

PRODUCTIVITY AND CURRENT TRENDS AND OPTIONS OF LATVIAN INFORUM MODEL

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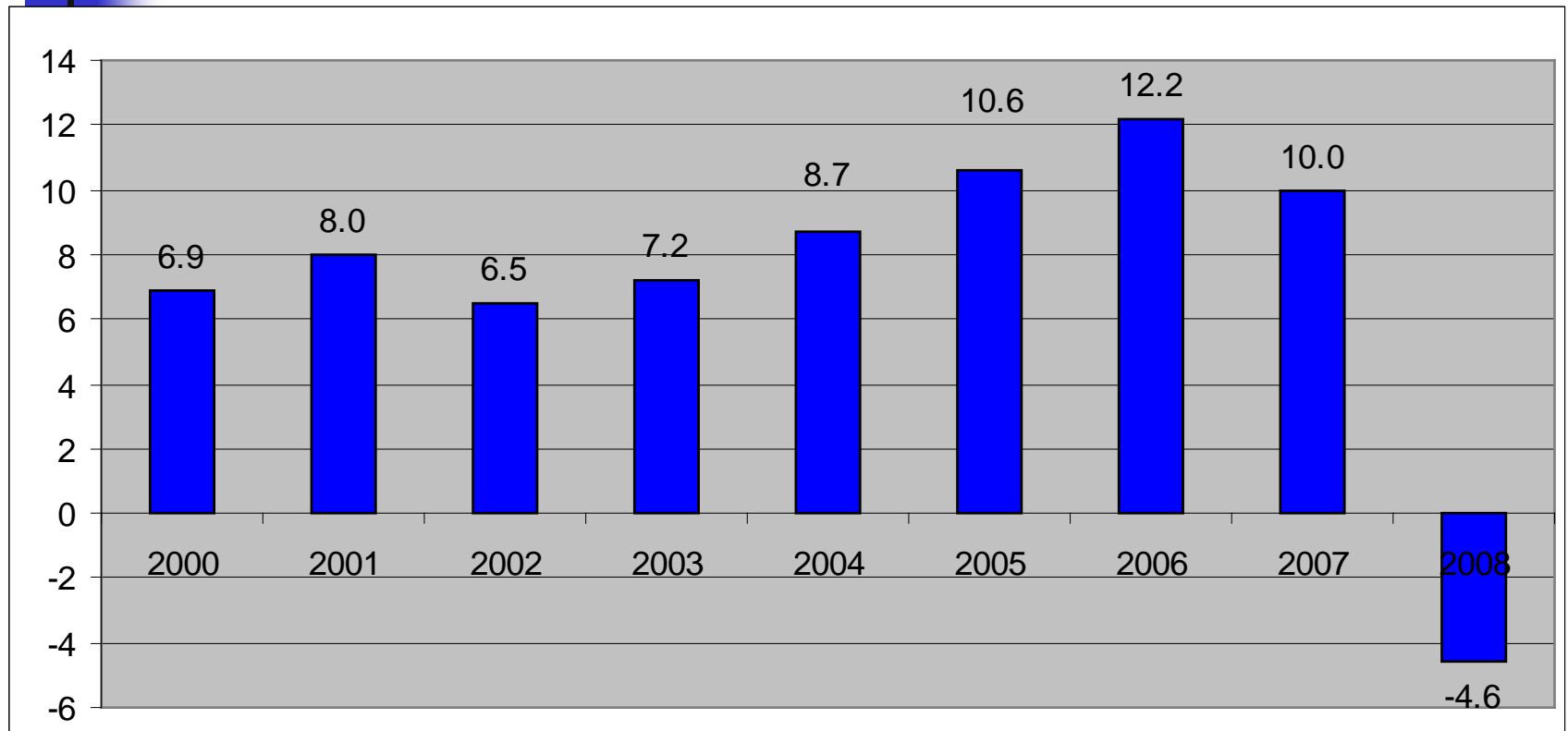
Ministry of Economy of Latvia



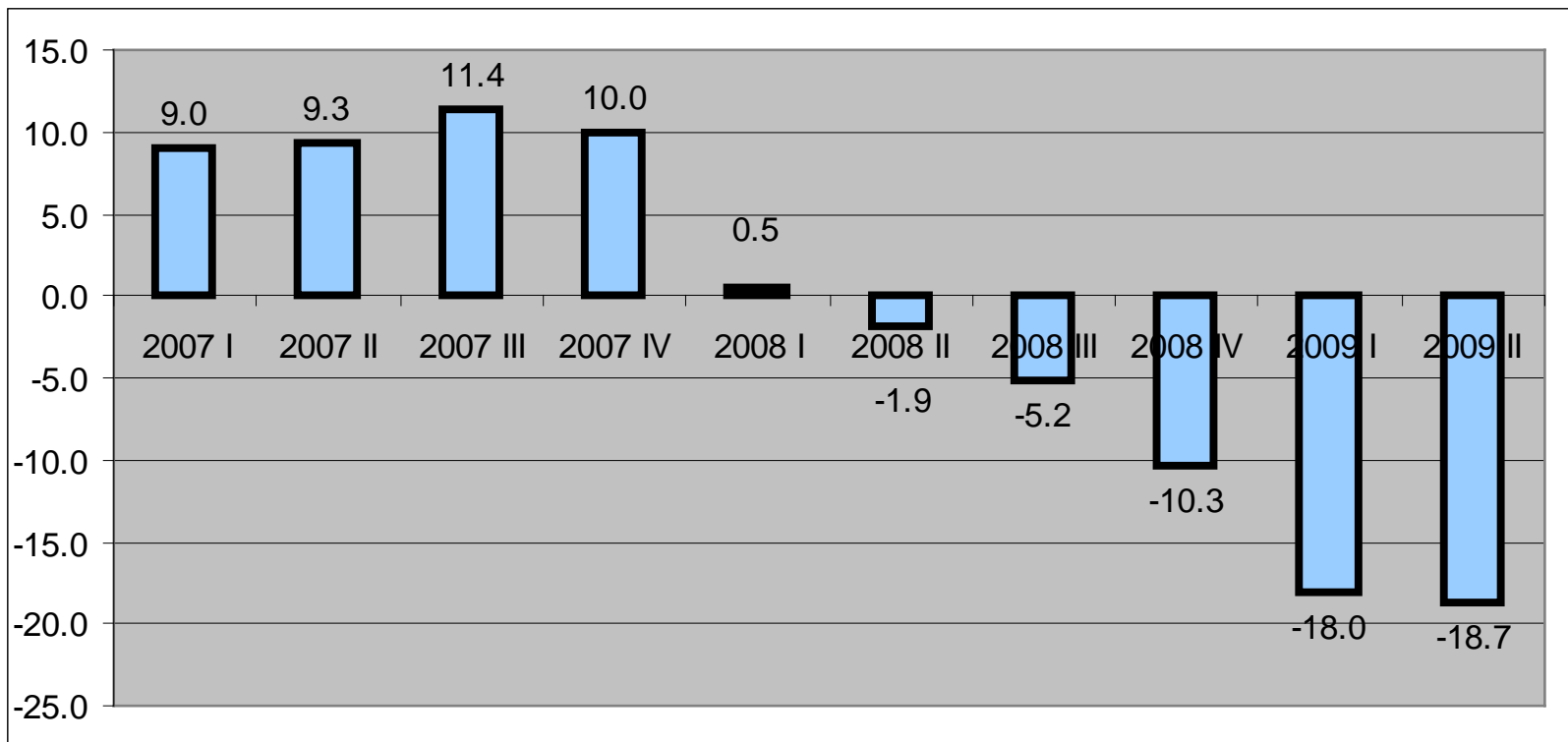
STRUCTURE OF PRESENTATION

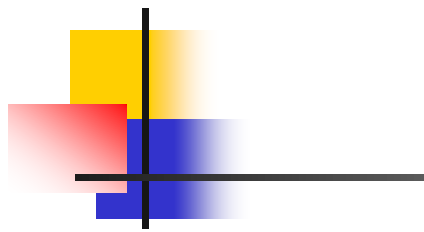
- Current macroeconomic situation, problems
- Productivity analysis
- Latvian macroeconometric model
- Options of Latvian INFORUM model

GDP growth rates in Latvia (% change on previous year) 2000-2008

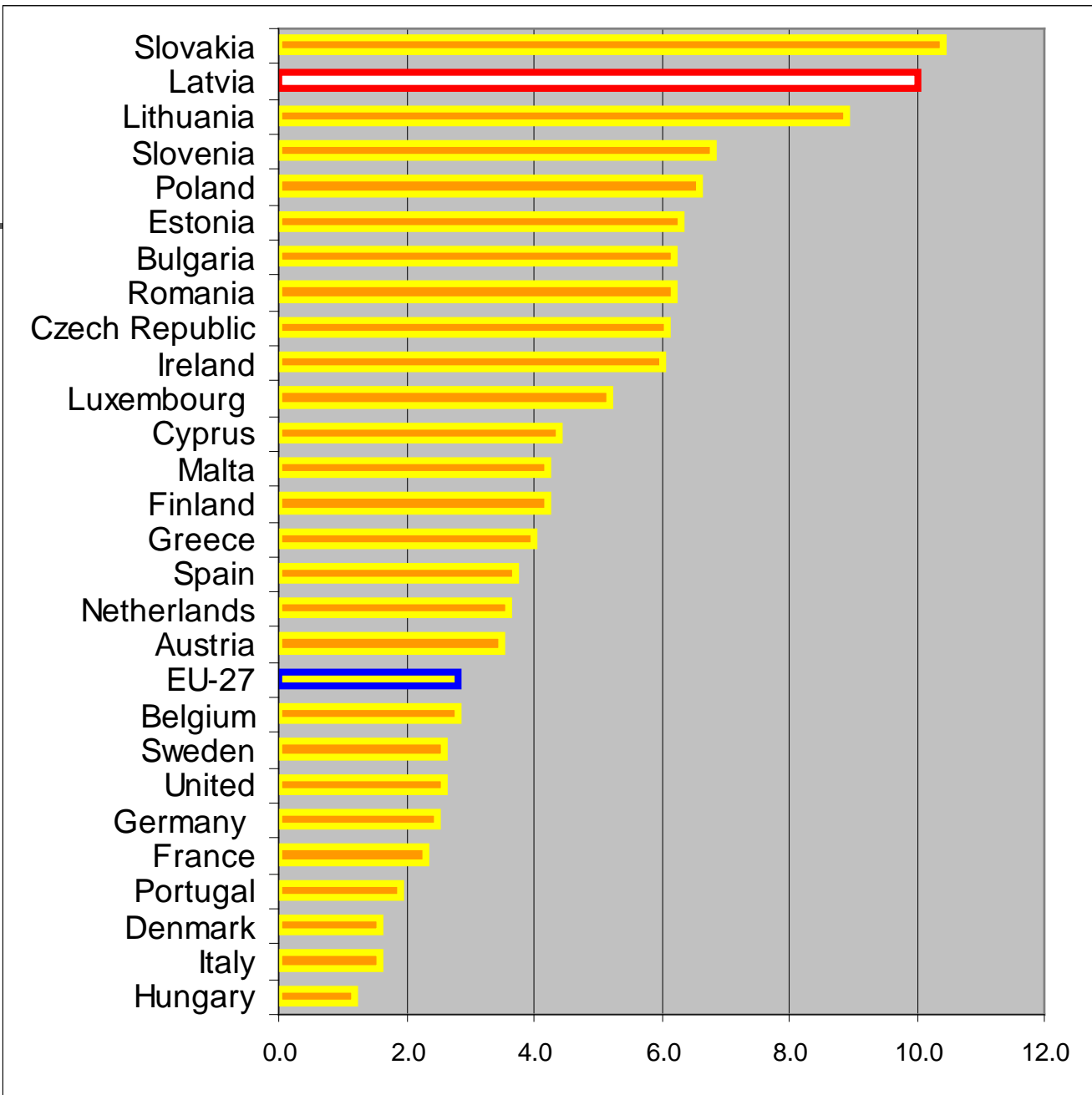


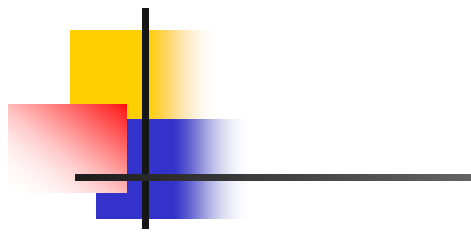
GDP growth rates in Latvia (% change on previous year) 2007 I – 2009 II



