

WAGES AND EMPLOYMENT IN THE CZECH REPUBLIC SINCE 1970

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Abstract

The income approach represents one of three approaches to measuring gross domestic product. It covers primary incomes of a national economy, namely compensation of employees, other net taxes on production, consumption of fixed capital, net operating surplus and net mixed income. The Czech Statistical Office has been publishing all these indicators since 1990. However, the distribution of primary income before 1990 could be gained from the information using the expenditure and production approaches that we already prepared based on the ESA 2010 methodology. The paper brings a detailed look on gross domestic product primarily estimated from the expenditure and production approaches. It shows the development of the structure of all indicators from 1970 to 2014. Moreover, it briefly deals with the methodology of construction of historical time series under the income approach and shows the results including the comparison with the development from 1990 onwards.

Key words: gross domestic product (GDP), ESA 2010, income approach.

1. Introduction

Gross domestic product (GDP) represents very important indicator used for many purposes, even though it is the indicator of economic activity only. Beside its main purpose, it is also used as a denominator of many relative indicators (not only economic indicators) or as the indicator of economic aspect of living standard. Therefore, time series of main economic aggregates are necessary for assessing the country from longer perspective. In many cases, comparable time series of national accounts' indicators are missing. With respect to current legislative, EU countries are usually obliged to publish national accounts data starting in 1995, see Regulation EU No. 549/2013. The Czech Statistical Office (CZSO) publishes its time series from 1990 onwards. With respect to the users' needs, we were able to enlarge main data sets. Time series starting in 1970 were prepared by the University of Economics as a research project, see Fischer et al. (2013). This work done in ESA 1995 methodology was updated last year (2015) when the first results were presented in ESA 2010 methodology, see Vltavská et al. (2015). Our research is primarily aimed at the Czech Republic only but main comparisons with Slovakia were done as well, see Sixta et al. (2013). Gross domestic product is also used for international comparison. For this purpose, GDP has to be recalculated into

internationally comparable prices, usually purchasing power standard (PPS), see Čadil et al. (2014).

Generally, there are three methods for computation of GDP. Output method based on the calculation of value added, expenditure method grounded on final expenditures and income method counting the costs of factors used. Historically, Czech statisticians usually prefer output method and they are used to use expenditure method for verification and balancing of products within input-output framework¹. Income method is not compiled directly. It means that both statistical surveys and procedures are not designed for independent estimation of items of generation of income account. In some countries (e.g. the United Kingdom), the situation is different². Despite the fact that income approach is not an independent approach in the Czech Republic, the most important items covering compensation of employees, employment and consumption of fixed capital are possible to obtain directly from data sources or statistical models. The most questionable item, operating surplus (including mixed income) has to be obtained as a balancing item of Generation of Income Account.

Our paper brings additional view on the Czech economy between 1970 and 1989. The paper is focused on the income approach and its main items. Such analysis can be treated as a supplement to the most discussed development of GDP and its expenditure components. The income side and mainly wages and employment provide valuable information about the economic history.

2. Methodological Points

Methodology of transformation of historical data based on the System of Balances of National Economy (SBNH) and their transformation into the System of National Accounts (SNA) was deeply described in Sixta and Fischer (2014). This methodology describes transformation into ESA 1995 methodology. The substantial difference between SBNH a SNA consists in the boundary of productive activities. SBNH statistically divided the economy into two parts. The first part labeled “productive sphere” was covering activities that would be treated as market in SNA. The second part labeled “non-productive sphere” was covering both market and non-market activities. The decision about the notion of the activities was rather arbitrary. The SBNH was theoretically based on Marx’s economic theory while SNA has its roots in Keynes’ economic theory. Subsequent ESA 2010 and SNA 2008 implementation made these estimates outdated. The first estimates of time series of sources and uses of gross domestic product for 1970 – 1989 in ESA 2010 methodology were published in Sixta et al (2016). When focusing on income approach, wages, employment and consumption of fixed capital are somehow possible to obtain. As in our previous research, we do not have primary data and we have to rely on published figures. Generally, income approach can be described by Generation of Income Account (GIA), see Table 1 for example.

