HISTORICAL TIME SERIES OF GDP EMPLOYING STANDARD ESA 2010

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Abstract

Every country wants to have long time series of the main macroeconomic indicators. In 2013 Department of Economic Statistics presented historical time series of GDP (using expenditure and production approaches) according to the European Standard of Accounts ESA 1995. Since ESA 2010 was put into the practice in September 2014 we have to recalculate the time series of GDP in the period between the years 1970 and 1989 according to the valid standards. The main differences between ESA 1995 and ESA 2010 lie in the capitalization of research and development, capitalization of military equipment and capitalization of small tools. Other methodical adjustments are not taken into account as the economy was closed and financial services were nor much developed in the period in question. This paper presents the preliminary results of GDP and its components using expenditure and production approach and presents several comparisons with the data estimated according to standard ESA 1995.

Key words: GDP, ESA 2010, revision

JEL Code: E01, C02, N01

Introduction

Year 2014 offered several significant changes in measuring economy. It was caused by the implementation of the latest version of European System of Accounts, ESA 2010 (Eurostat, 2013). ESA 2010 replaces ESA 1995 (Eurostat, 1996) which was based on the global System of National Accounts SNA 1993 (UN, 1993). ESA 2010 was implemented by all European Union countries at the same year and comprised many changes which correspond to the improvement of the statistical interception of the economy. The main changes represent the capitalisation of research and development, the capitalisation of small tools and the capitalisation of military assets. The Czech Statistical Office adjusted estimates of gross domestic product (GDP) and its components in the time series 1990 to 2013. As several groups of users often required long time series of GDP and its components, the Department of Economic Statistics is obliged to recalculate time series of GPD 1970-1989 (which were

calculated according to the ESA 1995 and published in 2013, see Sixta and Fischer, 2014 or Vltavská and Sixta, 2015) according to the ESA 2010. This recalculation contains not only recalculation of production and expenditure approaches to the GDP but also estimation of income approach to GDP and employment in the classification CZ-NACE rev. 2.

The recalculation of GDP and its components is on its beginning. This paper shows the influence of the main changes between the standards on the economy and presents preliminary results of GDP 1970–1989 as well.

1   Methodology

Our methodology refers to the project aimed at the reconstruction of gross domestic product (Fischer et al, 2013). The estimates of aggregates are based on the 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. On the contrary, Modern System of National Accounts (SNA) based on ESA 1995 was implemented in mid 1990s. For the purposes of international comparisons[1], 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[2]. Moreover, previous work was based on the previous standard of national accounts – SNA 1968.

Modern national accounts 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 gross domestic product are connected with the definition of assets.

From the perspective of the measurement of gross domestic product 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.

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[1]More about international comparison of macroeconomic indicators e.g Singer, 2013.
[2]Also we prepared provisional estimates of Slovak aggregates based on simplified procedures (derived from the Czech data). For more information about the current economic development of Slovakia see (Morvay et al., 2010)

Tab. 1: Changes between ESA 1995 and ESA 2010, 2010

| Indicator	Bil. CZK	% of GDP
Gross domestic product	3,791	100.0
Capitalisation of research and development	45.3	1.2
Capitalisation of small tools	62.6	1.7
Capitalisation of military assets	5.2	0.1
Other adjustments	49.9	1.1
Resulting GDP after all adjustments	3,945	104.3

Source: Czech Statistical Office, own calculations

The temporary transformation method is based on the differences between gross domestic product in ESA 1995 methodology and ESA 2010 methodology. Let's *w* is defined:

$$w_t = \frac{GDP^{ESA2010}}{GDP^{ESA1995}}$$

(1)

Figure 1 shows the differences between ESA1995 and ESA 2010 in the period between the years 1990 and 2013.

