

GROSS DOMESTIC PRODUCT OF THE CZECH REPUBLIC BEFORE AND AFTER ADJUSTMENTS

KRISTÝNA VLTAVSKÁ

University of Economics Prague, Faculty of Informatics and Statistics, Department of Economic
Statistics, nám. W. Churchilla 4, 130 67 Prague 3, Czech Republic
email: kristyna.vltavska@vse.cz

JAROSLAV SIXTA

University of Economics Prague, Faculty of Informatics and Statistics, Department of Economic
Statistics, nám. W. Churchilla 4, 130 67 Prague 3, Czech Republic
email: sixta@vse.cz

MARTINA ŠIMKOVÁ

University of Economics Prague, Faculty of Informatics and Statistics, Department of Demography,
nám. W. Churchilla 4, 130 67 Prague 3, Czech Republic
email: martina.simkova@vse.cz

JAN ZEMAN

University of Economics Prague, Faculty of Informatics and Statistics, Department of Economic
Statistics, nám. W. Churchilla 4, 130 67 Prague 3, Czech Republic
email: jan.zeman@vse.cz

Abstract

The paper deals with the methodology and shows provisional results of the reconstruction of the main macroeconomic indicators for the Czech Republic for 1970-1989. This work follows the project of the Department of Economic Statistics where we reconstructed production and expenditure approach to gross domestic product (GDP) in ESA 1995 methodology. Since ESA 2010 was put into the practice in September 2014, we have to update our estimates and adjust the methodology. The main differences between the methodologies lie in the capitalization of research and development, military equipment and small tools. Other methodical adjustments are not taken into account since the economy was much closed and financial services were not very developed. Moreover, some other adjustments not affecting GDP like processing are not estimated. Since our project started in January 2015, we present provisional figures without detailed breakdown. Details and completed methodology are intended to be published in the year 2016.

Key words: GDP, ESA 2010, revision.

1. Introduction

Time series of gross domestic product (GDP) are very often required by several groups of users. Availability of long time series is common for developed countries, for example US data starts in 1930s and French data in 1950s. Official GDP data provided by the Czech Statistical Office (CZSO) starts in 1990. According to Eurostat, the CZSO is obliged to provide data from 1995 onwards. Even the CZSO offers more than it is required, it is not enough. Users many times ask for 30, 40 or more year of comparable indicators. It depends on

the group of users. Some of them usually from analytical groups ask for quarterly data, mostly the most recent data are preferred. On the other side, researchers from academic sphere prefer long time series. Therefore we prepared time series of sources and uses of GDP for 1970 – 1989 fully compatible with official CZSO data. Our estimates were prepared within the Project of Czech Science Foundations (Fischer et al., 2013) in ESA 1995 (Eurostat, 1996) methodology.

In September 2014, new methodical standard of national accounts was put into practice, ESA 2010. It introduced lots of improvements ranging from computation of GDP to sector classification. It means that our estimates have to be updated for several methodical adjustments. The most important adjustments contain capitalisation of expenditures for research and development, small tools and military assets.

The aim of this paper is the introduction of the main changes in the methodology of national accounts and presentation of the first results based on ESA 2010 (Eurostat, 2013) on the historical time series of the Czech GDP. The paper also contains international comparison of changes in GDP by the individual groups of adjustments.

2. Methodology of computation

Our methodology refers to the previous project aimed at the reconstruction of GDP. The process of computation is based on transformation of original data from Material Product System (MPS). MPS was used in former Eastern bloc from 1950s to the transition period 1989/1990. Socialist MPS was based on Marx theory and it was completely abandoned in the Czech Republic. Modern System of National Accounts (SNA) based on ESA 1995 was founded in mid 1990s. For the purposes of international comparisons, the transformation of MPS data into SNA was performed even in former Czechoslovakia (Sixta et al., 2013). But such work was done for Czechoslovakia only. Our estimates refer to the Czech Republic. Moreover, previous work was based on the previous standard of national accounts - SNA 1968.