Gross value added (GVA) and GDP are calculated independently. With respect to the purposes of computation, we do not distinguish further operating surplus and mixed income. It means that net operating surplus (NOS) is obtained as a difference:

$$GVA - (COE + CFC + NTX) = NOS, \quad (1)$$

where GVA is gross value added, COE are compensation of employees, CFC is consumption of fixed capital, NTX are net taxes on production, NOS is net operating surplus (including mixed income), GOS is gross operating surplus (including mixed income).

¹ Kramulová and Musil (2013) discuss the issue of expenditure approach in specific regional circumstances.

² Available at: <http://www.ons.gov.uk> (accessed April 20, 2016).

Table 1: Generation of income account, 1995, ESA 2010 methodology, CZK mil.

Indicator	Uses	Resources
Gross value added		1,580,115
Compensation of employees	619,931	
Consumption of fixed capital	334,485	
Other net taxes on production	139,465	
Net operating surplus/ mixed income	486,234	
Employment (persons or FTE)	5,101,368	

Source: Czech Statistical Office (2015).

Consumption of fixed capital (CFC) represents both physical and moral depreciation. It is defined by national accounts rules and it is different from business accounting. Estimates of consumption of fixed capital are based on Perpetual Inventory Method (PIM), see Sixta (2007). Definition of this indicator is nearly identical with ESA 1995. The only difference is that CFC is computed for new types of assets covering Research and Development (R&D), military assets and small tools.

CFC for the years 1970 – 1989 is composed from two main sources. The first source comes from business accounting covering companies' depreciation. Since the prices did not rise significantly during socialist period, such simplification is possible. The second source is composed by national accounts' methodical adjustments, see Table 2.

Table 2: Estimates of consumption of fixed capital, 1970 – 1989, CZK/CSK mil.

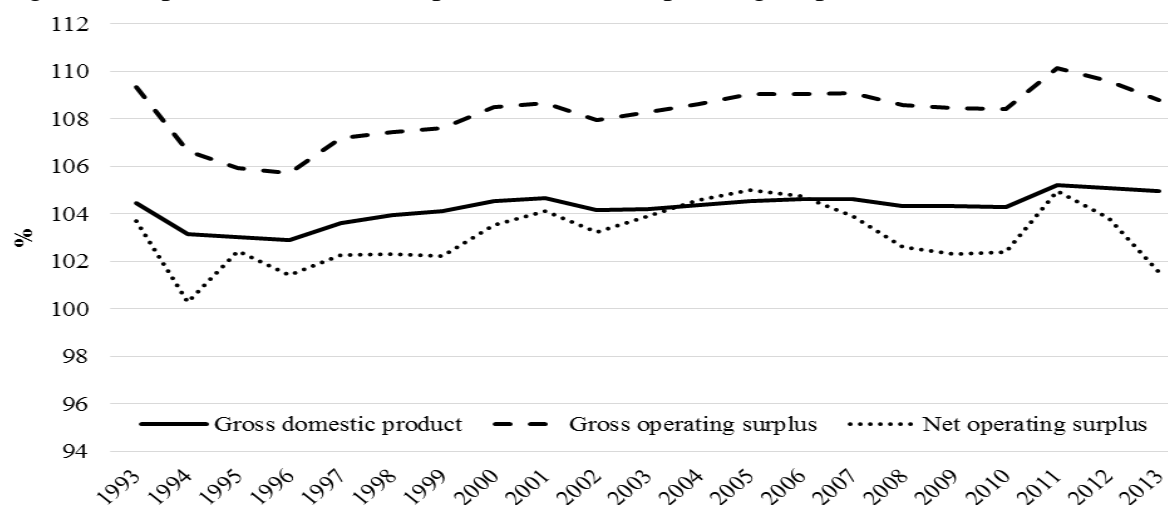
CFC for assets	1970	1975	1980	1985	1990	2000	2010
Depreciation	28,761	44,085	58,237	76,284	x	x	x
Other government assets	4,528	6,021	8,300	12,467	x	x	x
Infrastructure	11,717	11,845	11,208	12,751	11,132	38,618	60,883
R&D	2,863	3,693	4,368	4,967	6,723	37,468	46,754
Military assets	491	586	674	1,066	5,597	5,683	5,182
Other adjustments	3,498	4,790	5,988	7,778	x	x	x
Total CFC	51,858	71,020	88,774	115,313	157,823	542,747	849,717

Source: the authors based on the Czech Statistical Office (2015).