Fig. 1: Comparison of gross domestic product based on ESA 1995 and ESA 2010, %
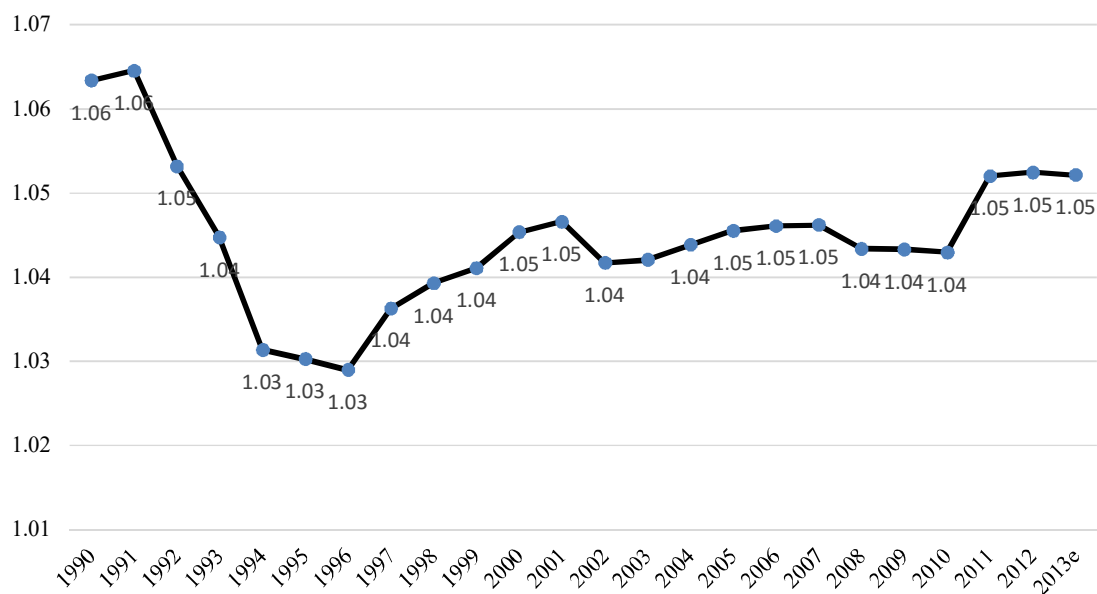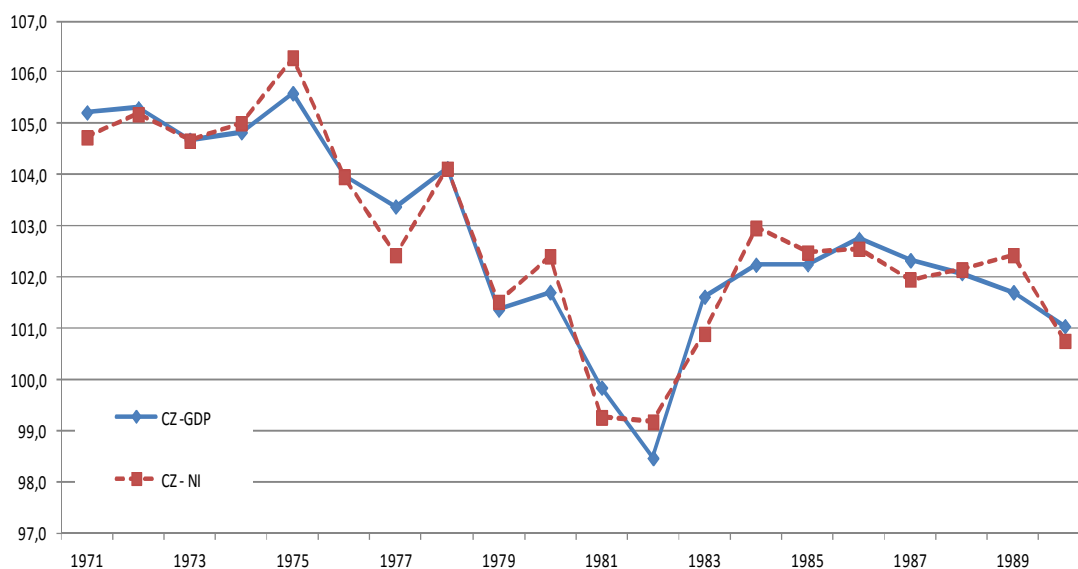

Source: Czech Statistical Office, own calculations

Note: 2013e = 2013 estimate

One can see that the maximum was achieved in 1991 (6.5%). The average difference in the period in question reaches 4.5%. The variation of w is given by the different

development of all components. It is mostly given by the consumption of fixed capital. It means that the capitalisation of expenditures on research and development, military assets and small tools is recorded as capital formation which creates capital stock.

Fig. 2: Development of national income and GDP, 1971–1990, volumes

Source: Czech Statistical Office, own calculations

Results showed in Figure 2 are influenced mainly by the development of expenditures in research and development and military spending. Detailed and more precise figures should be available by the end of 2015. Employing this simple approach, the nominal level of GDP should increase about 6% – 7%. Figure 3 presents estimated development of GDP at current prices (2014 =100). 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.