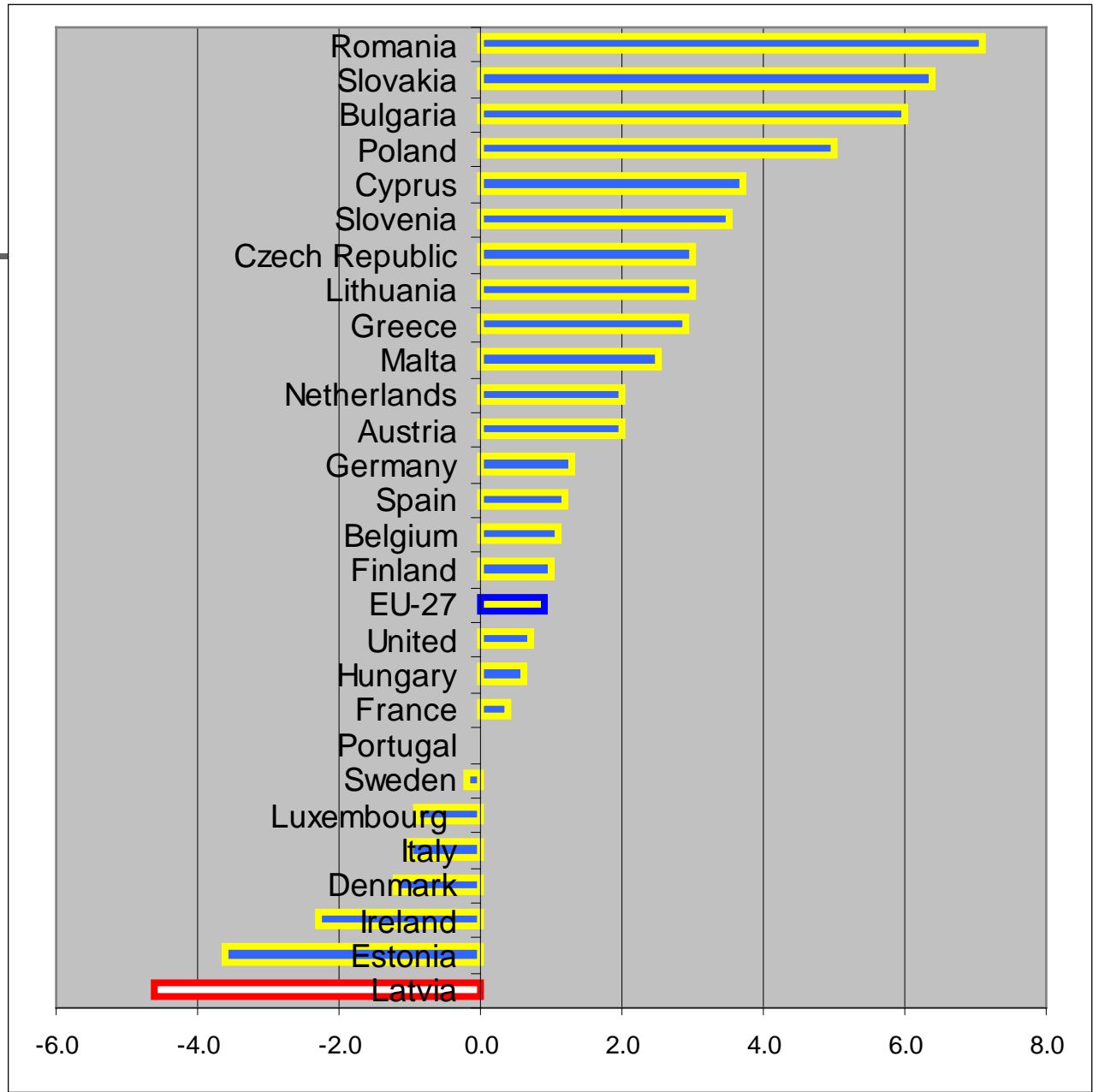


GDP growth rate (%), 2007

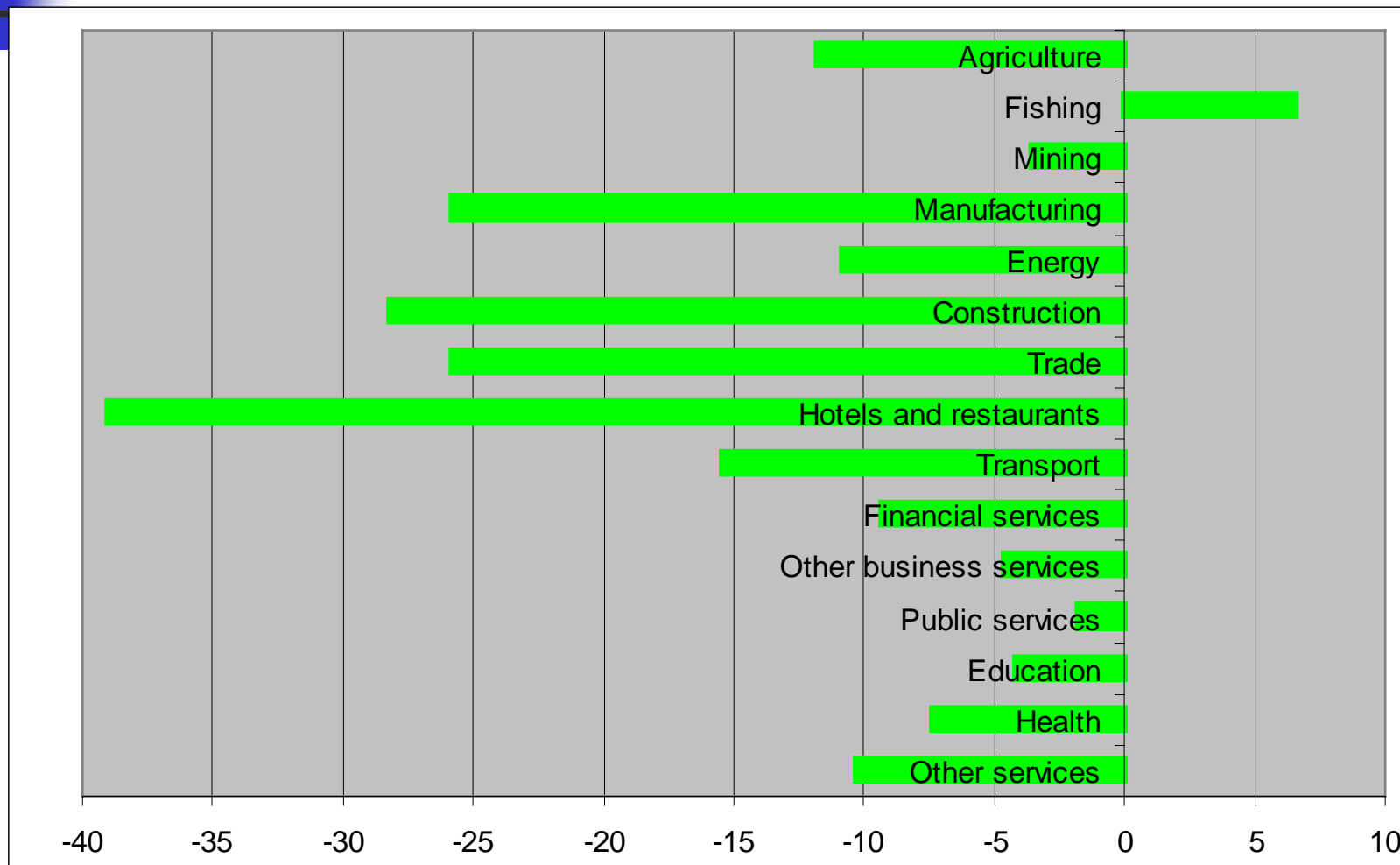




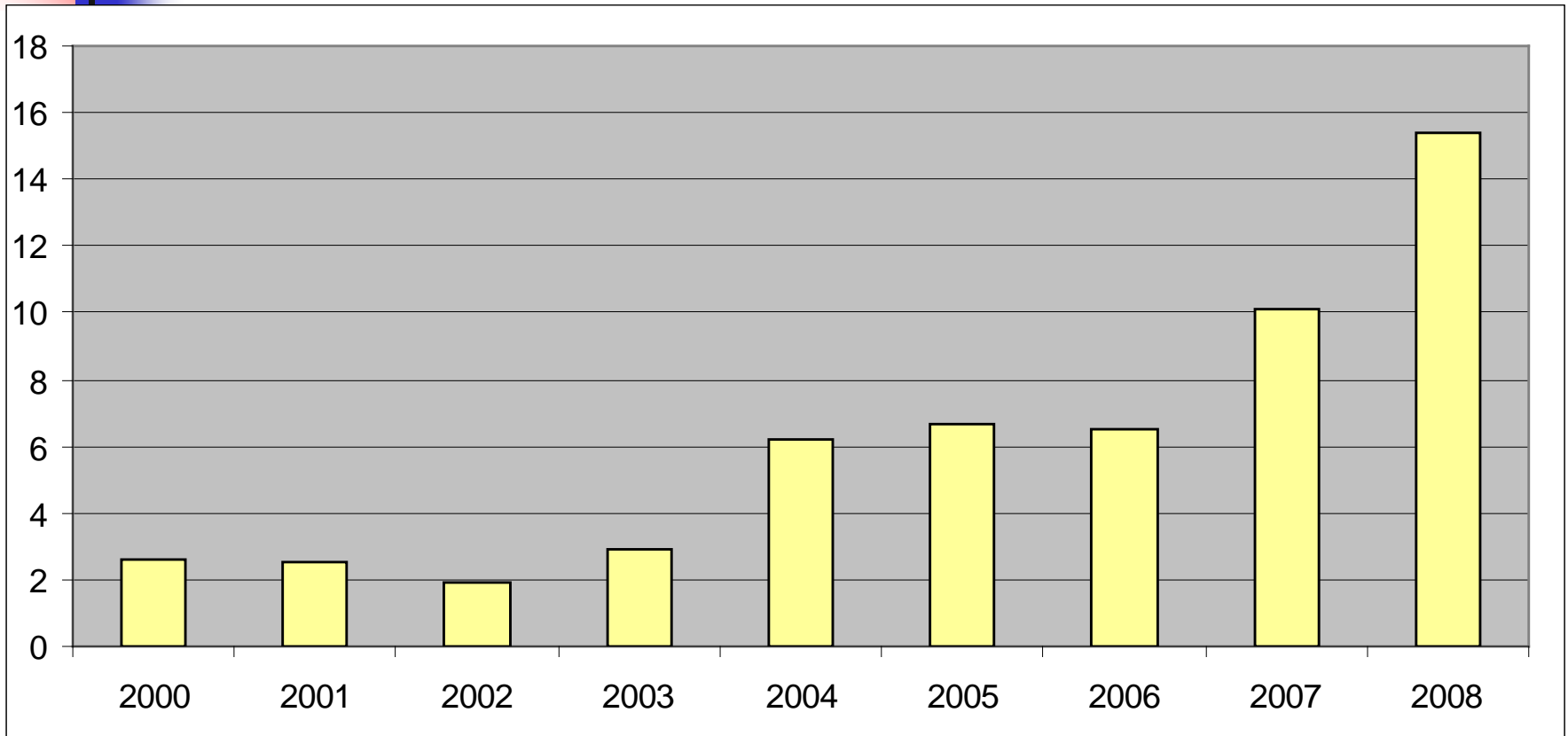
GDP growth rate (%), 2008



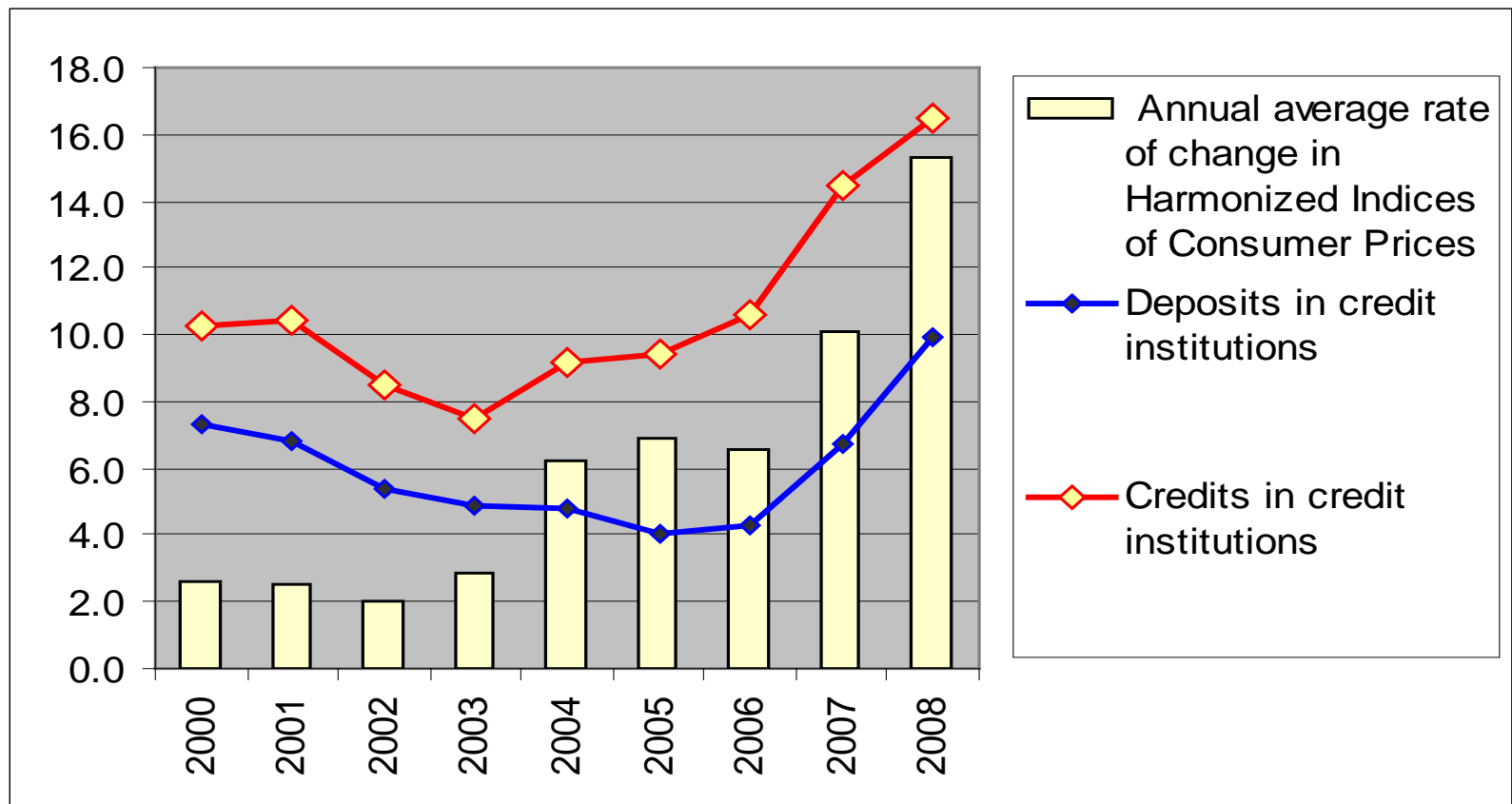