Compensations of employees include gross wages (including so called wage in kind) and social contributions paid by employers. Methodical definition of wages was not changed by ESA 2010. The difference between originally published wages in MPS methodology and national accounts lies mainly in wage in kind and non-observed economy. Wage in kind covers mainly clothing, meal voucher, cars for private use, etc. The key point is that this amount is not directly paid to employees in the form of their salaries, see ESA 2010 §4.04.

With respect to the changes mentioned above, implementation of ESA 2010 caused differences in operating surplus mainly. Since the definition of compensation of employees is identical with ESA 1995 methodology and consumption of fixed capital covers more types of assets, gross operating surplus is mostly affected. Net operating surplus is influenced significantly less, see Figure 1. Between 1993 and 2013, average increase of gross domestic product caused by implementation ESA 2010 is 4.2%. Gross operating surplus rose by 8.2% in average and net operating surplus by 3.1%.

Figure 1: Impact of ESA 2010 implementation on operating surplus (%)



Source: Czech Statistical Office (2015).

Table 3: The share of compensation of employees on GDP by industry (%)

	1970	1975	1980	1985	1990	1995	2000	2005	2010
Total	44.9	42.8	42.2	41.7	44.0	39.2	38.6	39.9	40.2
A	6.7	5.7	5.0	4.8	4.8	1.8	1.4	1.0	0.8
B	1.9	1.7	1.7	1.7	1.7	1.1	0.8	0.6	0.5
C	13.9	13.1	12.7	12.6	12.8	10.4	10.9	11.1	10.3
D	0.7	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.5
E	0.2	0.2	0.4	0.3	0.4	0.4	0.5	0.5	0.5
F	3.5	3.6	3.5	3.4	3.8	3.9	2.8	2.6	2.6
G	3.4	3.7	3.7	3.6	3.8	4.2	4.3	4.5	4.9
H	2.6	2.3	2.3	2.2	2.3	2.4	2.7	2.7	2.7
I	0.3	0.3	0.4	0.5	0.7	0.7	0.7	0.8	0.8
J	1.0	0.7	0.6	0.6	0.9	1.0	1.3	1.5	1.8
K	0.3	0.3	0.3	0.2	0.3	1.2	1.4	1.3	1.3
L	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.4	0.4
M	2.1	1.9	2.0	2.0	1.9	1.6	1.7	1.8	2.1
N	0.3	0.4	0.4	0.5	0.9	0.7	0.7	0.8	0.9
O	3.0	3.3	3.2	3.1	3.0	3.7	3.7	3.9	3.8
P	2.0	2.0	2.2	2.3	2.3	2.5	2.2	2.7	2.7
Q	1.7	2.0	2.1	2.2	2.4	2.0	1.9	2.3	2.6
R	0.5	0.4	0.5	0.5	0.5	0.4	0.4	0.4	0.4
S-U	0.5	0.3	0.5	0.5	0.6	0.3	0.3	0.4	0.4

Legend: A = Agriculture, Forestry and Fishing; B = Mining and Quarrying; C = Manufacturing; D = Electricity, Gas, Steam and Air Conditioning Supply; E = Water Supply; Sewerage, Waste Management and Remediation Activities; F = Construction; G = Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles; H = Transportation and Storage; I = Accommodation and Food Service Activities; J = Information and Communication; K = Financial and Insurance Activities; L = Real Estate Activities; M = Professional, Scientific and Technical Activities; N = Administrative and Support Service Activities; O = Public Administration and Defence; Compulsory Social Security; P = Education; Q = Human Health and Social Work Activities; R = Arts, Entertainment and Recreation; S = Other Service Activities; T = Activities of Households as Employers; Undifferentiated Goods- and Services-Producing Activities of Households for Own Use; U = Activities of Extraterritorial Organisations and Bodies.

