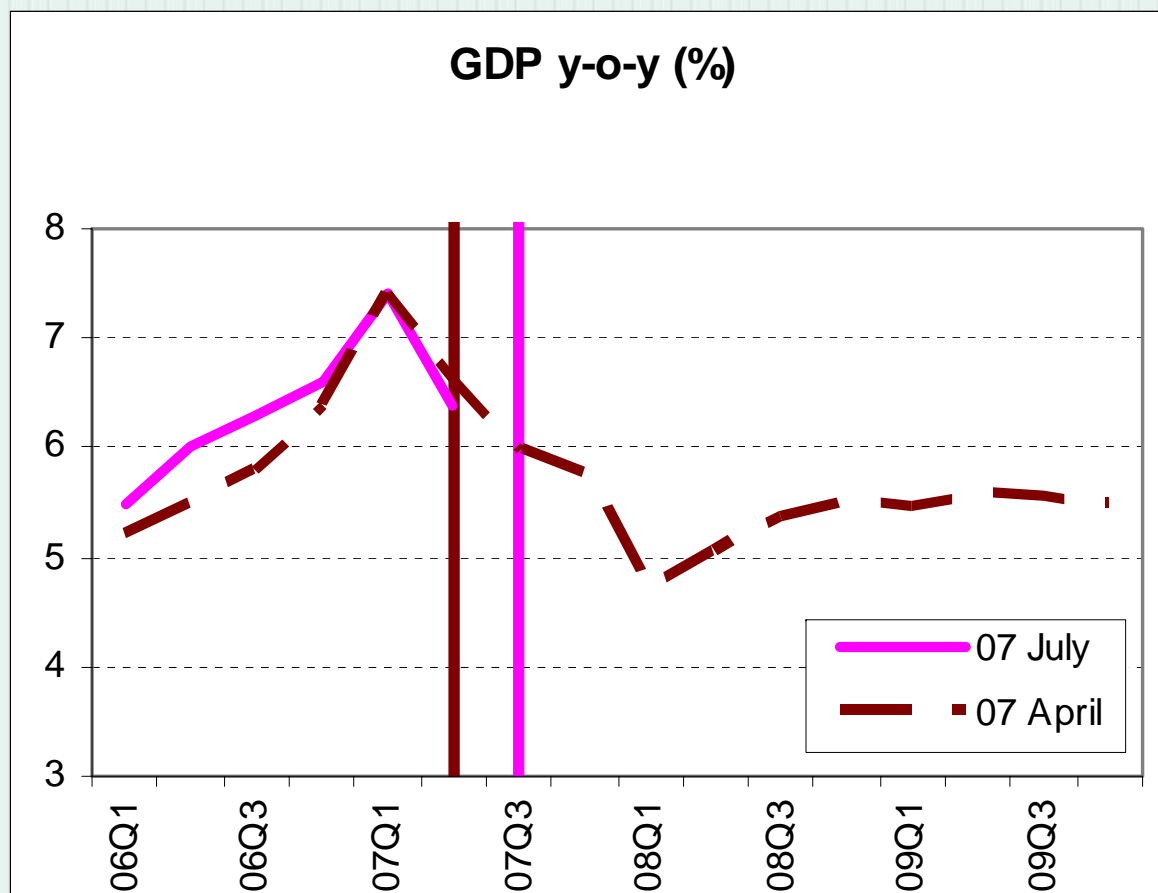
Individual consumption: higher growth



Contribution of net exports: slightly lower

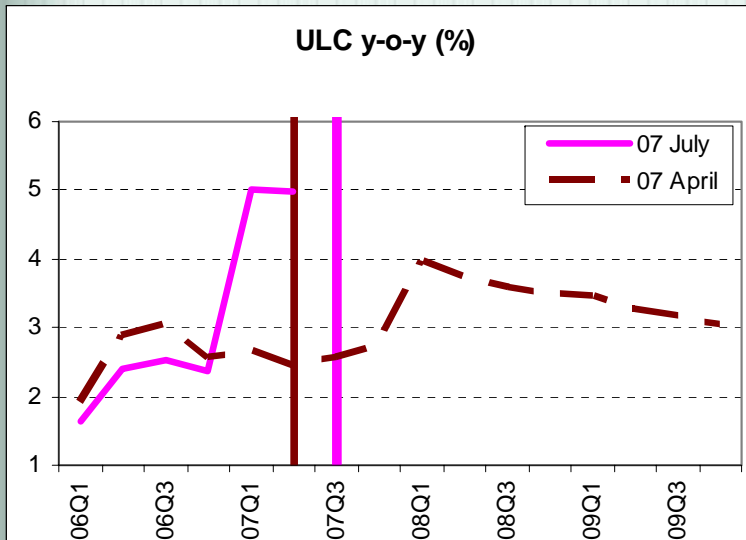
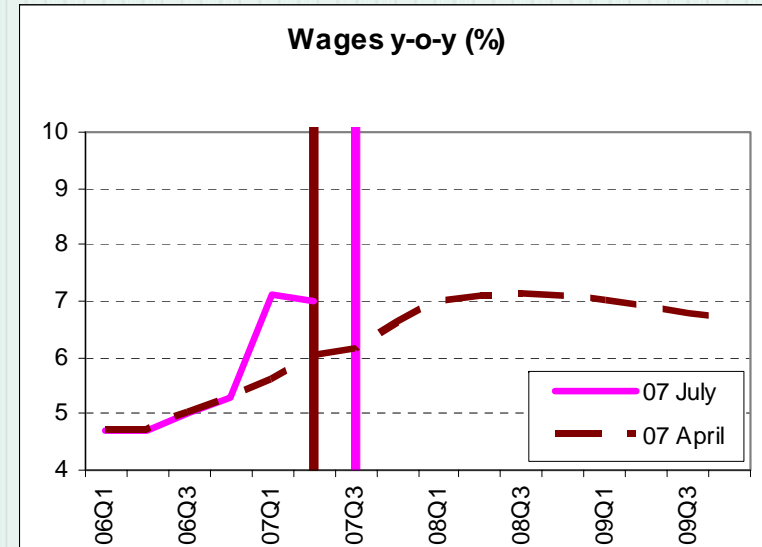
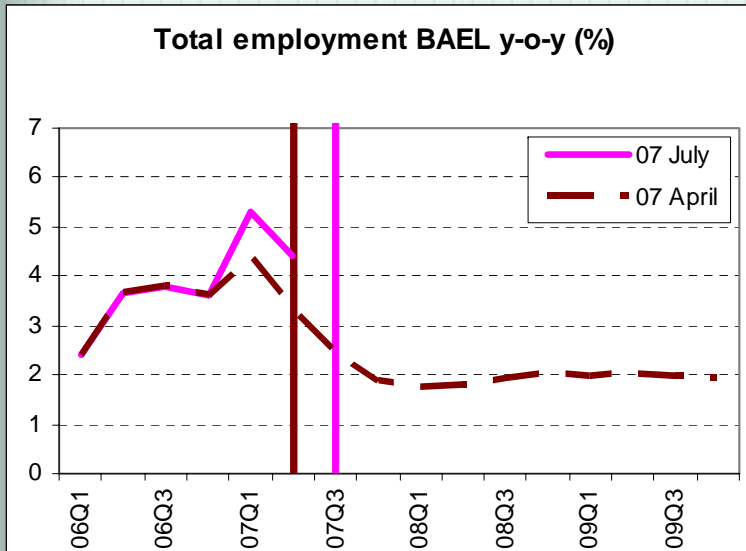