Value added change (% of corresponding period of previous year) 2009 I



Inflation - CPI (%)

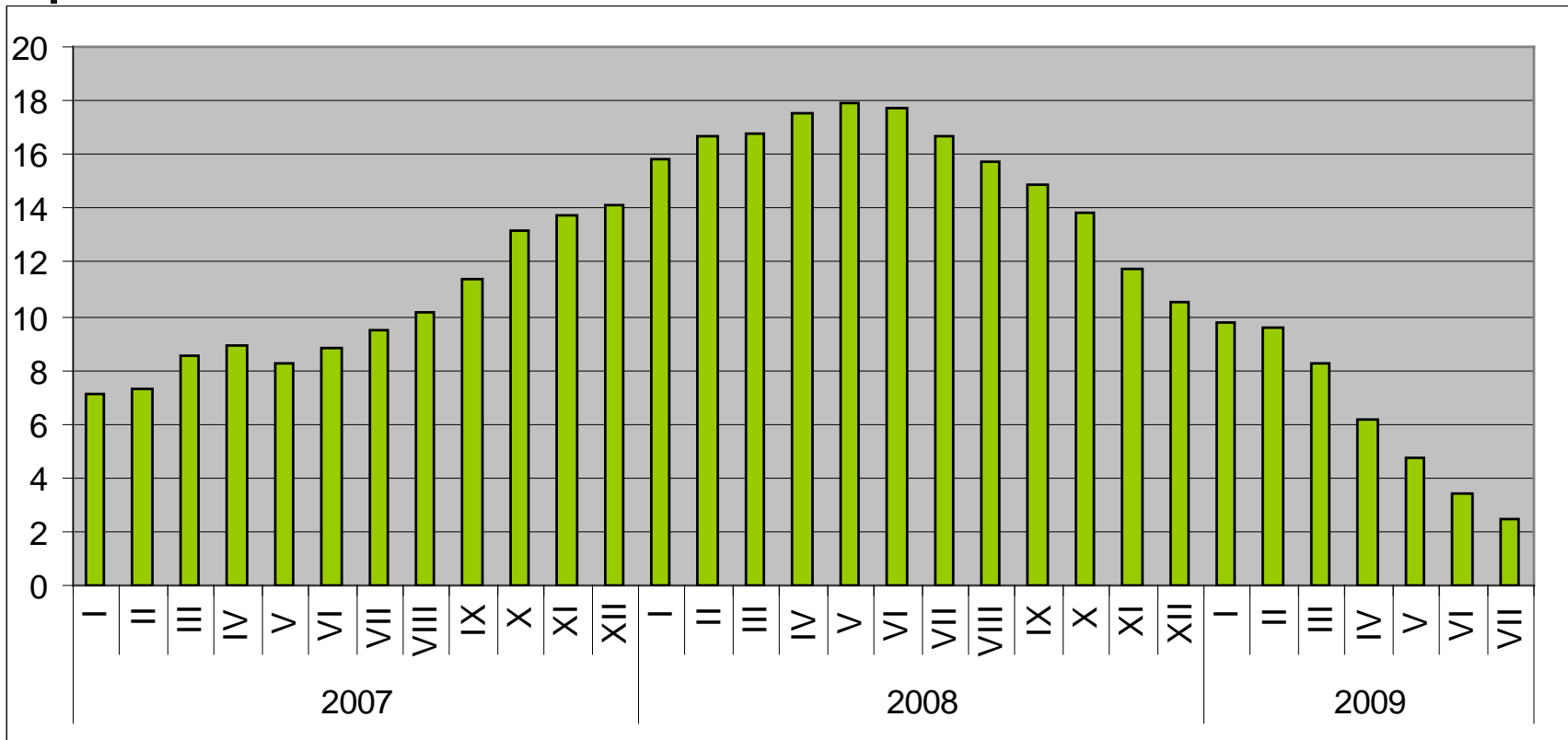


Dynamics of average weighted interest rates in LVL on deposits and credits in credit, inflation