Current standard ESA 2010 was implemented in all EU countries. ESA 2010 is European modification of international standard SNA 2008, that was implemented by the USA, Australia, etc. ESA 2010 emphasises the most recent events in economy. The key point is to be in touch with the changes connected with knowledge-based economy. Hence the most important changes that influence GDP are connected with the definition of assets.

From the perspective of the measurement of GDP we can distinguish three crucial changes. Capitalisation of expenditures on research and development, capitalisation of expenditures on small tools and capitalisation of military assets. The relevance of individual methodical adjustments is described on 2010, see Table 1.

Table 1. Changes between ESA 1995 and ESA 2010, 2010, %

Indicator	bn CZK	% of GDP
GDP (before adjustments)	3,791	100.0
Capitalisation of research and development	45.3	1.19
Capitalisation of small tools	62.6	1.65
Capitalisation of military assets	5.2	0.14
Other adjustments	49.9	1.32
GDP 2010 (after all adjustments)	3,954	104.3

Source: own calculation based on CZSO data

The provisional transformation method is based on average difference between GDP data based on ESA 1995 and ESA 2010. Let's w is defined as following:

$$w_t = \frac{GDP^{ESA2010}}{GDP^{ESA1995}} \quad (1)$$

The average difference is 4.5% with maximum in 1991 of 6.5%, see Figure 1. The variation the share (w) is given by the different development of all components. The impact on GDP is mostly given by the consumption of fixed capital from these assets. It means that capitalisation of expenditures (on research and development, military assets and small tools) is recorded as capital formation that creates capital stock. Since the output of non-market producers is estimated as a sum of costs, consumption of fixed capital (depreciation) plays important role.

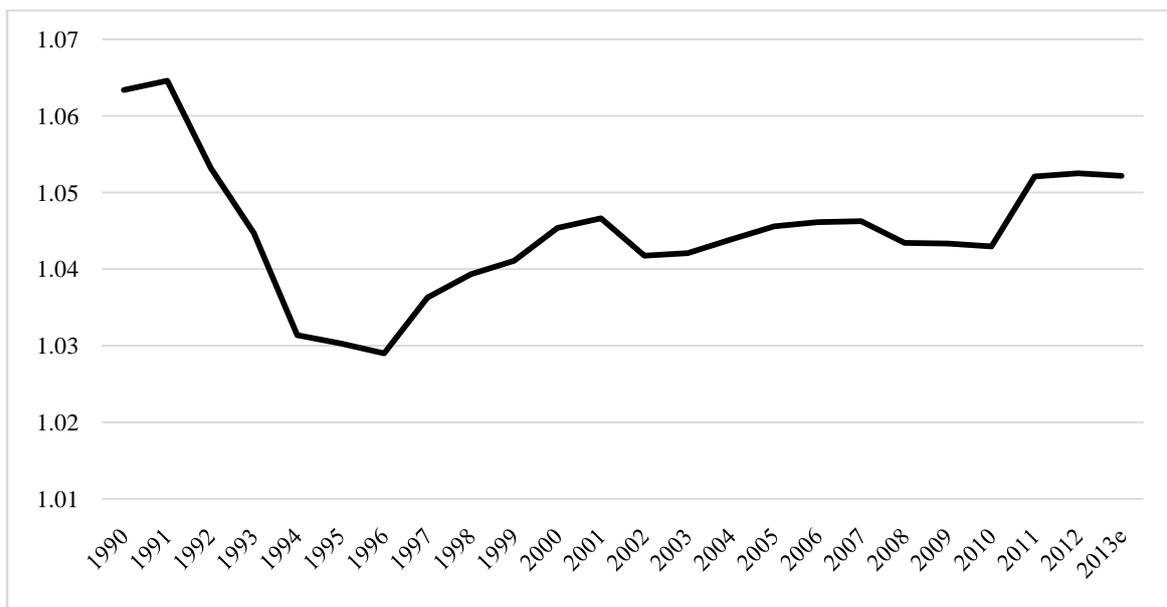


Figure 1. Comparison of GDP based on ESA 1995 and ESA 2010

Source: CZSO 2014

Transition from ESA 1995 to ESA 2010 affected mainly nominal value of GDP rather than volumes. Real development of GDP remained nearly unchanged. On the contrary, the transition from MPS to ESA 1995 affected both nominal values and volumes. National income was in the MPS the most important aggregate. It is an equivalent of GDP in national accounts. The difference of volumes between GDP and national income is shown in Figure 2. The difference lies in both methodical adjustments given by national accounts rules (Sixta and Fischer, 2014) and principles of deflation. The deflation is based on previous years' prices instead of originally base method. The difference between growth rates of both indicators is not very significant except 1977 and 1982. The year 1982 is connected mainly with economic problems of eastern bloc due to the increase of oil prices. Since oil prices for socialist