GDP: slightly lower growth



Labour market

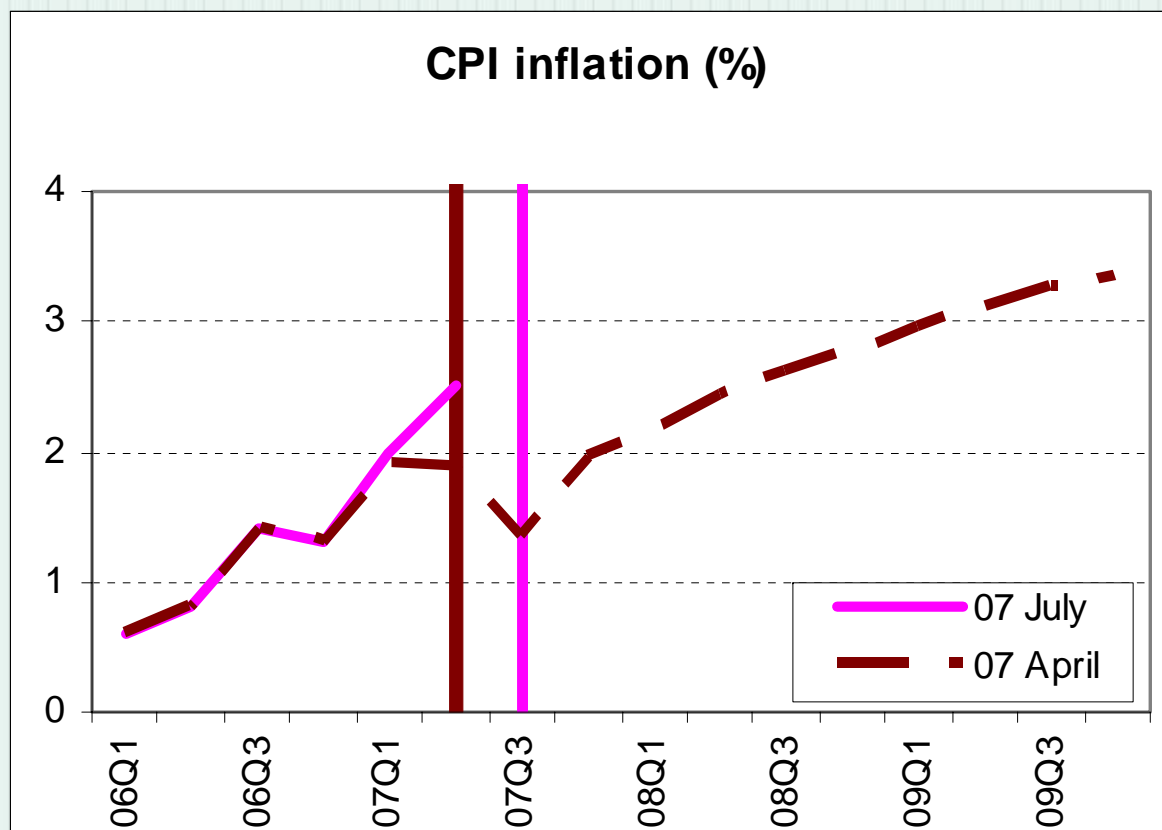
Total employment, wages and ULC



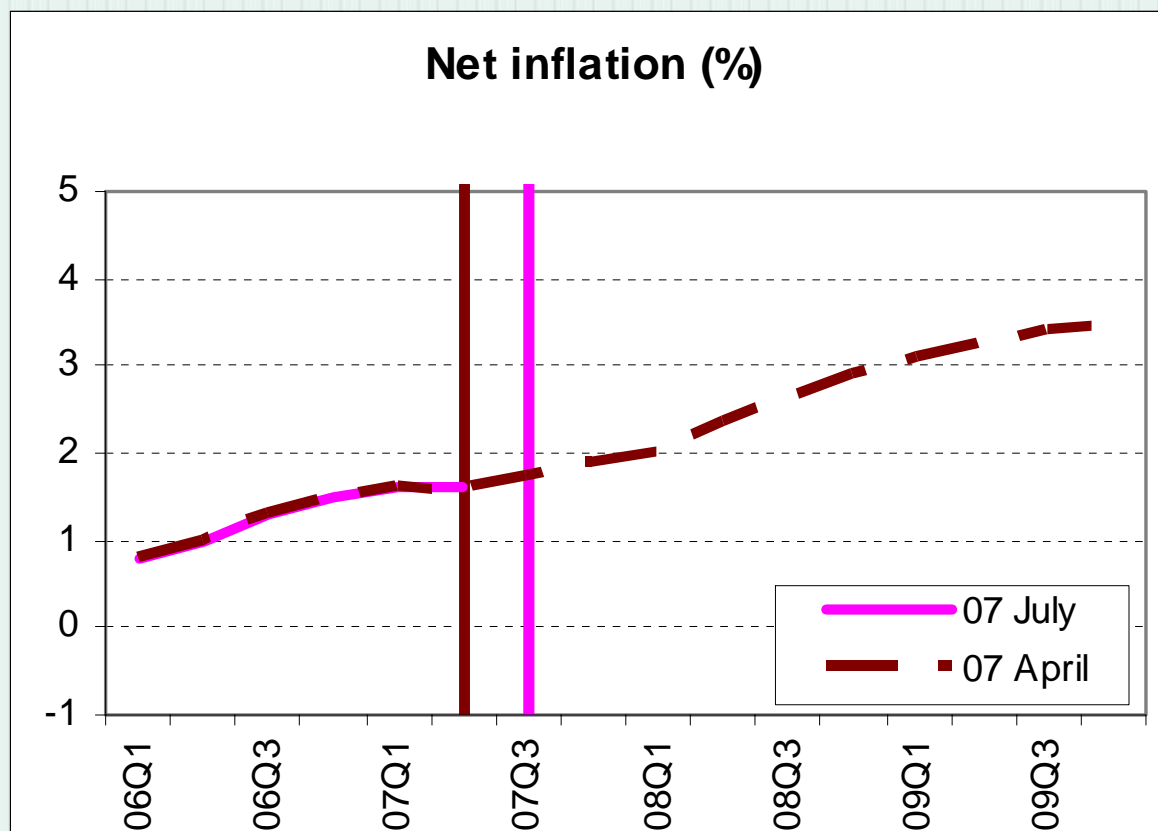
- Stronger recovery in labour market
- Significantly higher growth rate in the total employment, wages and ULC

Inflation

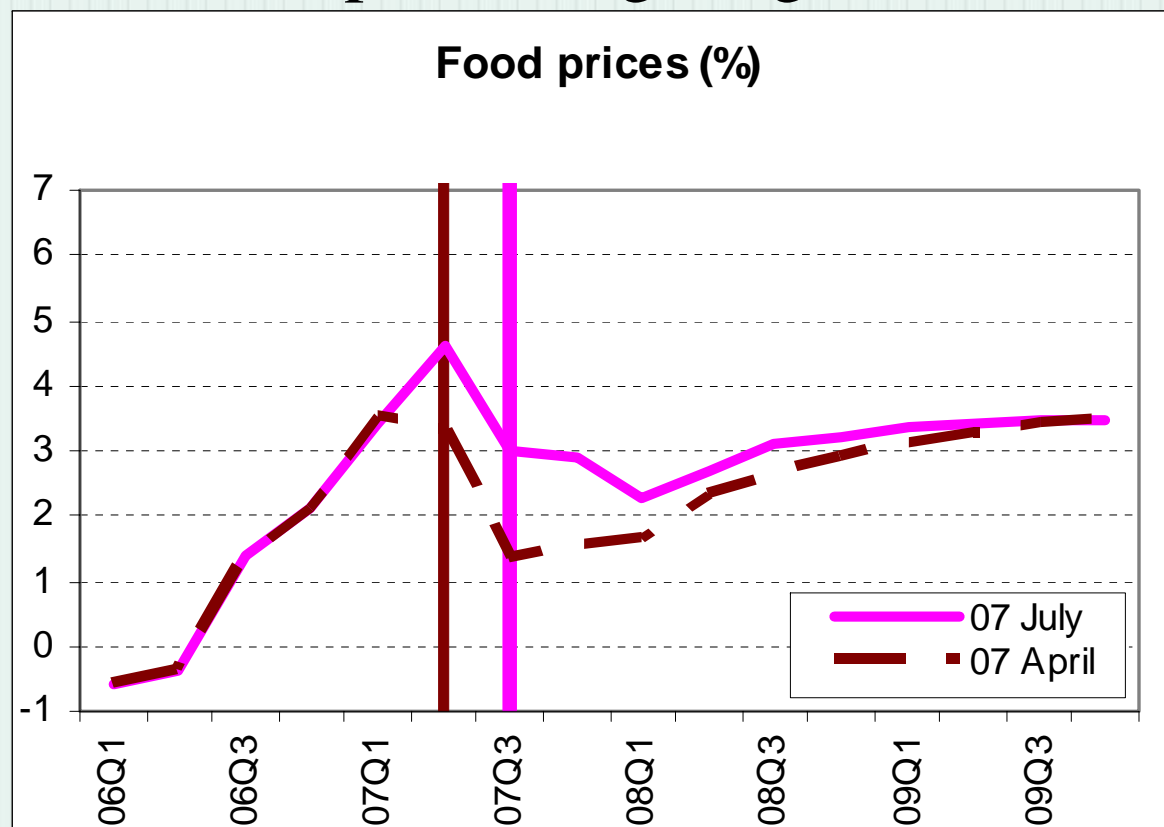
CPI inflation: higher



Net inflation: no change

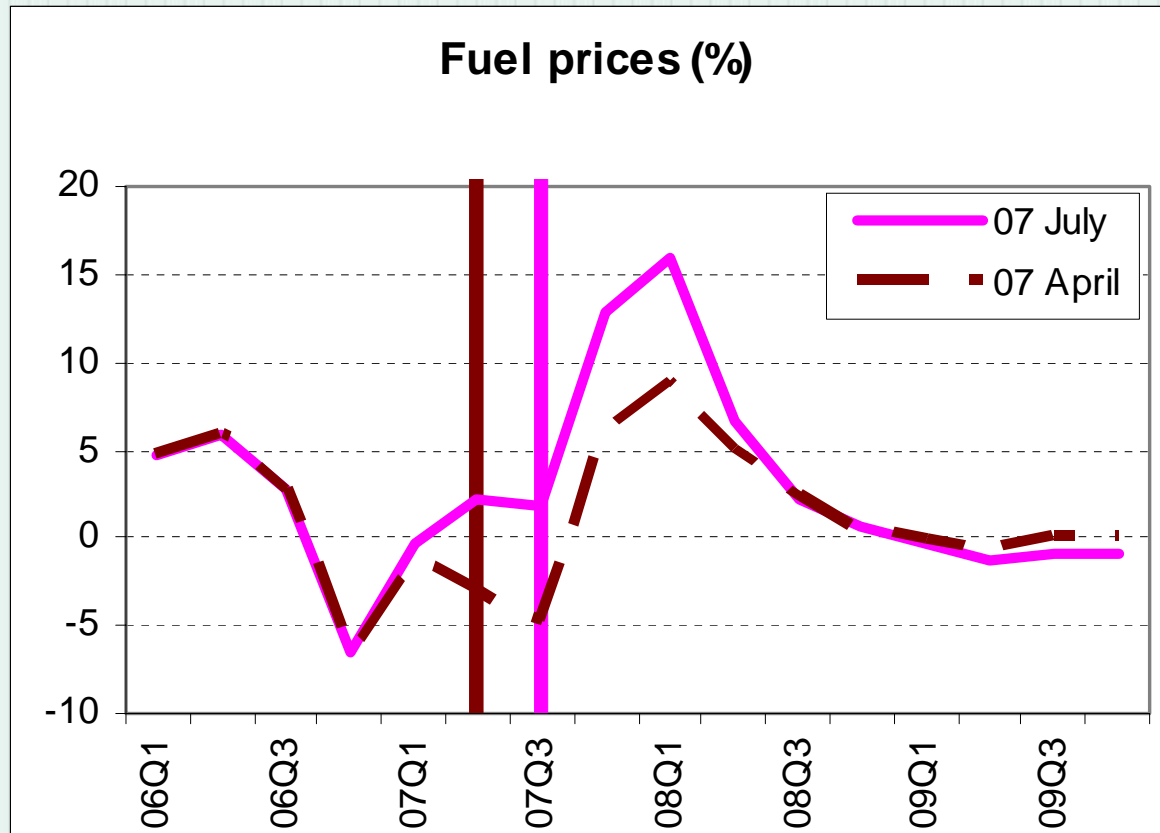


Food prices: higher growth



- Decreasing impact of expert-set food prices on inflation, subsiding after 4 quarters
- Food price growth rate converges to the net inflation growth rate (no sequence of shocks is forecast that would deviate food price inflation from net inflation)