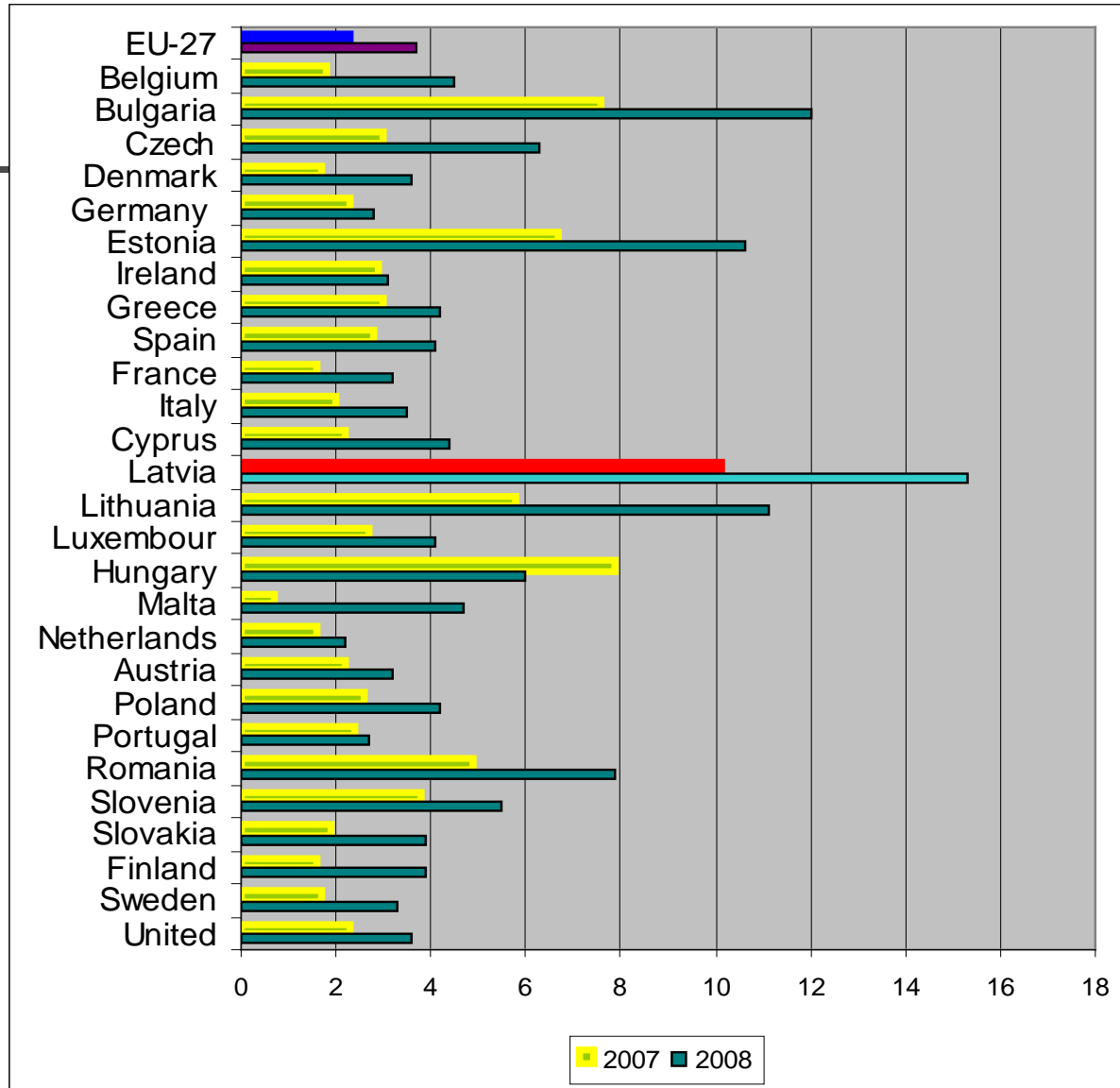


CONSUMER PRICE CHANGES

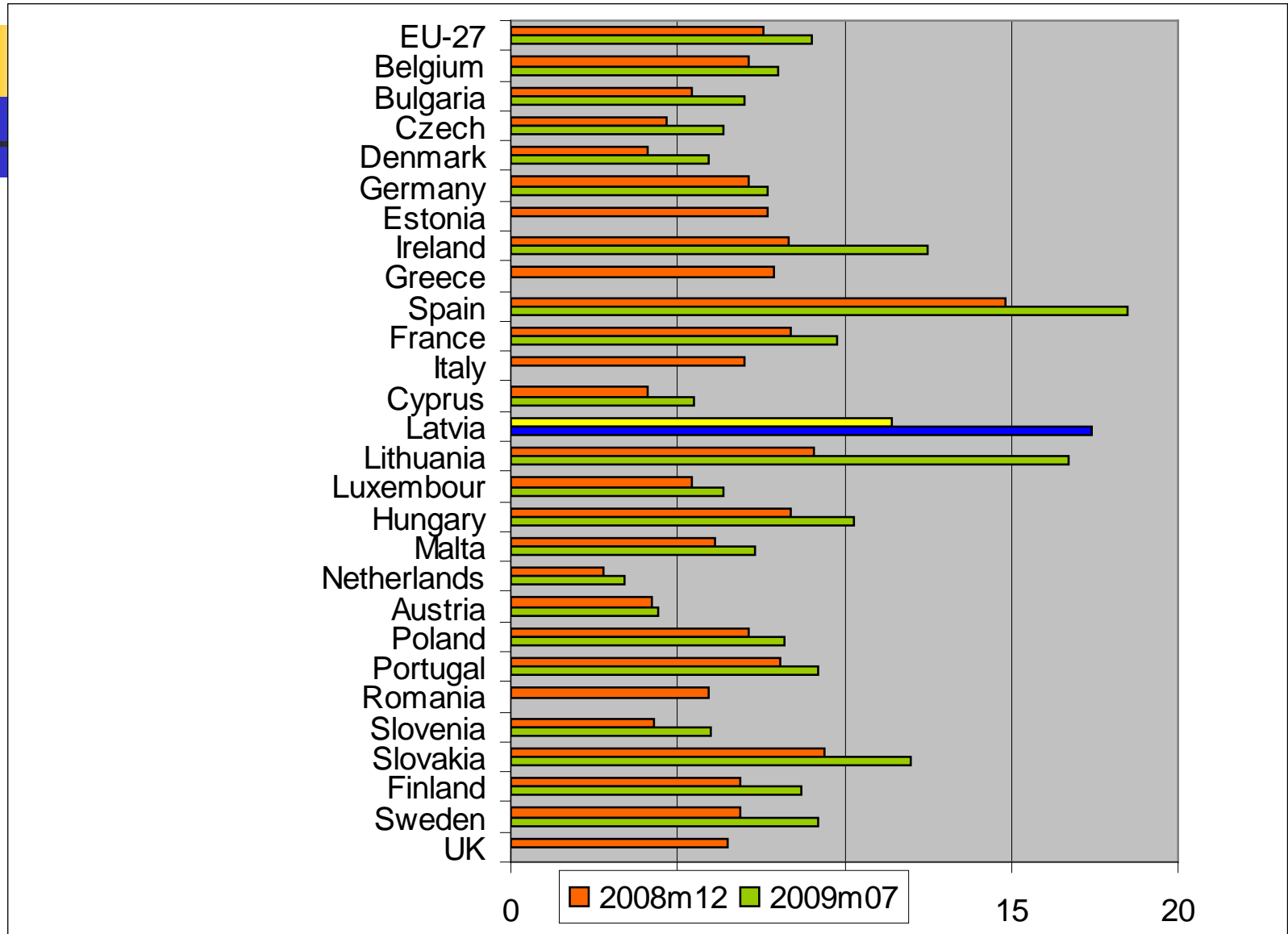
(% of corresponding period of previous year)



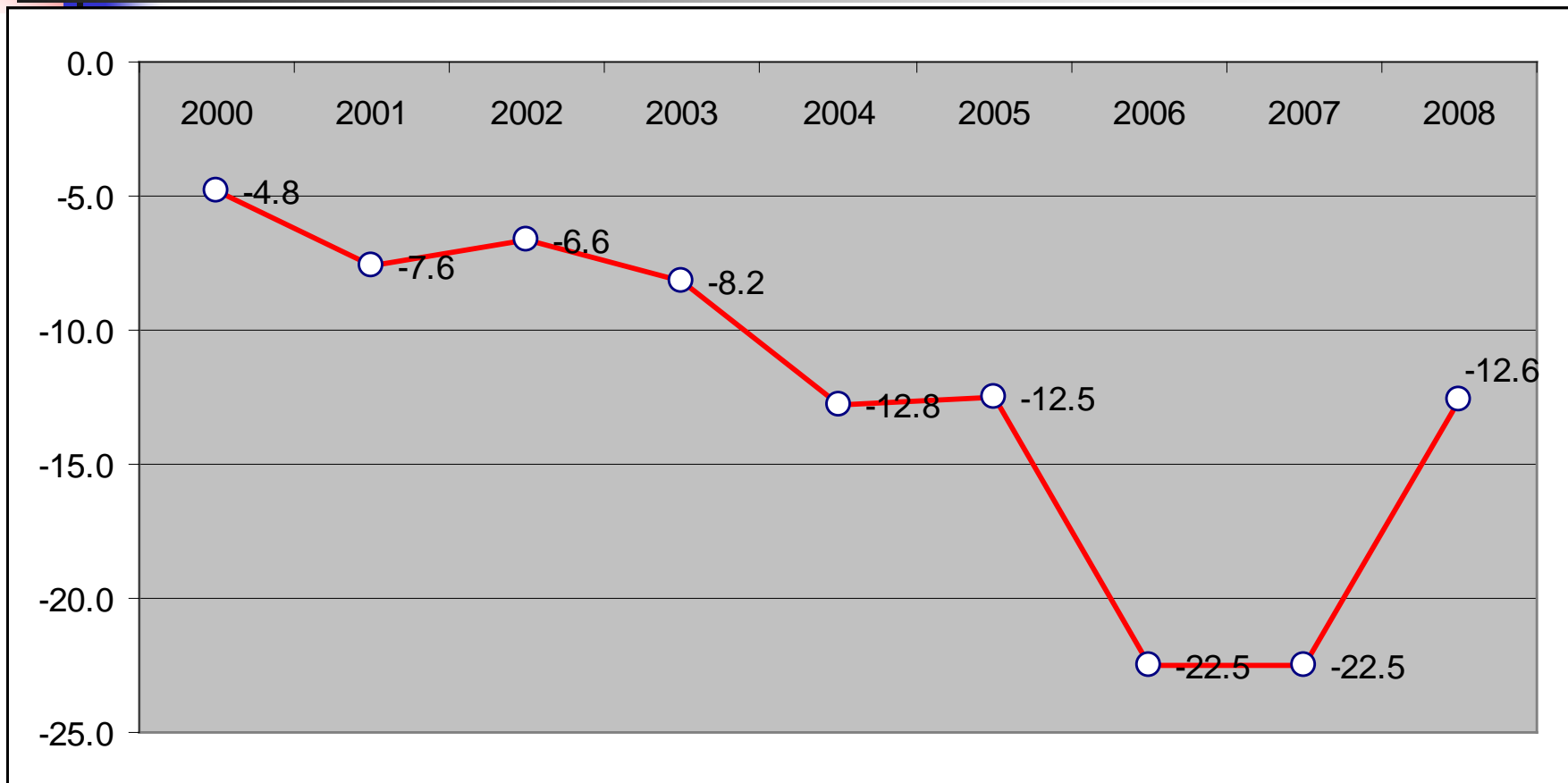
Harmonized Indices of Consumer Prices (HICPs)



Harmonised unemployment rate (%)