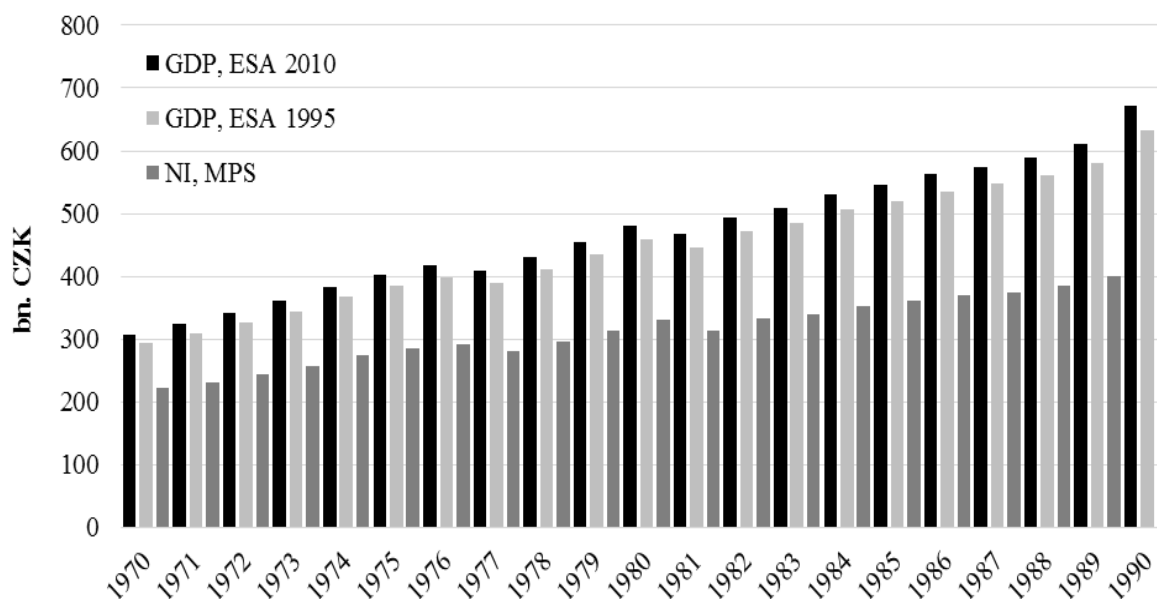
Source: the authors.

We reconstructed compensation of employees (COE, wages plus social contribution) for the period 1970 – 1989. The figures reflect structural changes that occurred in the Czech economy. The overall share of COE declines from 44.9% in 1970 to 44.0% in 1990 and 40.2% in 2010, see Table 3. There are identified industries, significantly changing its importance during the time. Compensation of employees paid to workers in agriculture formed 6.7% of GDP in 1970 and 0.8% in 2010. Significant decrease can be also found in mining and manufacturing. Minor changes were observed in trade, transport and some government services (public administration and education). In market services relative weight of COE increased, e.g. in financial services.

3. Comparable Time Series of Gross Domestic Product

Historical data for the Czech Republic were originally published within the System of Balances of National Economy (SBNE). Material Product System (MPS) represented the most important part of SBNE that described sources and uses of national income. This key indicator was conceptually similar to domestic product. The division of the economy between productive and non-productive spheres caused that only productive sphere contributed to national income. This represents the most important difference between SNA and MPS.

Figure 2: Domestic product and national income 1970 – 1990, current prices, bn. CZK



Note: MPS = Material Product System

Source: the authors.