Fuel prices: higher growth, then no change



Macroeconomic projection 2007-2009

Constant interest rates

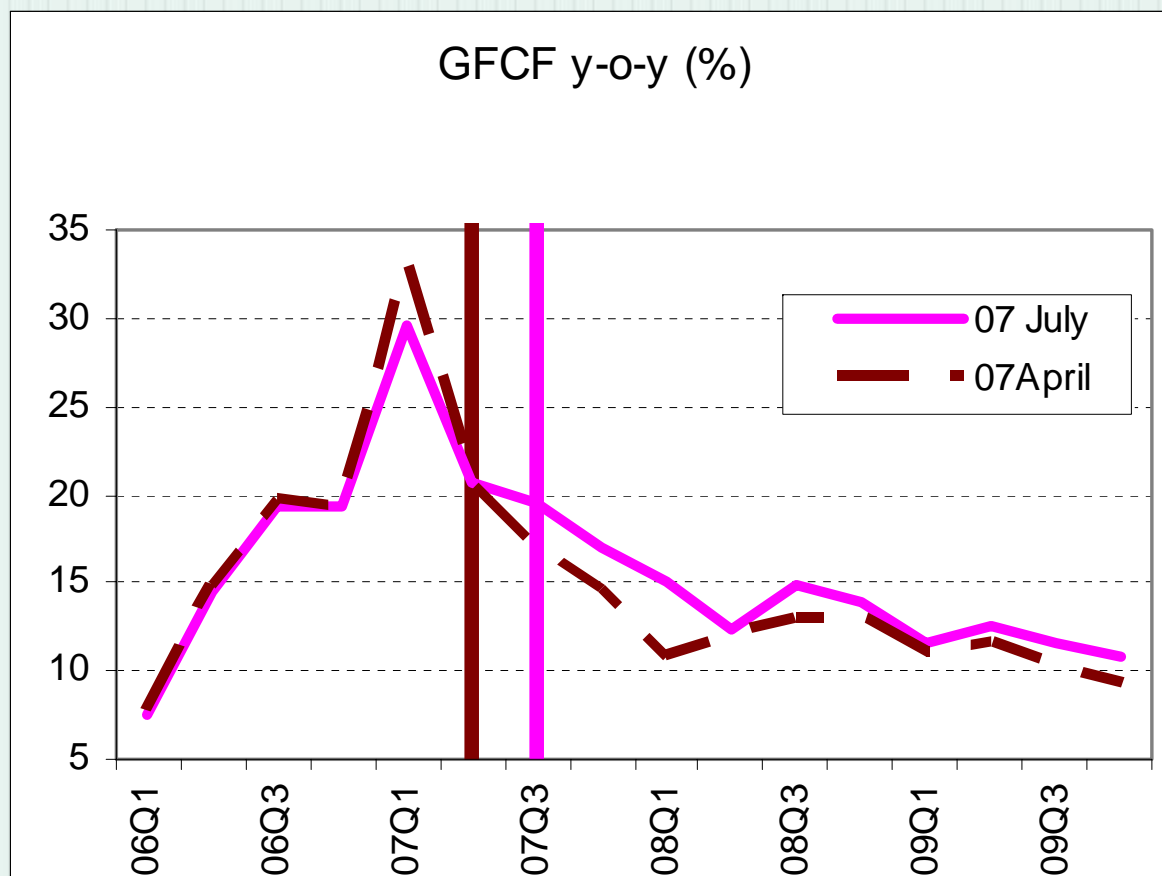
Assumptions – external factors:

- High GDP growth in the euro area in projection horizon, above 2% y-o-y (2.1-2.2% y-o-y was assumed for 2008-2009).
- Higher foreign GDP deflator growth rate in 2007 (set at 2.4% compared to 2% in the April projection), and then staying at the level assumed for the April projection (i.e. 2%)
- Oil prices higher than in the April projection (66.6 USD/b assumed for 2007 compared to 62.1 USD/b in the April projection) throughout the projection horizon, though the difference diminishes in time

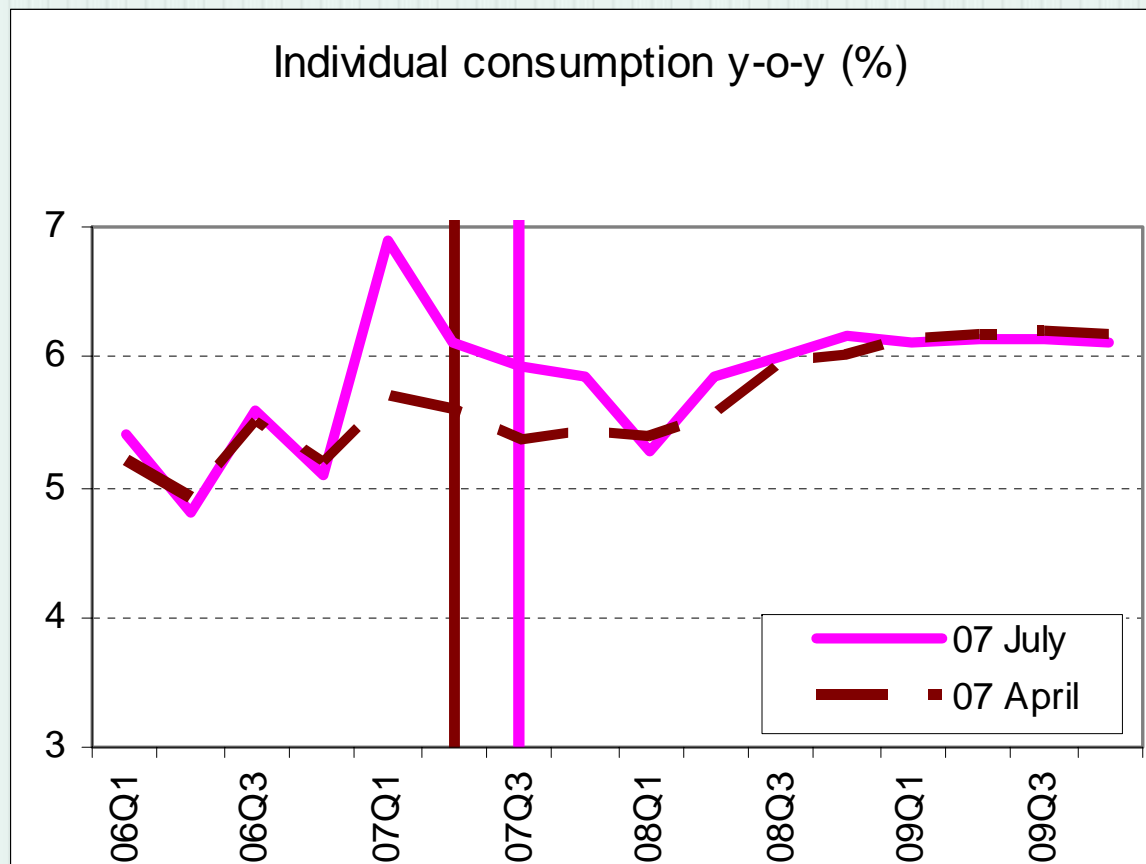
Assumptions – internal factors:

- Slightly higher increase in fuel prices till mid-2008 (by 5.4 pp q/q at the starting point, then by 0.3 pp q/q on the average), similar in the further projection horizon
- Forecast of the annual food price growth in the first four quarters of the projection significantly higher (by 1.3 pp) than assumed in the April projection
- Path of structural and cohesion fund utilisation for 2007 EUR is 350 million lower in relation to the April projection (difficulties in utilisation of the cohesion fund, delays in utilisation of funds from the new Financial Perspective for 2007-2013). No change in assumptions for 2008-2009.
- In the fiscal sector – 7 pp reduction of disability pension contribution was taken into account and budget anchor retained
- NBP interest rates higher by 50 basis points.