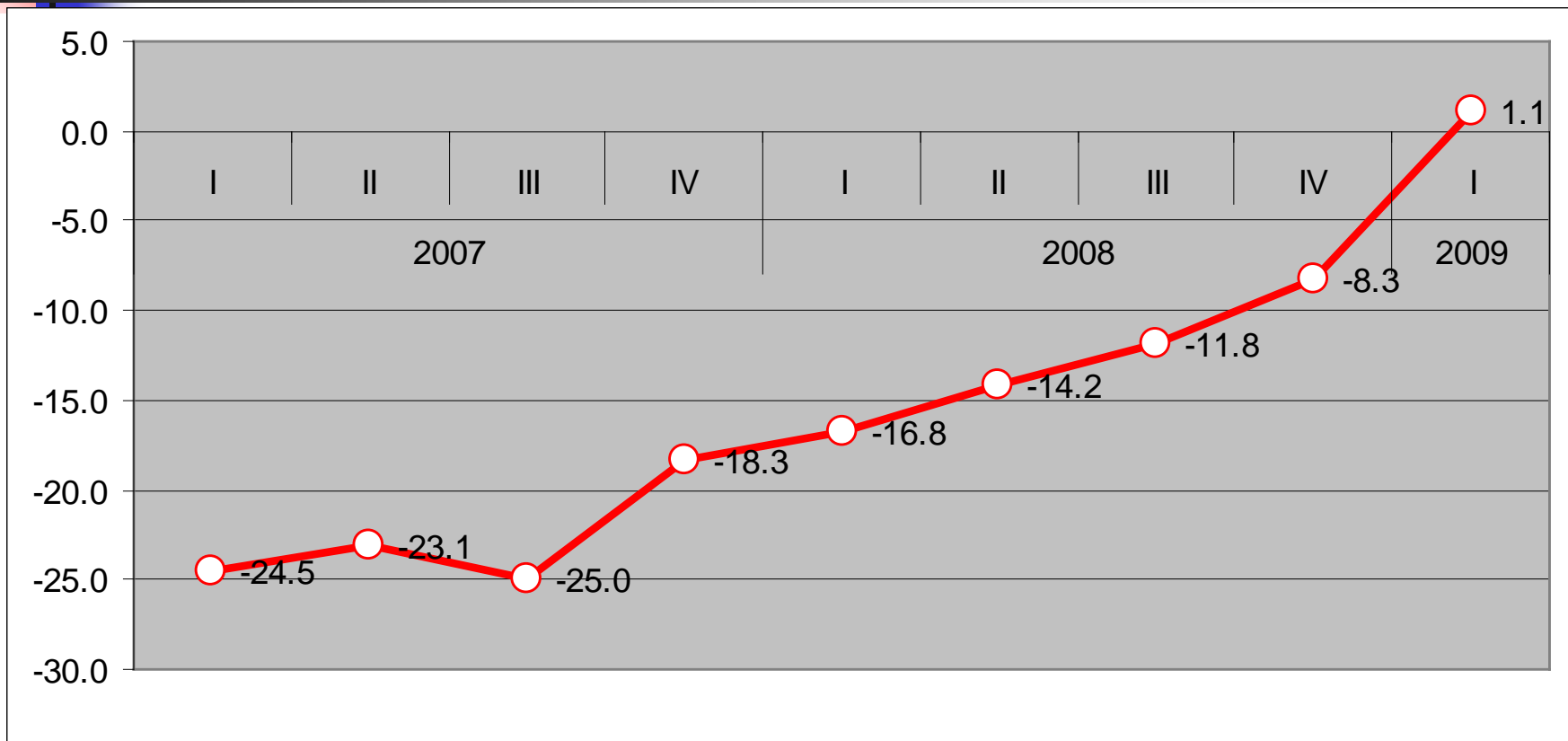


Balance of the current account in Latvia (% of GDP)

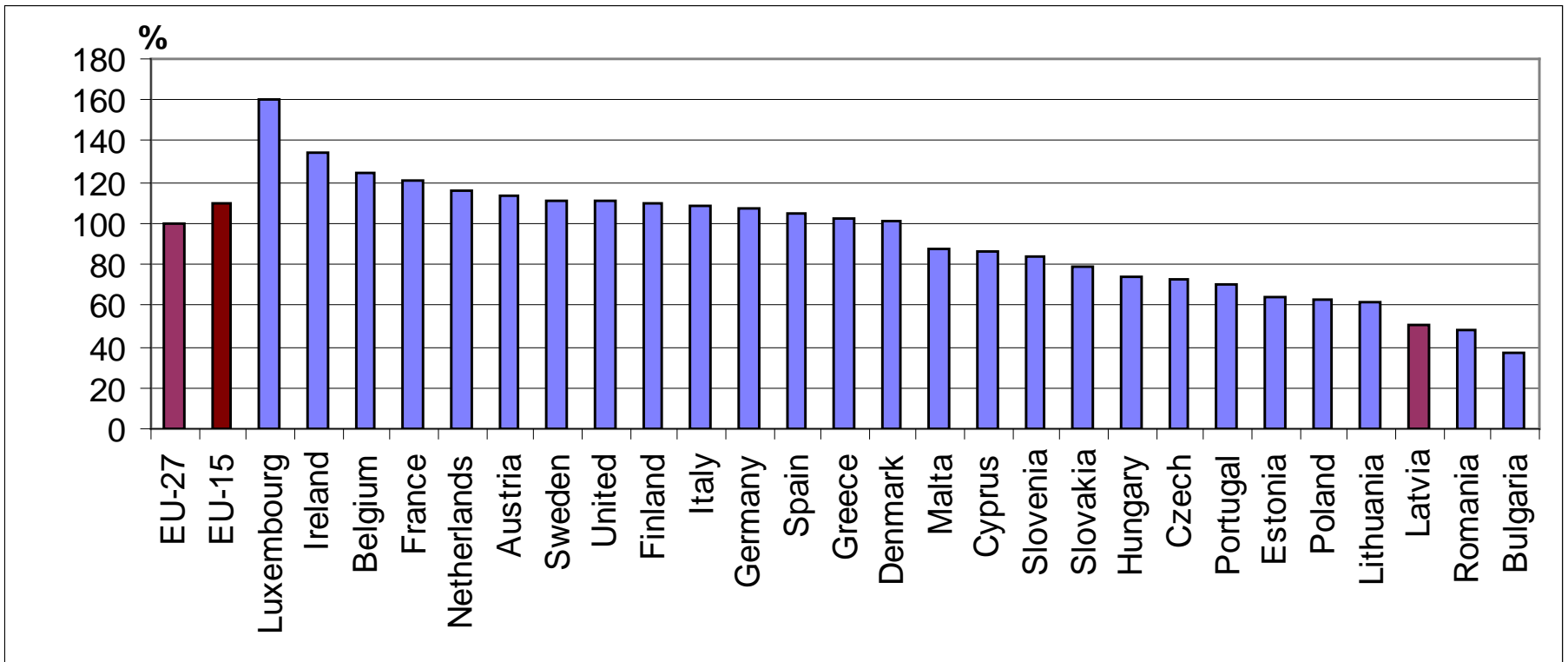


Data source: Bank of Latvia

Balance of the current account in Latvia (% of GDP)

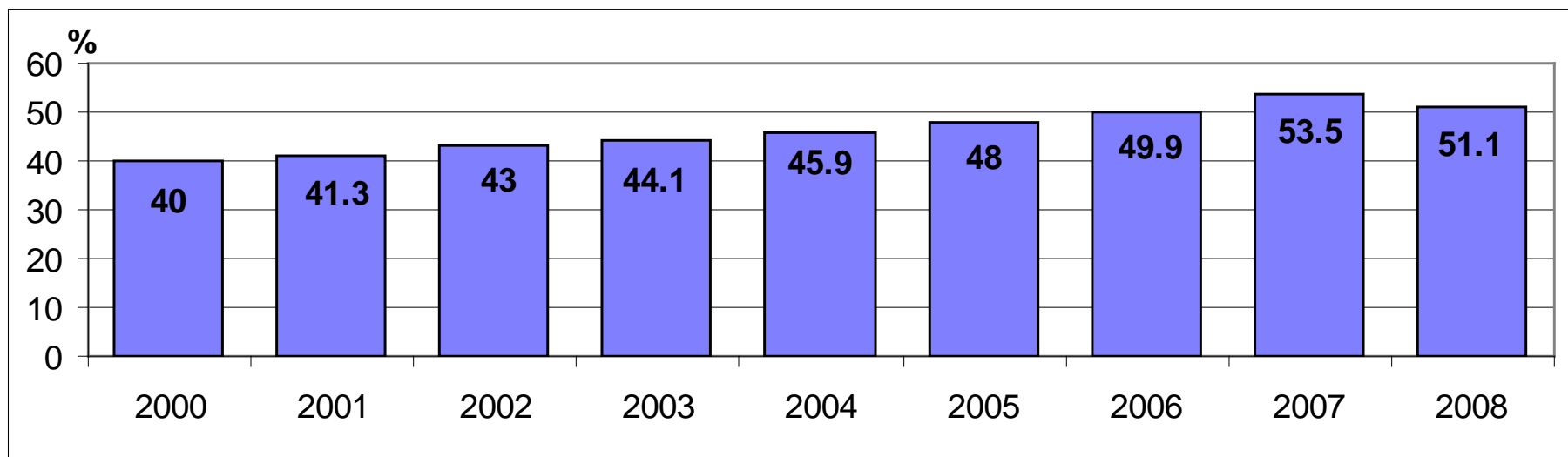


GDP in Purchasing Power Standards (PPS) per person employed relative to EU-27 in 2008 (EU-27 = 100), %