countries (from Soviet Union) were constructed differently from west markets, there was a significant delay of the oil shock in the East.

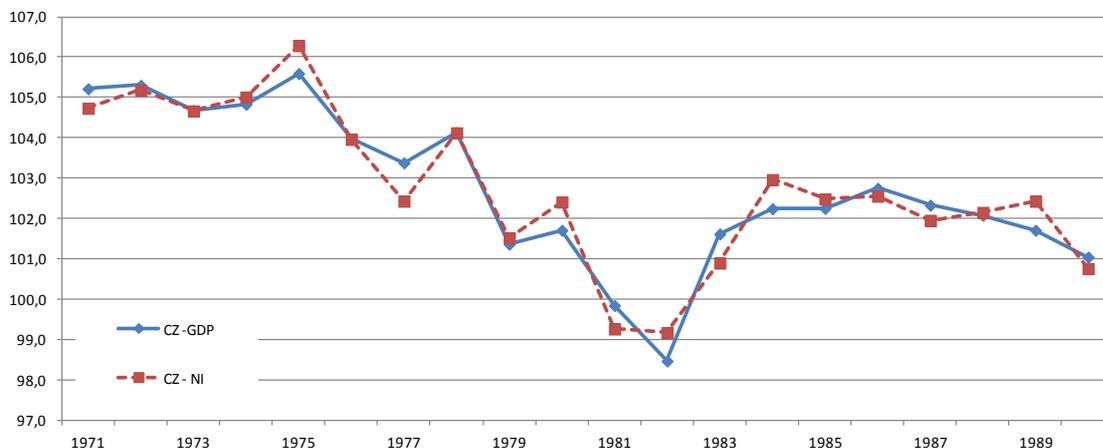


Figure 2. Development of national income and gross domestic product, 1971-1990, volumes
 Source: CZSO 2014

The detailed estimates of individual adjustment representing the difference between ESA 1995 and ESA 2010 will need more precise elaboration. Since we are on the beginning of the project, we prepared preliminary estimates of time series of GDP based on the coefficient w . Final figures will be sharply influence mainly by the development of expenditures in government research and development and military spending. Detailed and more precise figures should be available by the end of 2015. When using this simple approach, the nominal level of GDP should be increased about 6% - 7%. Estimated development of GDP at current prices (2014 = 100) is presented in Figure 3. GDP in 1970s represented hardly 10% of GDP in 2014. The price and volume level were strongly different than in these days. Since 1990 there the level of GDP (in comparison with 2014) has been significantly rising as the Czech economy was transforming. The most interesting year was 2008. The level of GDP was 94% of GDP in 2014. This was the last year before the economic crises which slowed down the economy.