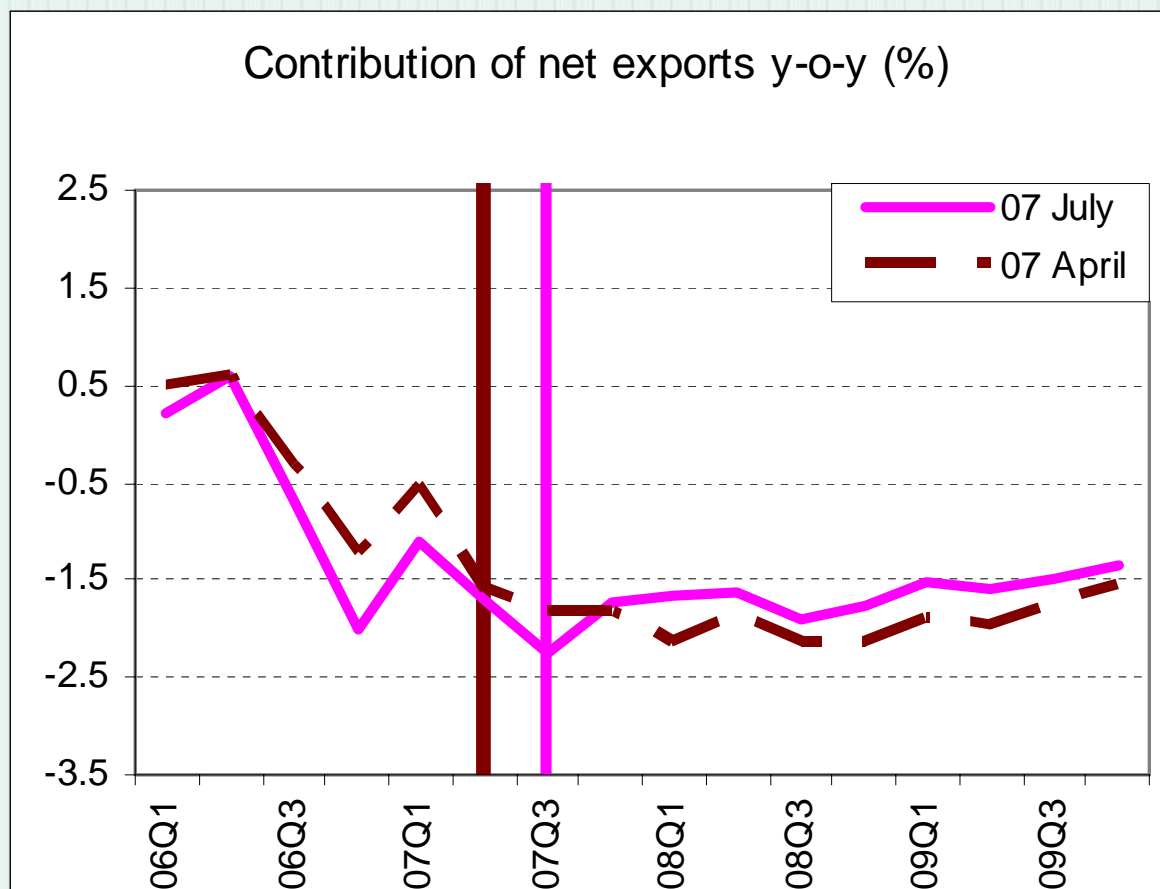
GDP and its components



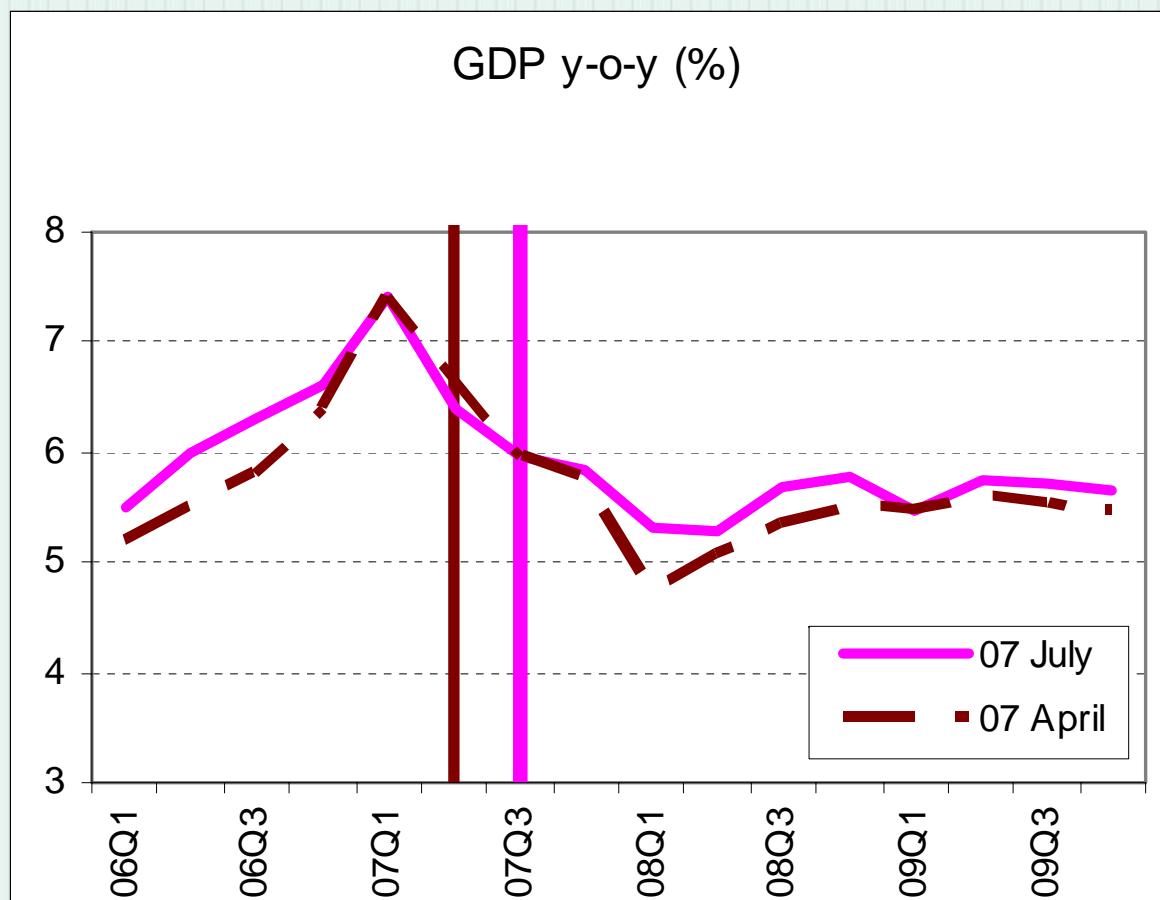
GDP and its components



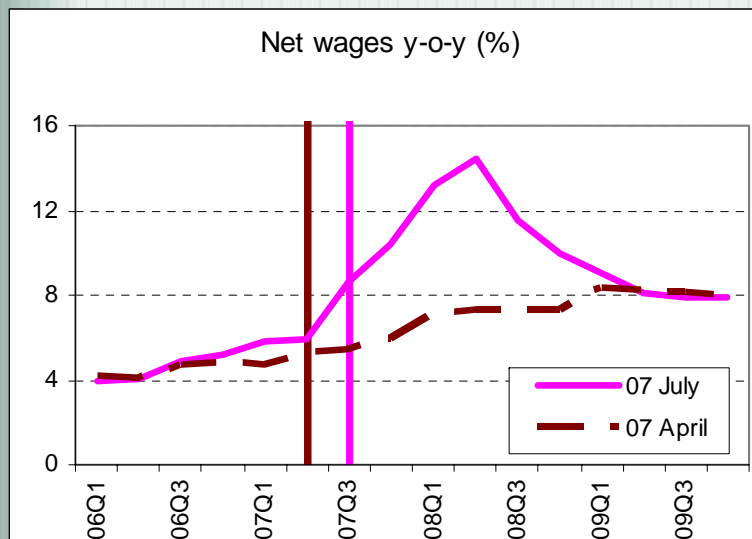
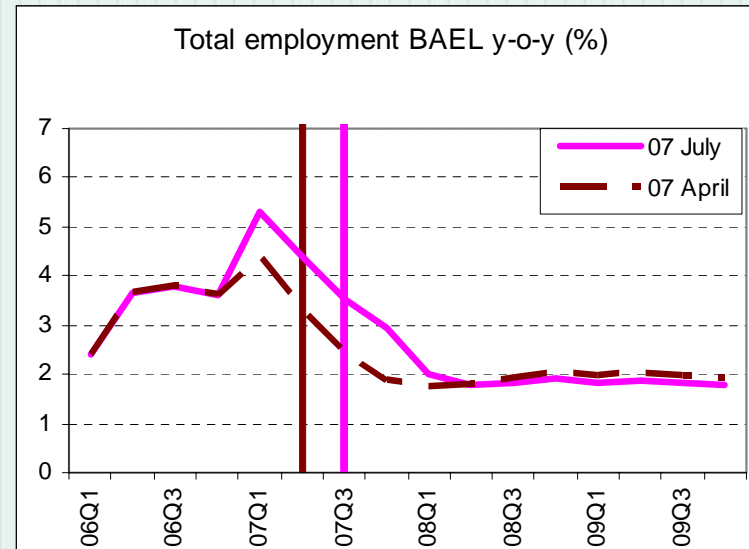
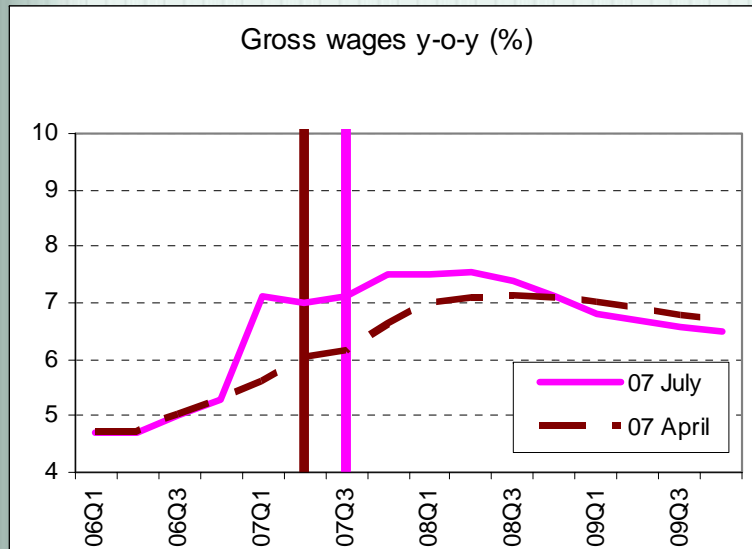
GDP and its components