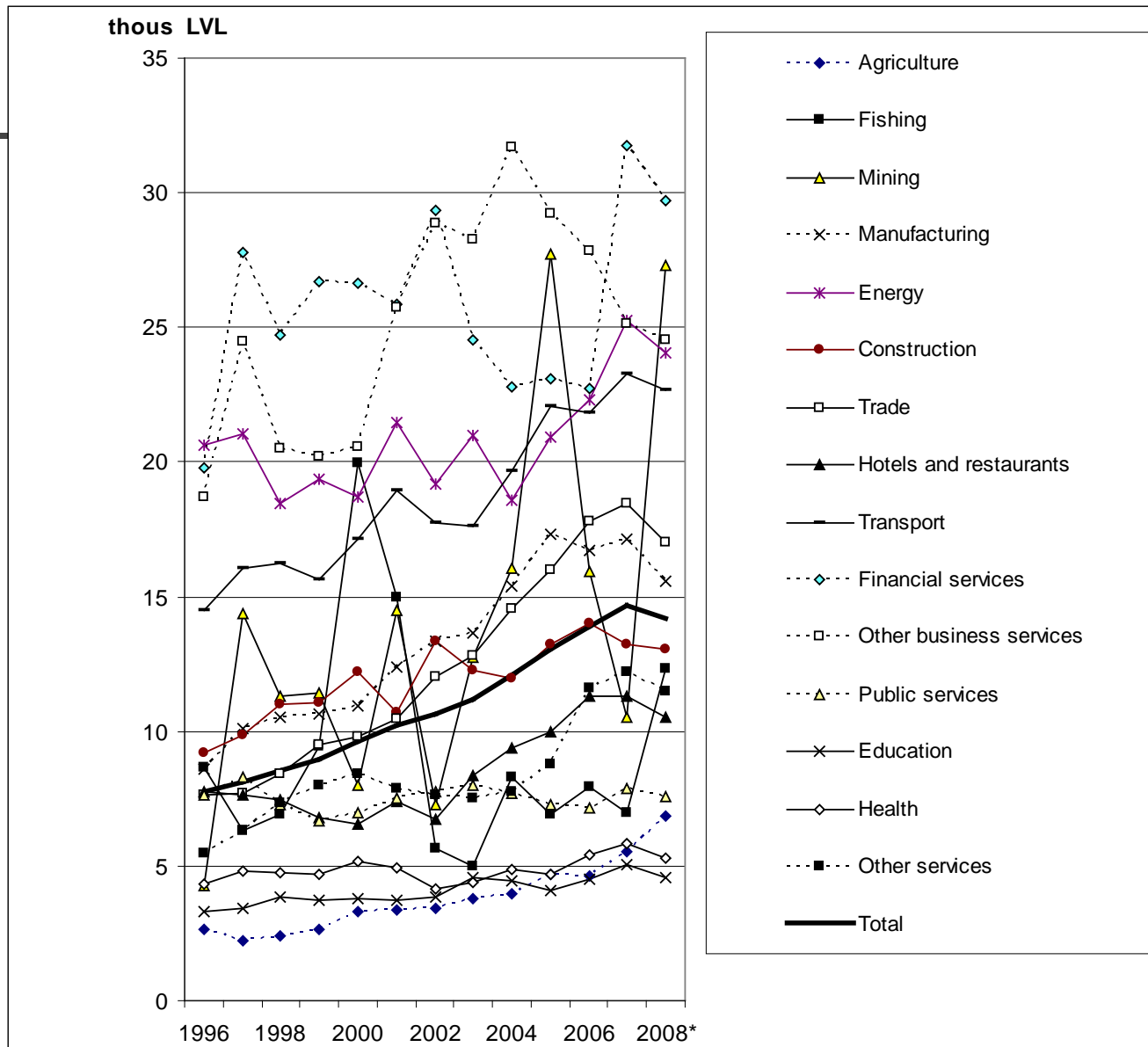




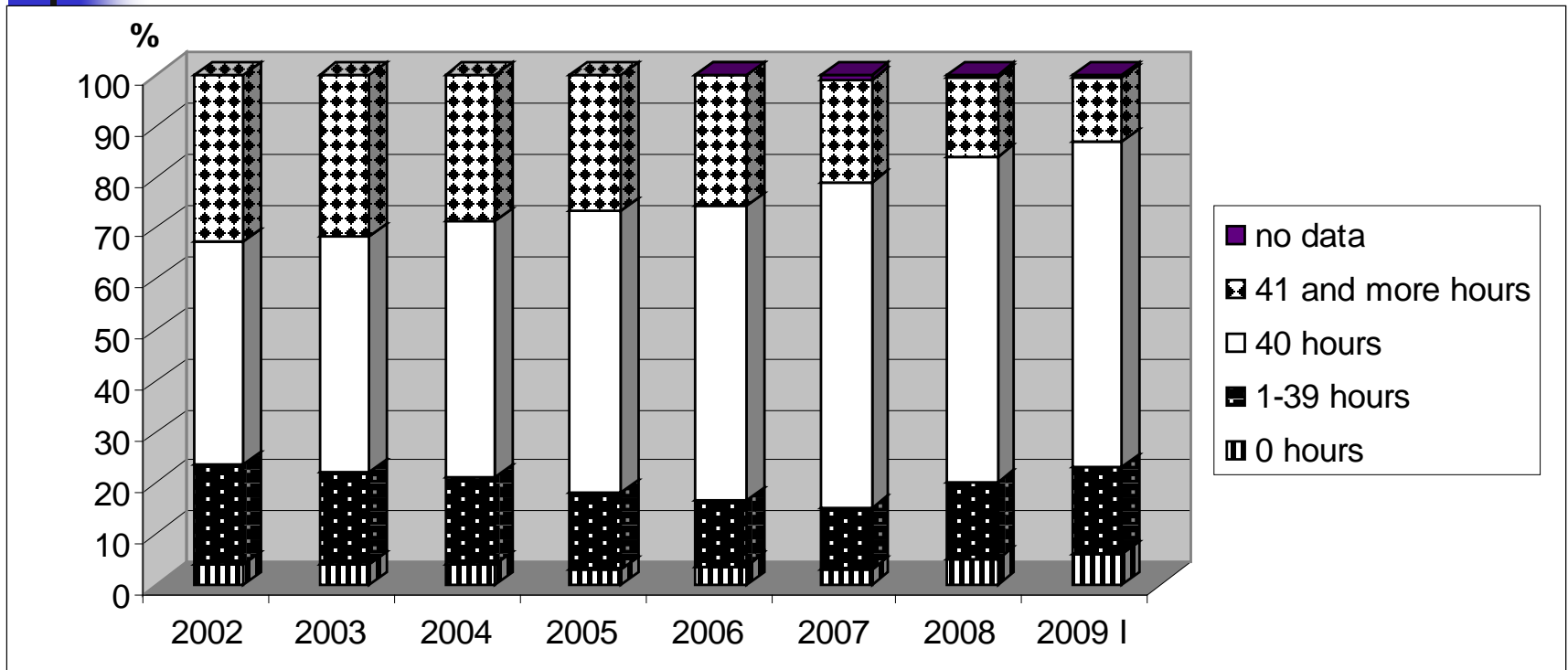
GDP in Purchasing Power Standards (PPS) per person employed in Latvia relative to EU-27 (EU-27 = 100), %



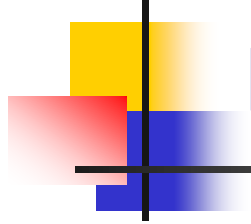
Productivity by industries in Latvia




Employment structure in Latvia by hours worked per week, %



Latvian macroeconomic model

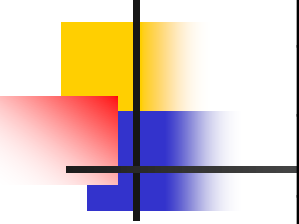


World's Most Significant Macroeconometric Models



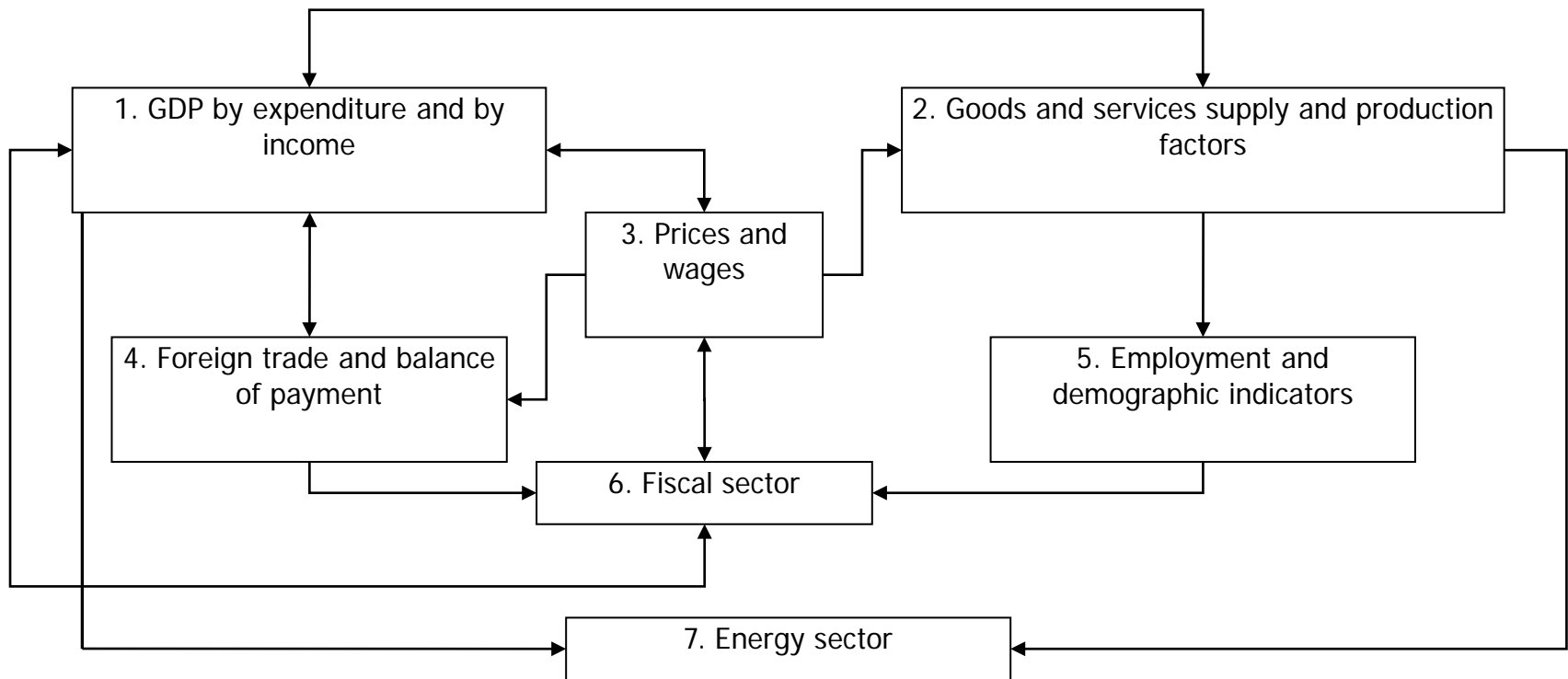
| Country | Title of model |
|---------------------|------------------------|
| USA | US model |
| USA | Global Insight's model |
| Euro zone countries | AWM |
| Euro zone countries | MCM |
| Austria | AQM-06 |
| Austria | A-LMM |
| Belgium | NBB |
| Denmark | ADAM |
| France | Mascotte |
| Greece | Greece model |
| Estonia | Estonian model |
| Estonia | EMMA |
| Lithuania | LITMOD |
| Slovakia | Slovakian model |
| Slovenia | SLOPOL6 |
| Finland | EMMA |
| Malawi | Malawi model |
| Group of countries | MCD |
| Group of countries | BbkM |

Blocks of Macroeconometric Models



| Title of model | Number of blocks |
|------------------------|-------------------------|
| US model | 5 |
| Global Insight's model | 7 |
| AWM | 6 |
| MCM | 4 |
| AQM-06 | 7 |
| A-LMM | 6 |
| NBB | 8 |
| Mascotte | 7 |
| Greece model | 5 |
| Estonian model | 5 |
| EMMA | 6 |
| LITMOD | 7 |
| Slovakian model | 6 |
| EMMA | 4 |
| Malawi model | 6 |
| MCD | 40 |
| BbkM | 13 |