Fig. 3: Gross domestic product, current prices, 2014 = 100
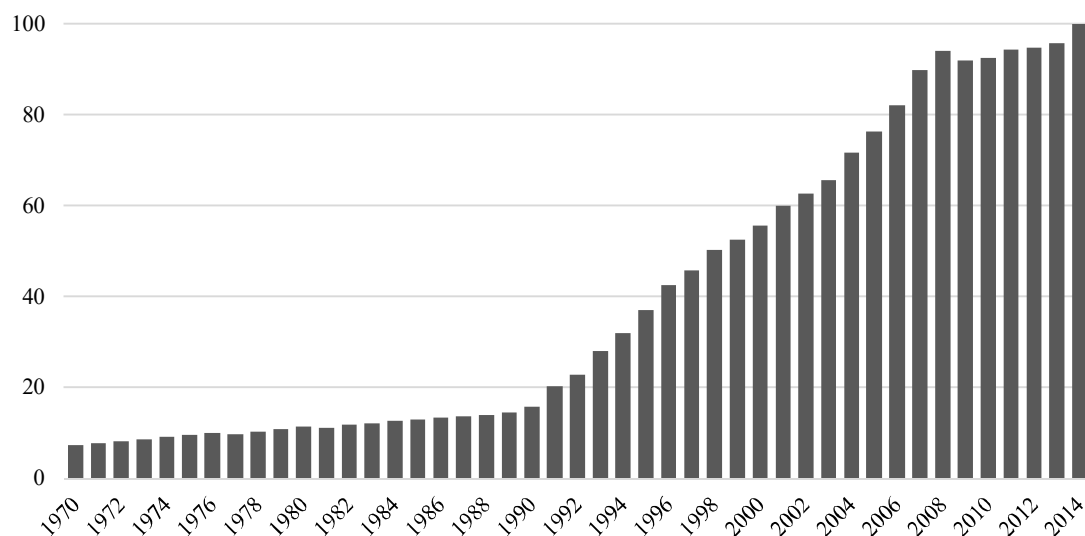
Source: own calculations

The role of national accounts standard is indisputable. The value of the product is crucially determined by applied convections given by standards. The following example (see table 2) is calculated for 1990 that was (nearly) the last year of existence of Material Product System (MPS) and Balances of National Income. Therefore it is possible to compare one year via different national accounts' standards. It is clear that implementation of a new standard usually led to the increase of the level of gross domestic product. In other words, taking ESA 1995 as a base, MPS national income counts to 69.2%. Implementation of ESA 2010 led to 6.3% increase of GDP. When SNA 2008 was being revised, the issue of capital services was deeply discussed. Even though, capital services represent mainly analytical tool, it was intended to use them for calculation of virtual profit (net operating surplus) of non-market services provided by government. It can be illustrated on the example of services of public infrastructure that are measured by the costs containing intermediate consumption, consumption of fixed capital and compensation of employees. No profit is added to non-market services. According to the original draft of SNA 2008, profit for non-market services has to be estimated according to either market producers or the rate of return for risk-free assets (usually government bonds). The computation shows that the increase of GDP is 11.4% in comparison with ESA 1995 (Fischer and Sixta, 2008).

Tab. 2: Product of the Czech Republic, 1990, mil. CZK

Standard of national accounts	Indicator	Value, mil. CZK	ESA 1995 =100
Material Product System	National Income	438 135	69.2
SNA 1968	GDP	n.a.[3]	0.0
SNA 1993/ ESA 1995	GDP	632 691	100.0
SNA 2008/ ESA 2010	GDP	672 776	106.3
SNA 2008 including capital services	GDP	705 005	111.4

Source: Czech Statistical Office, own calculations

Conclusion

One of the visible marks of developed country is statistical history. There is no excuse for countries regarding themselves as developed without statistical time series. The issue of long time series is very relevant in economic statistics where it is crucial to permanently react on changes in international standards. In September 2014 when ESA 2010 was implemented, the Czech Statistical Office provided time series of gross domestic product from 1990 onwards. We followed up on our previous research aimed at time series of GDP for 1970–1989 in ESA 1995 and started to work on the update of our estimates. The provisional figures presented within this paper are illustrative because final figures will be available by December 2015.

Acknowledgment

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