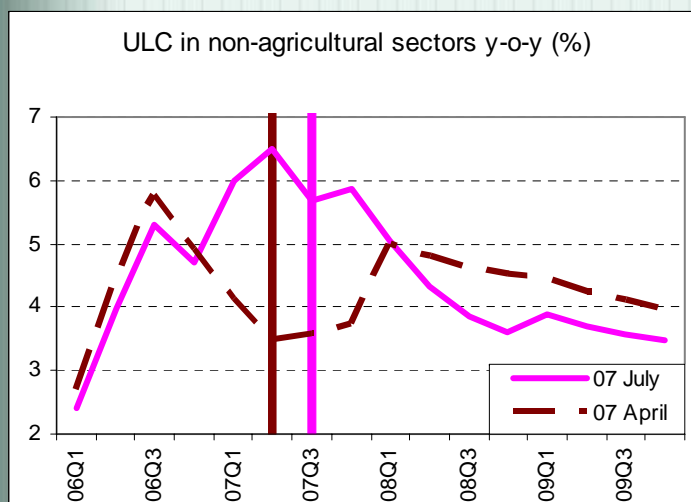
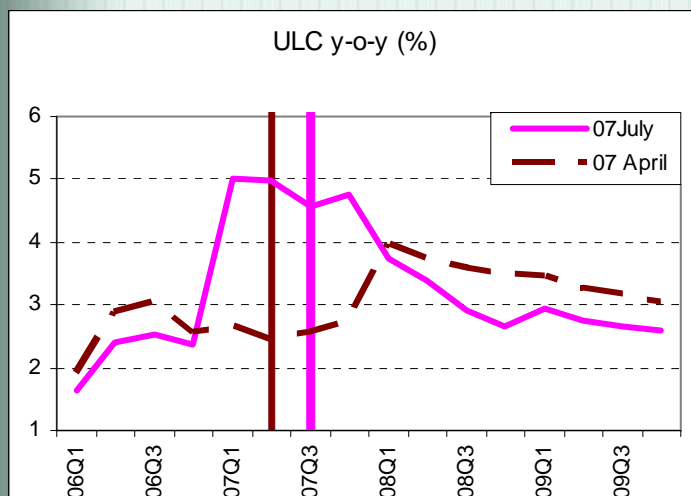
GDP and its components