Latvian macroeconomic model's scheme



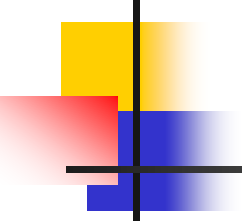
Size of Macroeconometric Models

| Models | Number of equations | Econometrically estimated equations |
|------------------------|----------------------------|--|
| US model | 125 | 30 |
| Global Insight's model | 1700 | – |
| AWM | 84 | 15 |
| MCM | 80-100 | 15-20 ¹ |
| AQM-06 | 107 | 38 |
| A-LMM | >100 | – |
| NBB | 150 | 30 |
| ADAM | 2500 | – |
| Mascotte | 280 | 60 |
| Greece model | 93 | 17 |
| Estonian model | 34 | 17 |
| EMMA | 84 | 14 |
| LITMOD | >200 | – |
| Slovakian model | >50 | – |
| SLOPOL6 | 57 | 21 |
| EMMA | 71 | 15 |
| Malawi model | 116 | 7 |
| MCD | >1000 | 314 |
| BbkM | 691 | 292 |

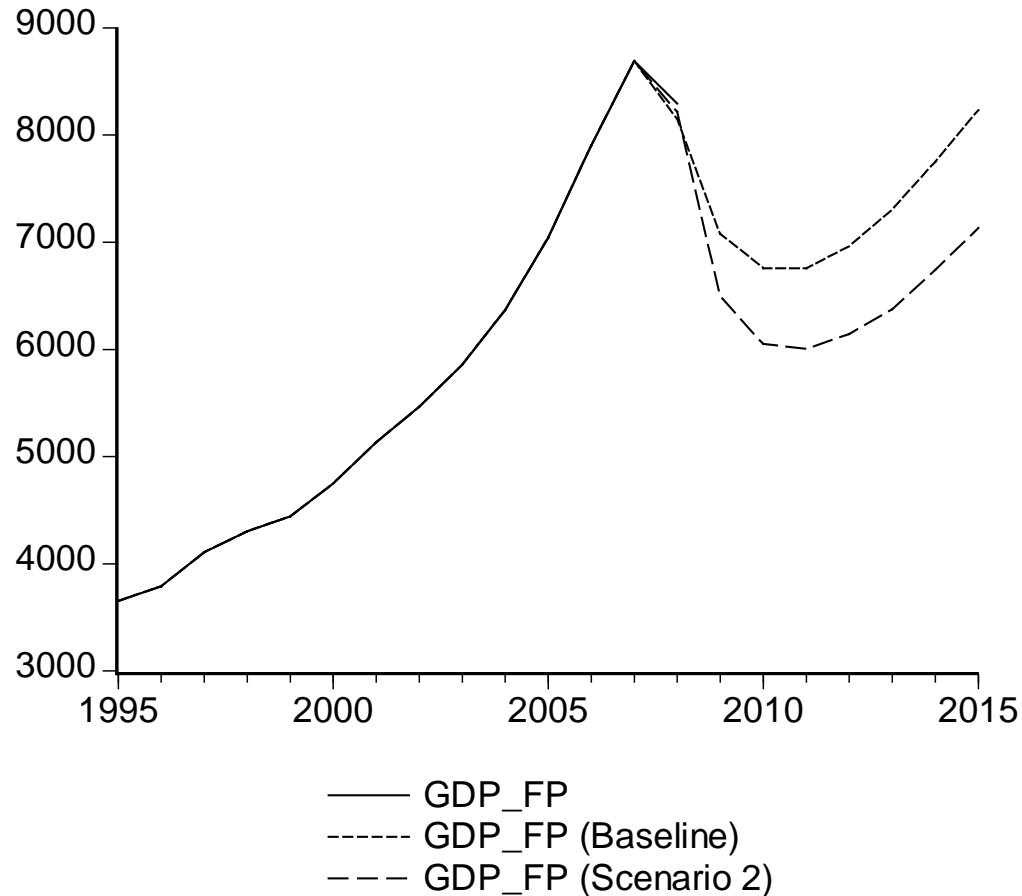
Latvian macroeconomic model



- Model contains 378 equations, of them 73 are econometrically estimated.
- Model includes sectoral disaggregations – 15 industries (according to NACE 1.1.red.).

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- $\text{Cons_fp_priv} = 3131.7 + 0.35 (\text{di/pi_cons_pr}) - 111.4 \text{ unempl_r_tot} + 0,63 \text{ cred} (-1)$
 - t: 3.2 2.9 -2.8 4.8
 - $R^2 = 0.99$ $DW = 2.61$ $P(\text{F-stat}) = 0.00$ [1997 – 2007]

GDP forecast by Latvian macroeconomic model



GDP forecasts

| | 2007* | 2008* | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Nominal GDP (mil LVL) | | | | | | | | | |
| 1 st scenario | 14780 | 16243 | 13244 | 12524 | 12542 | 13042 | 13963 | 15322 | 16922 |
| 2 nd scenario | 14780 | 16243 | 12090 | 11124 | 11038 | 11386 | 12049 | 13178 | 14488 |
| GDP per capita (thous LVL) | | | | | | | | | |
| 1 st scenario | 6493 | 7168 | 5869 | 5571 | 5600 | 5842 | 6275 | 6906 | 7647 |
| 2 nd scenario | 6493 | 7168 | 5358 | 4948 | 4928 | 5101 | 5415 | 5939 | 6547 |
| Real GDP (mil LVL) | | | | | | | | | |
| 1 st scenario | 8692 | 8293 | 7078 | 6756 | 6757 | 6964 | 7306 | 7750 | 8232 |
| 2 nd scenario | 8692 | 8293 | 6497 | 6052 | 6004 | 6144 | 6375 | 6742 | 7133 |
| Real GDP growth rate (%) | | | | | | | | | |
| 1 st scenario | 10,0 | -4,6 | -14,6 | -4,6 | 0,0 | 3,1 | 4,9 | 6,1 | 6,2 |
| 2 nd scenario | 10,0 | -4,6 | -21,7 | -6,9 | -0,8 | 2,3 | 3,8 | 5,8 | 5,8 |



OPTIONS OF LATVIAN INFORUM MODEL



LATVIAN INFORUM MODEL

- 55 sectors;
- Long-term forecasting – till 2020;
- IO 2000;



Current state of the model:

- Waiting for Generation III;
 - *Begining I;*
 - *In last September/October - II;*
- Hibernate since last October;
- Waiting for new IO table;
- Runs on the basis of current data base;



The Latvian INFORUM model

- At the current moment, in the Latvian INFORUM model productivity by branches is estimated **outside** the model due to considerably short time series and radical changes in the recent years.
- Taking into account the estimated productivity growth and integrating these values in the model, results are computed that represent the further economic and sectoral development pace on the basis of integrated assumptions.
- The applied approach is used to examine the productivity changes influence on the economy. As in many fields, Latvia converges with the average EU level or, at least, the average Baltic States level of indicators, therefore, such a study gives an insight in potential development trends.



Last year (2008)– very optimistic view

- Assumptions regarding the scenario are mainly based on the current economic trends. Since the fourth quarter of 2007, the economic development slow down has been observable, and hence the included assumptions are reflecting slow down also in the next few years.
- It is believed that households' final consumption will grow by 6% in 2008, by 5.5% in 2009, and in 2010 and 2012 it recovers, but in long-term it gradually decreases to 3% in 2020.

Last year (2008) – Output and employment forecasts (average annual change, %)

| No. | NACE code | Output forecasts | | | | Employment forecasts | | | |
|-----|-----------|------------------|-----------|-----------|-----------|----------------------|-----------|-----------|-----------|
| | | 2007-2010 | 2011-2015 | 2016-2020 | 2007-2020 | 2007-2010 | 2011-2015 | 2016-2020 | 2007-2020 |
| 6 | D 15 | 4.3 | 2.5 | 0.4 | 2.3 | 0.3 | -1.4 | -2.5 | -1.3 |
| 8 | D 17 | 7.9 | 9.7 | 6.6 | 8.1 | 3.8 | 5.5 | 3.5 | 4.3 |
| 9 | D 18 | 4.9 | 7.3 | 4.7 | 5.7 | 0.9 | 3.1 | 1.6 | 1.9 |
| 10 | D 19 | 7.4 | 9.7 | 5.6 | 7.6 | 3.3 | 5.5 | 2.5 | 3.8 |
| 11 | D 20 | 6.5 | 5.3 | 3.5 | 5.0 | 2.4 | 1.3 | 0.5 | 1.3 |
| 12 | D 21 | 0.2 | 6.0 | 3.6 | 3.4 | -3.7 | 1.9 | 0.6 | -0.2 |
| 13 | D 22 | 4.6 | 8.3 | 5.4 | 6.2 | 0.5 | 4.2 | 2.3 | 2.5 |
| 14 | D 23 | 4.3 | 3.2 | 1.8 | 3.0 | 0.3 | -0.7 | -1.1 | -0.6 |
| 15 | D 24 | 4.5 | 4.3 | 2.9 | 3.8 | 0.5 | 0.3 | -0.1 | 0.2 |
| 16 | D 25 | 3.4 | 3.4 | 1.9 | 2.9 | -0.6 | -0.5 | -1.1 | -0.7 |
| 17 | D 26 | 8.6 | 6.3 | 4.2 | 6.2 | 4.4 | 2.2 | 1.2 | 2.5 |
| 18 | D 27 | 8.1 | 6.4 | 4.3 | 6.1 | 3.9 | 2.3 | 1.3 | 2.4 |
| 19 | D 28 | 6.4 | 5.4 | 3.5 | 5.0 | 2.3 | 1.3 | 0.5 | 1.3 |
| 20 | D 29 | 9.6 | 7.4 | 4.8 | 7.1 | 5.3 | 3.2 | 1.8 | 3.3 |
| 21 | D 30 | 11.1 | 7.0 | 4.4 | 7.2 | 6.9 | 2.9 | 1.4 | 3.5 |
| 22 | D 31 | 4.4 | 6.3 | 4.1 | 4.9 | 0.4 | 2.2 | 1.0 | 1.3 |
| 23 | D 32 | 5.2 | 7.0 | 4.2 | 5.5 | 1.1 | 2.8 | 1.2 | 1.8 |
| 24 | D 33 | 7.3 | 5.8 | 3.7 | 5.5 | 3.1 | 1.7 | 0.7 | 1.8 |
| 26 | D 35 | 11.0 | 6.4 | 4.0 | 6.8 | 6.7 | 2.3 | 0.9 | 3.1 |
| 27 | D 36 | 8.9 | 7.0 | 4.7 | 6.7 | 4.7 | 2.9 | 1.7 | 3.0 |
| 28 | D 37 | 6.8 | 5.6 | 3.7 | 5.3 | 2.7 | 1.5 | 0.7 | 1.6 |