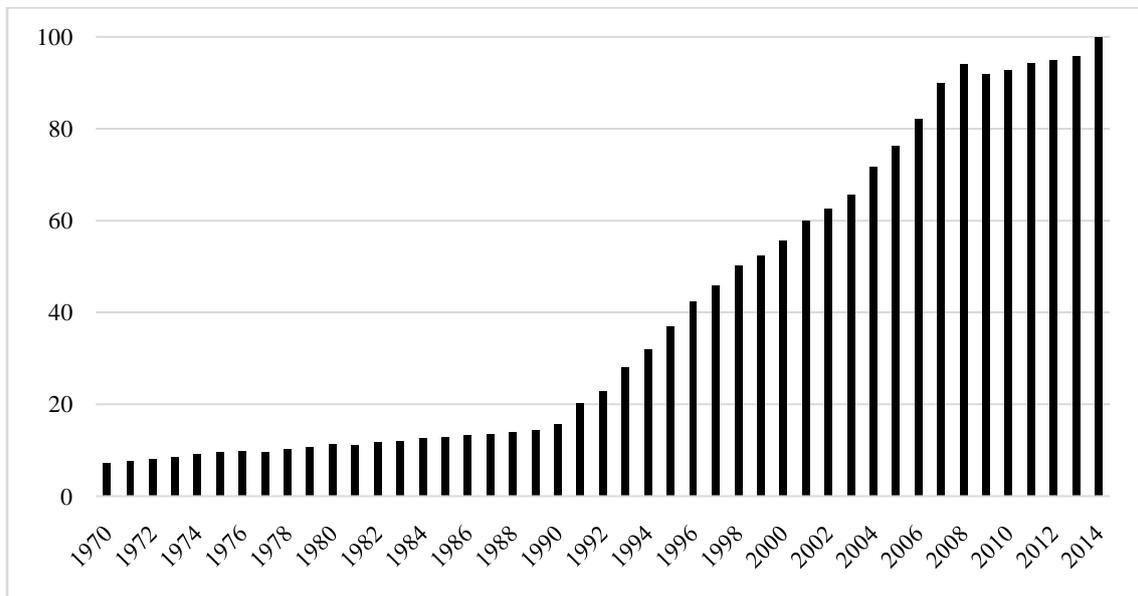


Figure 3. Gross domestic product of the Czech Republic, current prices, 2014=100
 Source: Own computation

3. International Comparison

The changes in ESA influenced all the EU countries. For most of them the capitalisation of research and development represents the most important change (Figure 4). On the other hand, the capitalisation of military assets do not influence the GDP as much as in the Czech Republic. For example the impact of capitalisation of military assets in the United Kingdom was estimated as 3.5 bil GBP. That represents approximately 0.3% of United Kingdom GDP in 2009. While the Czech investments into military assets in 2011 are 0.1% of GDP the investments into military assets in the United Kingdom forms 0.3% of GDP.

The results showed in Figure 4 state that Sweden (4.0%), Finland (4.0%) and Ireland (3.5%) represented countries with the highest share of capitalisation of research and development as the main change in the revision. On the other hand, Cyprus is the country with the highest portion of statistical improvements in the revision (8.4%). Other methodological changes (capitalisation of military assets and capitalisation of small tools) play the most important role in the Czech Republic (1.9%), Austria (1.4%) and Slovakia (1.4%). Statistical improvements represent negative impact in the Luxembourg (-1.4%) and Latvia (-1.2%).