Labour market

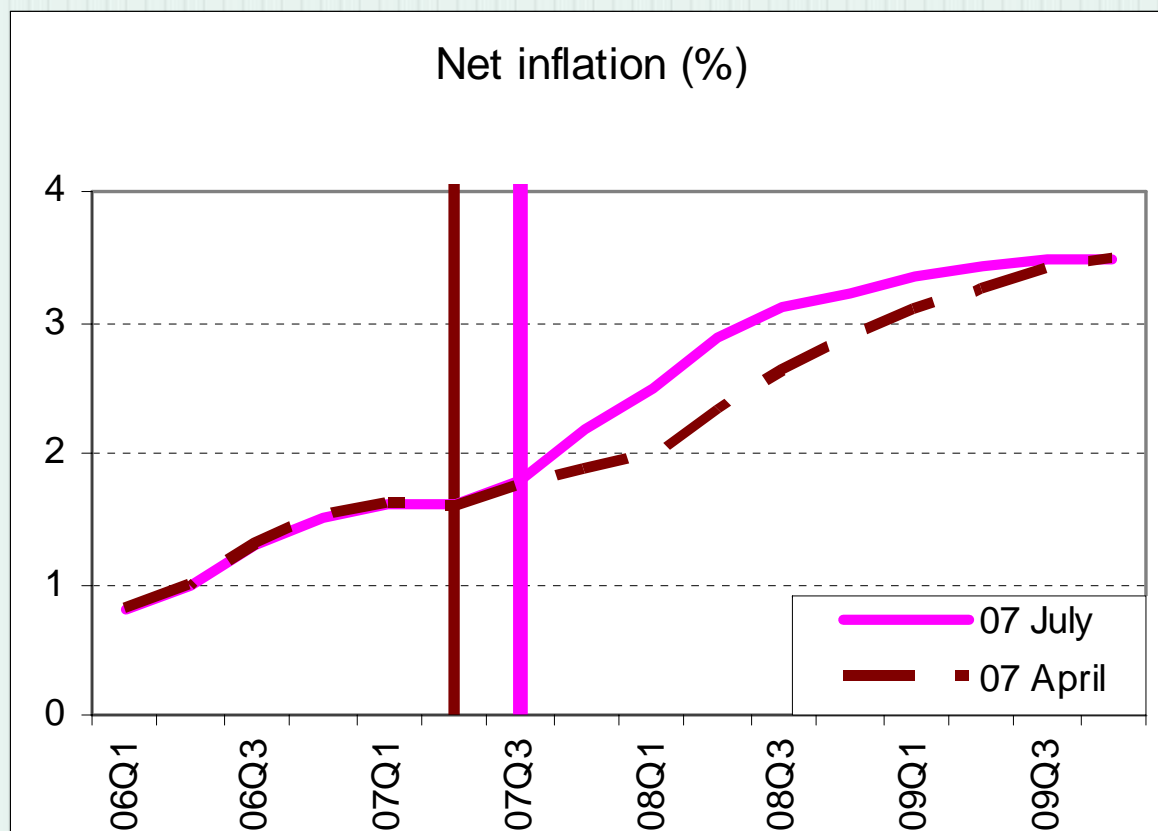


Labour productivity and ULC

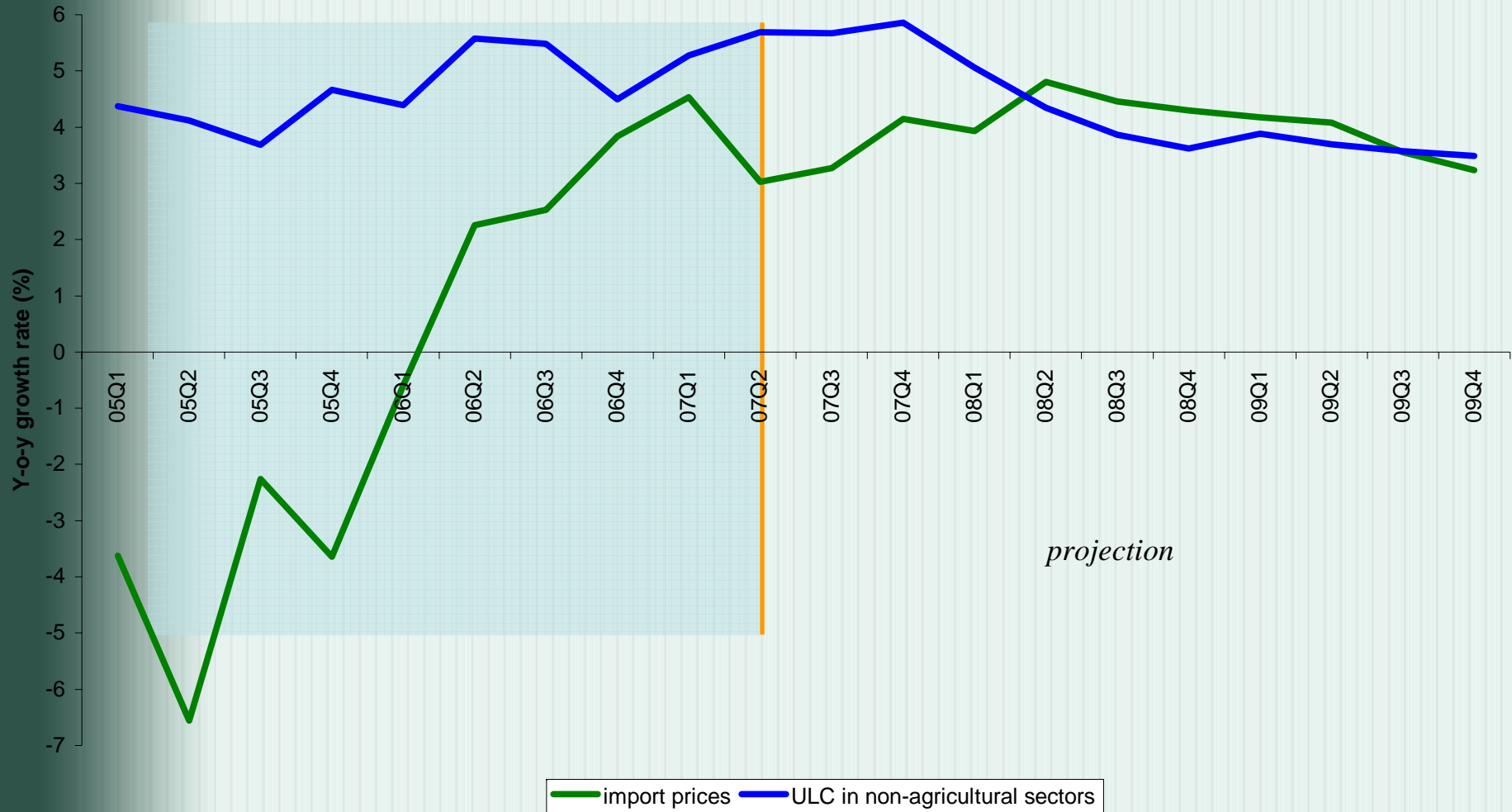


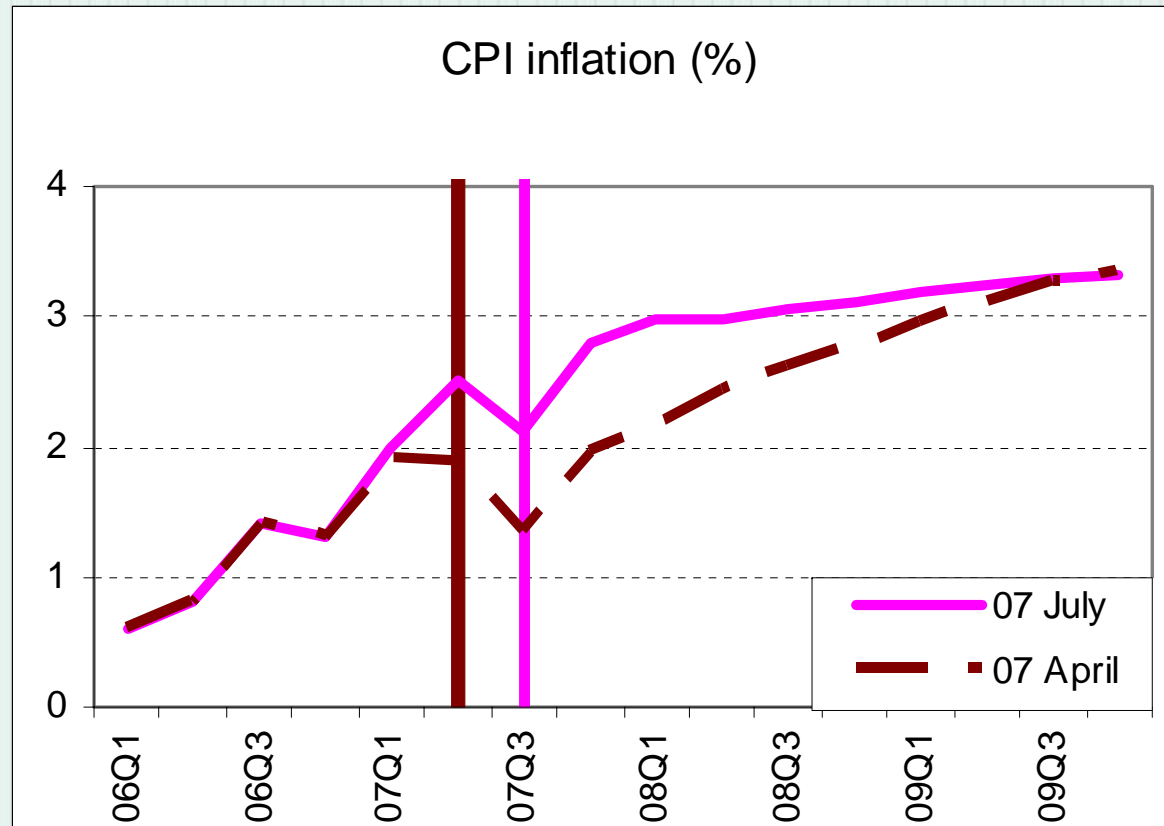
- Throughout the projection horizon, real wage growth will be higher than productivity growth

Net inflation y-o-y



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





The July projection compared to the April projection: CPI inflation

- CPI inflation at the starting point was 0.6 pp higher than in the April projection
- The difference between the projections is gradually growing (to 0.8 pp in 2008 Q1), and steadily falling in subsequent quarters. In 2009 Q2 the inflation paths coincide.
- Differences in inflation paths result from:
 - higher growth rates of food and fuel prices (impact mostly in the short term),
 - higher path of net inflation (the greatest impact from the end of 2007 to the first half of 2009)

The July projection compared to the April projection: net inflation

- The change in the forecast path of net inflation is connected to:
 - the assessment of labour market situation at the starting point of the projection (the growth rate of ULC in non-agricultural sectors is 2.2 pp higher than the April's forecast)
 - accounting for the reduction in disability pension contribution, introduced in July 2007 and scheduled for January 2008

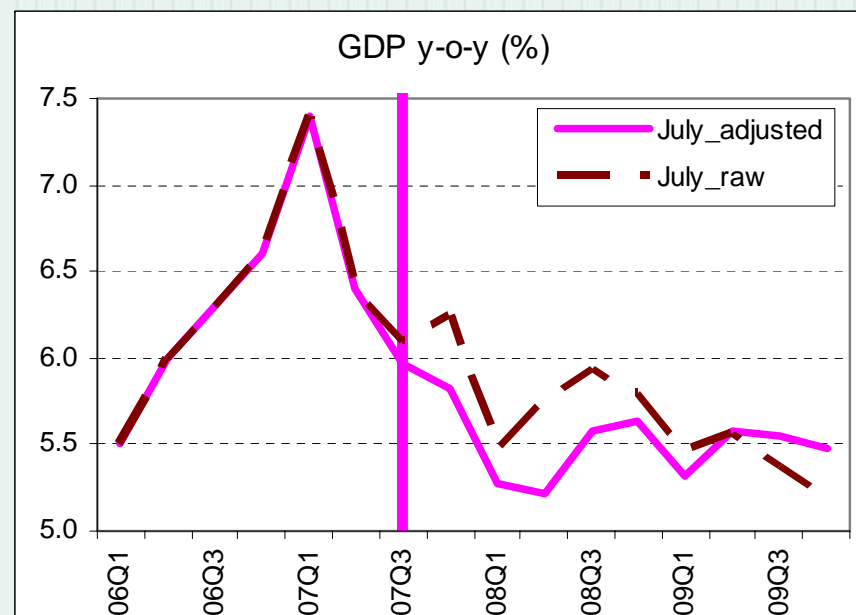
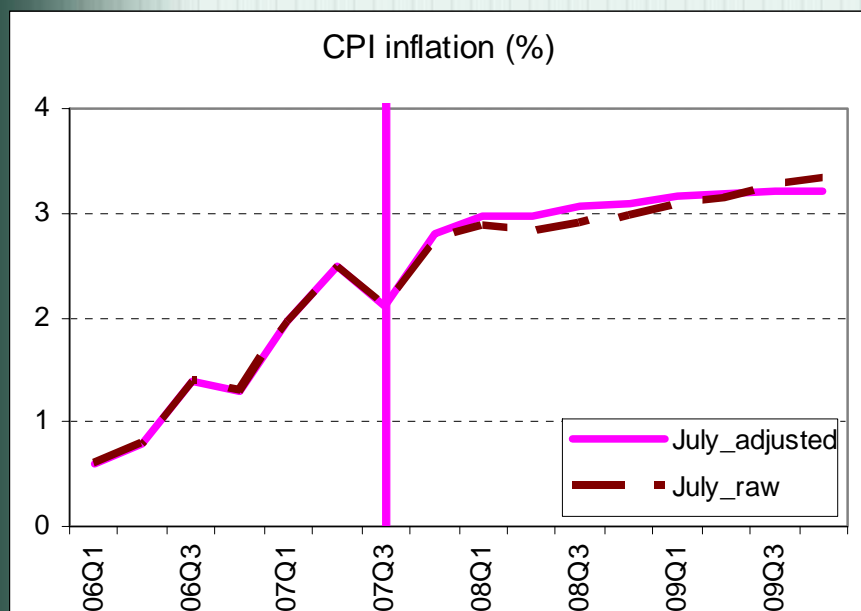
Effects of the cut in the disability pension contribution for the projection

- "Demand" effects:
 - reduction in disability pension contribution is a change in income distribution between the private sector (households and companies) and the public sector,
 - net wage increase leads to a rise in households' disposable income and, consequently, to a rise in consumption demand (and savings)
 - diminished revenues of the public finance sector, with the budget anchor preserved, means a reduction in public finance sector expenditure in relation to the scenario without cuts in disability pension contribution
 - short-term net effect of the change in income distribution is a decline in total consumption and a rise in savings (lower propensity to consumption on the part of the private sector in comparison to the public sector)
- "Supply" effects:
 - lowering of labour costs eases the cost pressure and positively affects the level of employment and profits (savings),
 - net wage increase leads to a rise in labour supply and, consequently, to the higher potential output
- Macroeconomic effect of the reduction in disability pension contribution: higher potential GDP, lower inflation