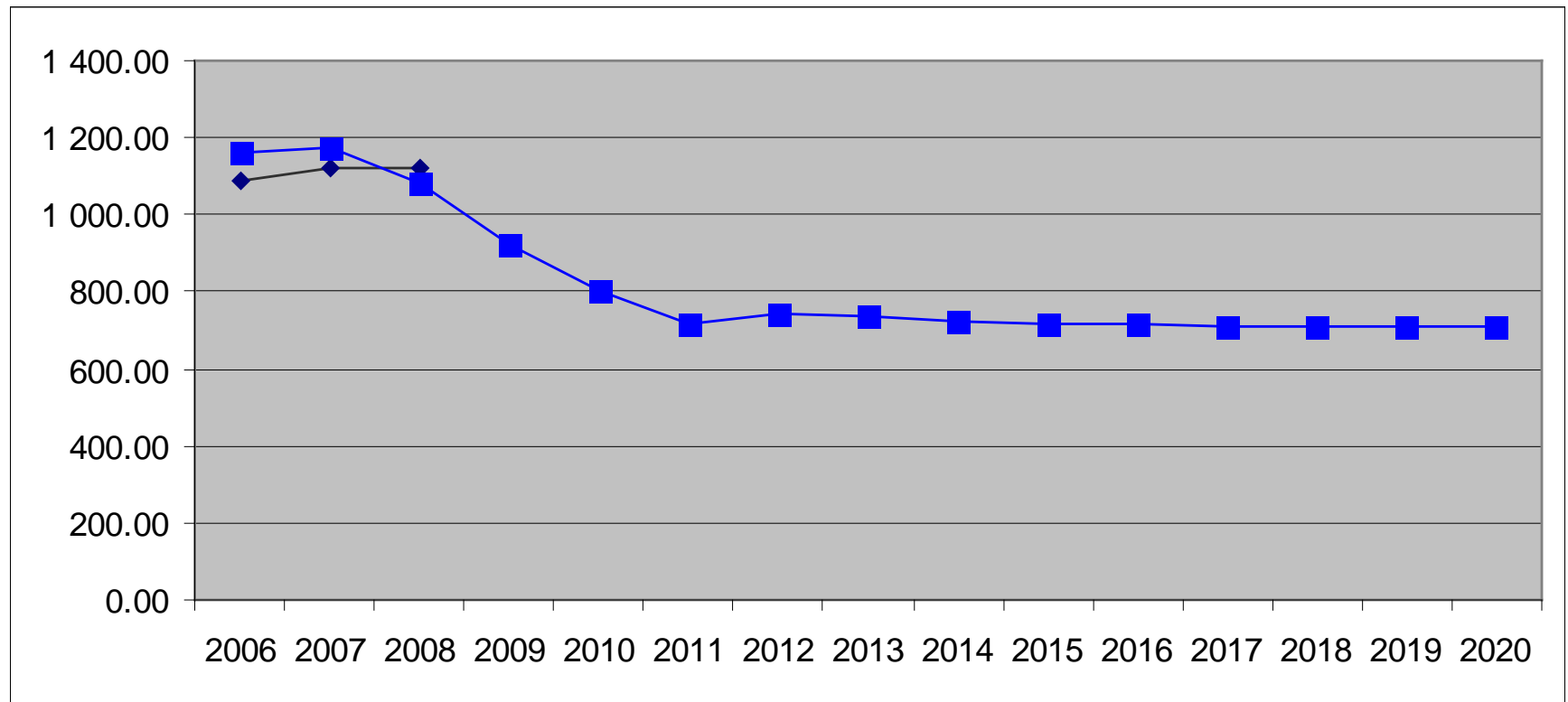
This year (2009)

- **Again**, the assumptions regarding the scenario are mainly based on the current economic trends. Since the fourth quarter of 2007, the economic development slow down has been observable, and hence the included assumptions are reflecting slow down also in the next few years.
- It is believed that **households' final consumption** will fall by 10% in 2009, by 8% in 2010, and by 5% in 2011, in 2012 it recovers, but in long-term it gradually decreases to 3% in 2020.
- It is believed that **exports** will fall by 15% in 2009, by 10% in 2010, and by 4% in 2011, in 2012 it recovers, but in long-term it gradually decreases to 4% in 2020.

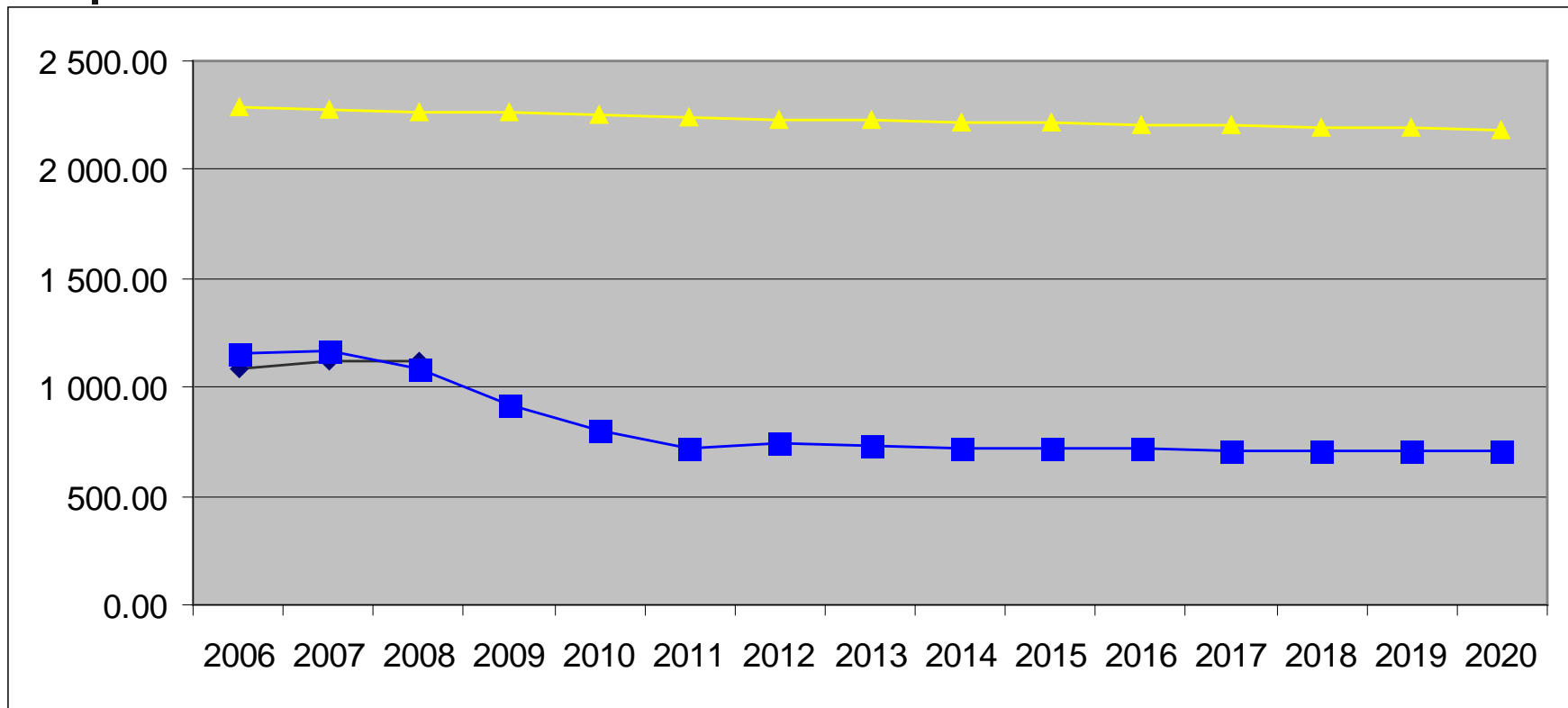
Output and employment forecasts (average annual change, %)

| No | Short name | NACE 1.1.red. code | Output forecasts | | | Employment forecasts | | |
|---------------|------------|--------------------------|------------------|-----------|-----------|----------------------|-----------|-----------|
| | | | 2008-2010 | 2011-2015 | 2016-2020 | 2008-2010 | 2011-2015 | 2016-2020 |
| 6 | FoodBev | 15 | -16.9 | -1.0 | -0.4 | -20.1 | -4.8 | -3.3 |
| 7 | Tobacco | 16 | -13.7 | 4.5 | 3.7 | -17.0 | 0.5 | 0.7 |
| 8 | Textiles | 17 | -12.1 | 7.3 | 6.5 | -15.5 | 3.2 | 3.4 |
| 9 | Clothing | 18 | -12.5 | 4.8 | 4.3 | -15.8 | 0.7 | 1.3 |
| 10 | Leather | 19 | -16.1 | 6.5 | 5.3 | -19.3 | 2.4 | 2.3 |
| 11 | Wood | 20 | -10.1 | 4.6 | 4.2 | -13.6 | 0.6 | 1.2 |
| 12 | PulpPaper | 21 | -14.2 | 3.4 | 3.7 | -17.5 | -0.6 | 0.7 |
| 13 | PrintRecd | 22 | -11.7 | 4.0 | 4.3 | -15.1 | 0.0 | 1.2 |
| 14 | Coke | 23 | -11.3 | 2.3 | 2.7 | -14.8 | -1.6 | -0.3 |
| 15 | Chemical | 24 | -8.3 | 1.8 | 2.3 | -11.8 | -2.1 | -0.6 |
| 16 | RubPlast | 25 | -12.0 | 1.3 | 2.2 | -15.4 | -2.6 | -0.8 |
| 17 | OthNMet | 26 | -7.6 | 2.5 | 4.5 | -11.1 | -1.5 | 1.4 |
| 18 | BasicMet | 27 | -10.0 | 3.9 | 4.3 | -13.5 | -0.1 | 1.3 |
| 19 | MetalPro | 28 | -9.9 | 1.9 | 3.7 | -13.4 | -2.1 | 0.7 |
| 20 | MachEqu | 29 | -7.2 | 2.9 | 5.1 | -10.7 | -1.0 | 2.0 |
| 21 | MachOffi | 30 | -6.2 | 2.3 | 5.0 | -9.8 | -1.7 | 2.0 |
| 22 | MachEle | 31 | -8.4 | 3.0 | 4.0 | -11.9 | -1.0 | 1.0 |
| 23 | CommEd | 32 | -8.3 | 2.5 | 4.4 | -11.9 | -1.4 | 1.3 |
| 24 | MedOptI | 33 | -8.8 | 2.7 | 3.6 | -12.3 | -1.2 | 0.5 |
| 25 | Vehicles | 34 | 13.0 | 15.7 | 12.8 | 8.7 | 11.2 | 9.5 |
| 26 | OthTrans | 35 | -10.2 | 4.1 | 4.9 | -13.7 | 0.1 | 1.8 |
| 27 | FurnitOh | 36 | -8.7 | 3.9 | 5.3 | -12.2 | -0.1 | 2.3 |
| 28 | SecRawM | 37 | -10.8 | 5.0 | 4.5 | -14.2 | 1.0 | 1.5 |
| Total economy | | | -8.2 | 2.0 | 3.0 | -12.0 | -2.2 | -0.1 |

Employment forecasts (thous persons)



Employment forecasts (thous persons)





Thank you for attention!

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