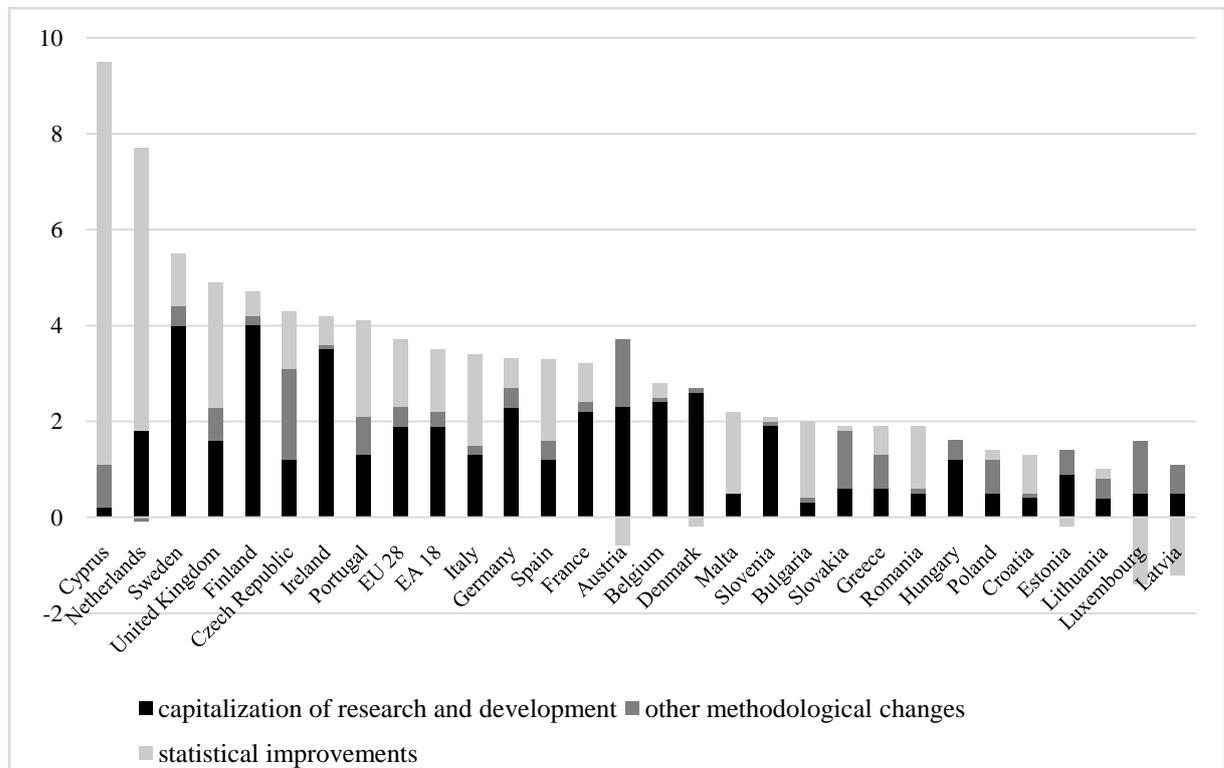


Figure 4. Revision of gross domestic product in the EU, 2010, %
 Source: CZSO 2014

4. Conclusion

The long time series of the main economy indicators are demanded not only by the researcher but also from the economic experts. Till 2014 all of them could evaluate the economic development of the Czech Republic on the data 1970-2013 based on ESA1995. In September 2014 the newest European standard of accounts 2010 took place and the Czech Statistical Office recalculate national account since 1990 onwards. The Department of Economic Statistics reconstructed the historical time series 1970-1989 in ESA1995 therefore the Department will also recalculate source and usage of GDP in ESA2010. This paper represented the main methodological changes between ESA1995 and ESA2010. The capitalisation of research and development was indicated as the main changes in the calculation of GDP not only in the Czech Republic but in Finland and Austria as well.

The recalculation of production and expenditure approach to GDP (for the results based on ESA 1995 see Sixta et al., 2014) in the Czech Republic will be finished as well as the estimation of income approach to GDP will be finished in 2016 and all the results will be available online at the website of the Department of Economic Statistics.

Acknowledgement

This paper has been prepared under the support of the project of the University of Economics, Prague - Internal Grant Agency, projectNo. 17/2015“GDP of the Czech Republic in the period between the years 1970-1989 according to ESA 2010”.

References

1. European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations, World Bank. 2009. System of National Accounts 2008 (SNA 2008).
2. EUROSTAT. 1996. European System of Accounts (ESA 1995). Eurostat, Luxembourg 1996.
3. EUROSTAT. 2013. European System of Accounts (ESA 2010). Eurostat, Luxembourg 2013.
4. FISCHER, et al. 2013. The Estimation of the Czech Gross Domestic Product for the years 1970-1989 Based on ESA 1995. In *Politická ekonomie*, 2013, vol. 61, iss. 1, pp. 3-23.
5. SIXTA, J., FISCHER, J. 2014. Using Input-Output Tables for Estimates of Czech Gross Domestic Product 1970-1989. In *Economic Systems Research – Journal of the International Input-Output Association*, 2014, vol. 26, iss. 2, pp. 177-196.
6. SIXTA, J., VLTAVSKÁ, K., FISCHER, J. 2013. The Development of Gross Domestic Product in the Czech Republic and Slovakia between 1970 and 1989. In *Ekonomický časopis*, 2013, vol. 61, iss. 6, pp. 549-562.
7. SIXTA, J. et al. 2014. Household consumption expenditures between 1970-2012. In: *Politická ekonomie*, 2014, vol. 62, iss. 6, pp. 725-748.