Expert adjustments

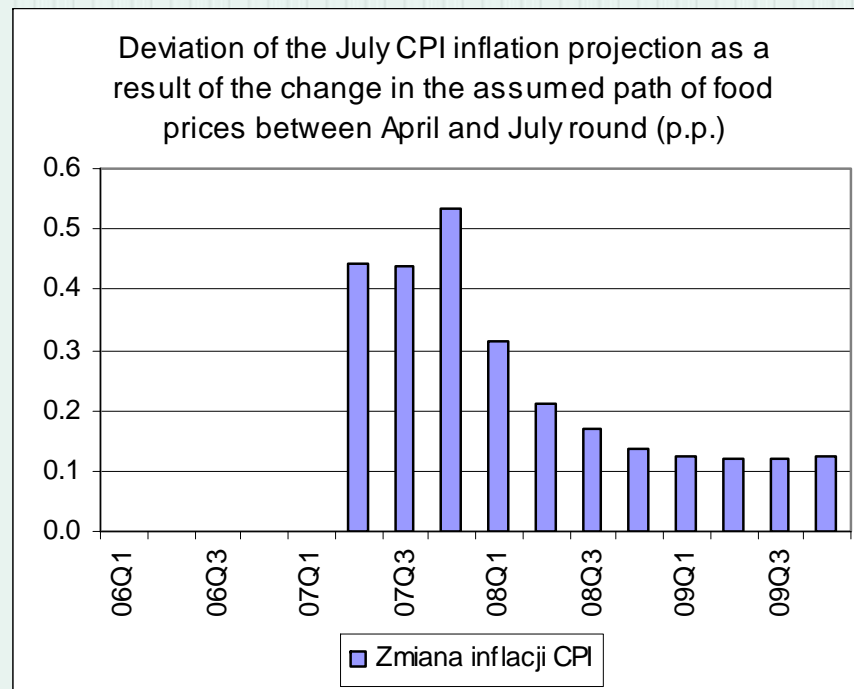
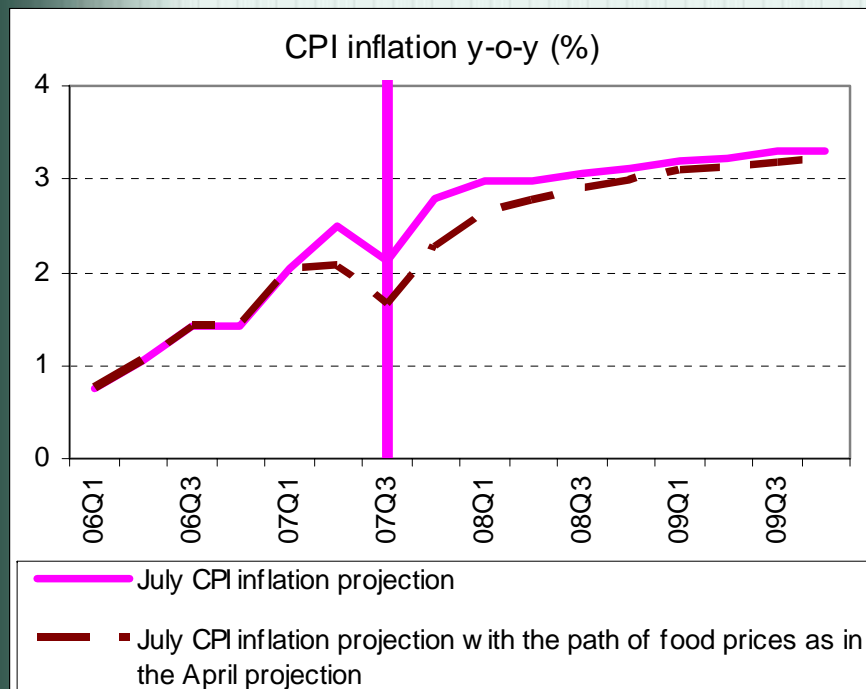
- Main areas of adjustments in the July forecasting round:
 1. individual consumption,
 2. gross fixed capital formation,
 3. fiscal sector variables, including public consumption,
 4. the volume of exports,
 5. export and import prices.
- The following slide presents the paths of variables before adjustments (so-called raw projection) and after introducing all expert adjustments to the model (the July projection).

Joint effect of adjustments on inflation and GDP

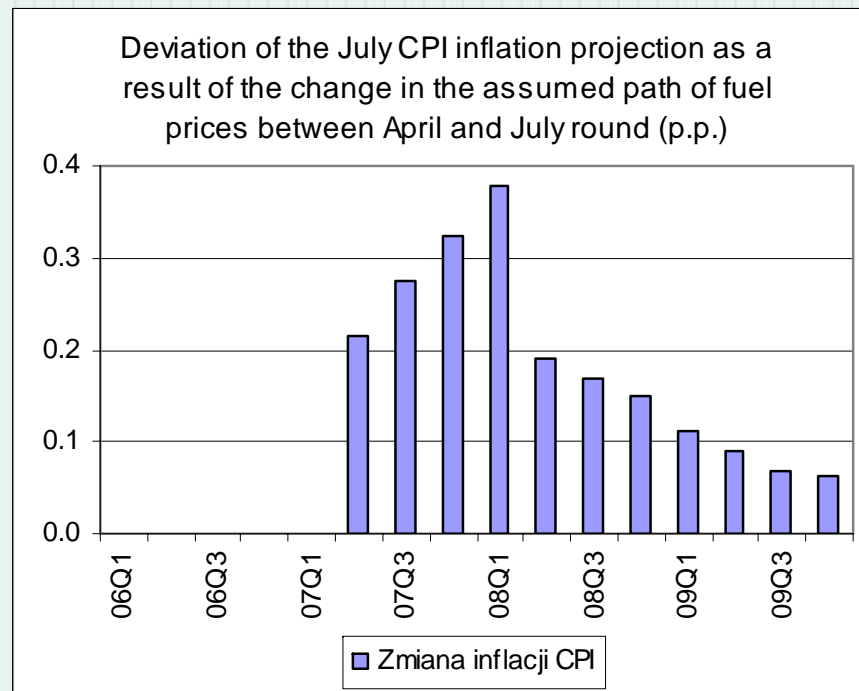
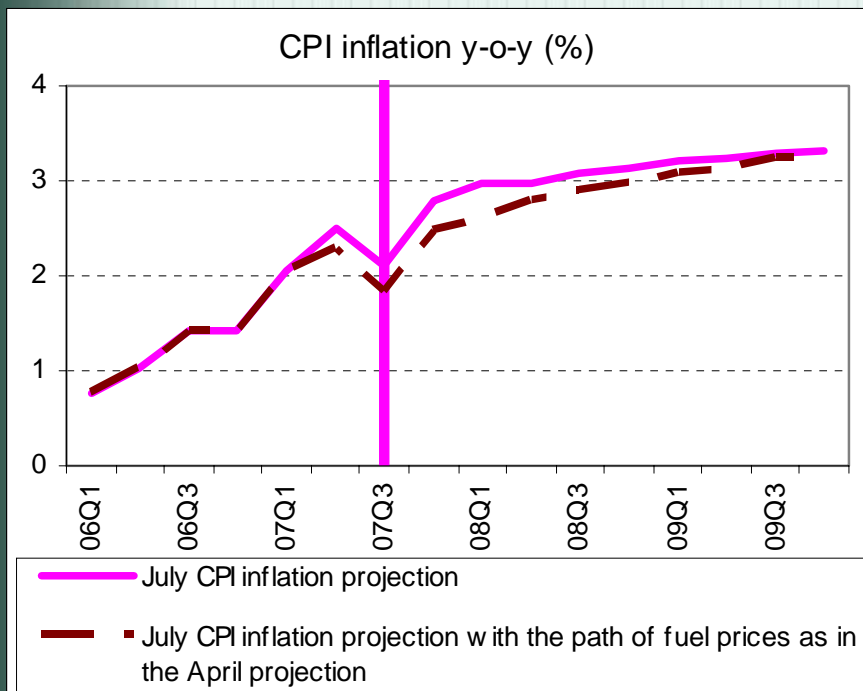


Accounting for CPI inflation

Food prices

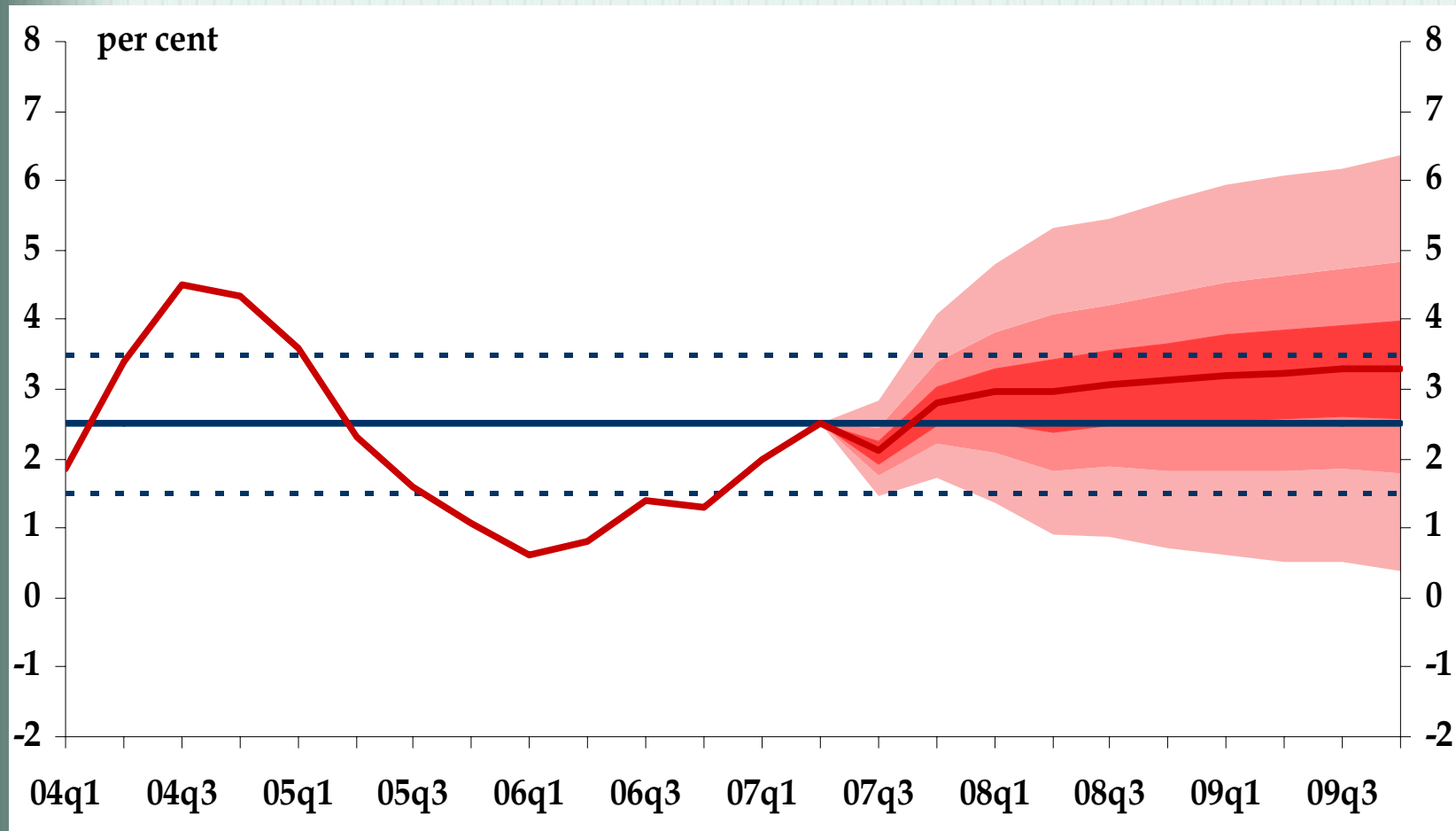


Fuel prices



Uncertainty of macroeconomic projection - fan chart -

Inflation projection – July 2007



Source: Macroeconomic and Structural Analyses Department

Inflation projection - July 2007 (constant interest rates)

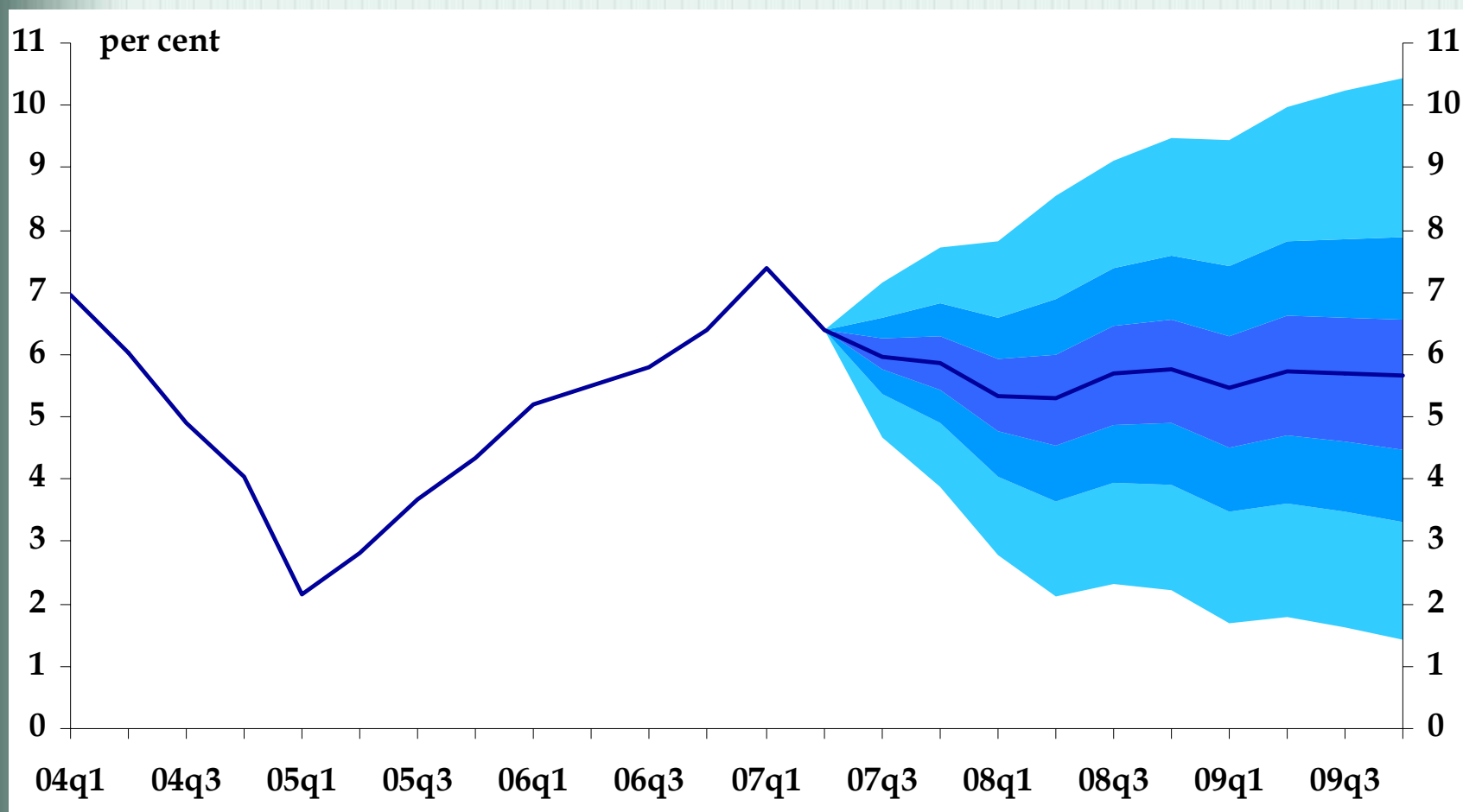
- The central path indicates that inflation will breach the level of inflation target (2.5%) in 2007 Q4, approaching the upper tolerance limit for deviations (3.5%) at the end of projection horizon
- Fan chart points to a roughly symmetrical distribution of risk of inflation deviating upwards and downwards from the central path in the projection horizon

Overview of probabilities for inflation

Probability of inflation running:					
	below 1.5%	below 2,5	below 3,5%	below central path	in the range (1,5%; 3,5%)
2007q3	0.06	0.82	1	0.52	0.94
2007q4	0.02	0.36	0.84	0.53	0.81
2008q1	0.07	0.34	0.71	0.53	0.64
2008q2	0.13	0.38	0.67	0.53	0.54
2008q3	0.12	0.35	0.64	0.52	0.51
2008q4	0.14	0.35	0.61	0.51	0.47
2009q1	0.15	0.34	0.59	0.51	0.44
2009q2	0.15	0.34	0.57	0.51	0.42
2009q3	0.15	0.33	0.56	0.51	0.41
2009q4	0.16	0.33	0.55	0.51	0.39

Source: Macroeconomic and Structural Analyses Department

Projection of GDP growth rate – July 2007



Source: Macroeconomic and Structural Analyses Department

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

- **In the short term:** dominant impact on inflation uncertainty is exerted by uncertainty of the paths of food prices, net inflation and oil prices
- **In the medium term:** the same factors as in the short term plus uncertainty of random component in equations of net inflation, GDP deflator, exchange rate and import prices
- The fan chart does not account for uncertainty of the model (is constructed on the assumption of model's adequacy)

Uncertainty factors unaccounted for in the model (1)

- **Labour market developments**
 - the impact of economic recovery on the rise in effective supply of labour, i.e. the number of economically active persons and the rate of unemployment NAWRU
 - the scale of alleviation of labour market tensions in response to a reduction in wage wedge and, consequently, the scale of producer price change
 - the uncertainty as to the direction of risks, with their most probable impact conducive to higher inflation
- **Cost pressure:**
 - risk of overestimating the cost pressure at the starting point (uncertainty connected with incomplete accounting for migrations in BAEL data, which led to overestimation of the growth rate of the total employment and ULC)
 - transmission of increased labour costs on inflation due to weakening of pricing power of enterprises, connected with globalisation (the scale of risk unchanged in relation to the April projection)

Uncertainty factors unaccounted for in the model (2)

- **External demand and inflation**
 - risk of projection error connected with a slowdown in the global economy
 - probability of a "hard landing" is lower than assessed in the previous projection
- **Exchange rate path**
 - problems in forecasting the exchange rate of zloty translate into a high risk of significant deviations of its future realisations from the projected path
 - symmetrical risk distribution

Uncertainty factors unaccounted for in the model (3)

- **Public finance sector**
 - in comparison to the April projection, increased risk of changes in the economic policy (in connection to the costly, from the point of view of public finances, reduction of disability pension contribution)
 - increased probability of higher inflation in the projection horizon
- **Data released after the cut-off date**
 - rising tendency of oil prices (new forecast of the US Department of Energy, high geopolitical risk in oil extracting regions, growing world demand for oil)
 - lower growth rate of food prices in 2008 Q2 (because of the European Commission permission to apply lowered VAT rate on some goods and services till the end of 2010)
 - expectations on foreign interest rates climbed up slightly (by a few basis points) in comparison to the levels assumed in the projection

Balance of all factors of projection risk
is assessed as symmetrical