It means that the measurement of economy is crucially dependent on statistical definitions and concepts and economic theory that provides the background. In 1990, gross national income for the Czech Republic based on MPS methodology amounted to 221 bn. CZK. The same year viewed by ESA 1995 added about 72 bn. CZK, 32%. When recalculated into ESA 2010 methodology, resulting GDP is 85 bn. CZK (38%) higher than the original national income. Since the Czech economy was developing also in other areas than “productive sphere”, mainly in services, MPS’ national income was not covering increasing part of the economy. Such indicator was rapidly losing its explanatory possibilities. In the early 1970s more than 1/3 of economy was not recorded within the product, in 1985 it was more than

50%. Increasing difference in the recording of domestic product was inevitably noticed by statisticians and SBNE and MPS were abandoned after the fall of communist regimes in former socialistic countries.

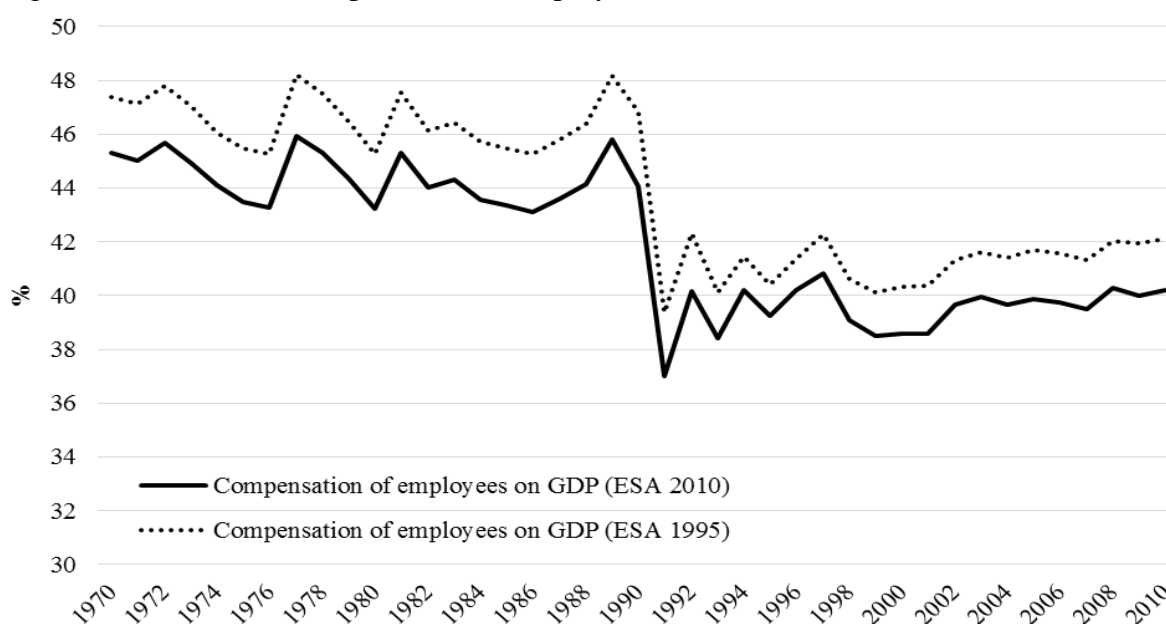
Implementation of new international statistical standards means that comparability of time series is always threatened. The only possibility represents recalculation of already published figures into new methodology otherwise users are losing inconsiderable amount of information. Of course, the main motivation for updates of statistical standards is the effort to keep measurement adequate and in line with the development of economy and society.

4. Income Approach to Gross Domestic Product

Income approach to gross domestic product is not the preferred one in Czech statistical community. Historically, output approach based on companies' value added is preferred. Income approach is not an independent method used to the estimates of gross domestic product. In Czech case it means that all indicators except operating surplus are estimated directly. Operating surplus is estimated indirectly as a balancing item.

The distribution of value added between workers and companies represent very sensitive issue and it can provide valuable information about the economy. The share of compensation of employees on gross domestic product describes Figure 3. Since methodical definition of wages was not significantly affected by implementation of ESA 2010, the difference in the share lies in higher denominator, GDP.

Figure 3: The share of compensation of employees on GDP, %



Source: the authors based on the Czech Statistical Office (2015).

Provisional results of income approach to GDP are presented in Table 4. The figures for 1970 to 1989 are based on the results of our research. Methodical definition of these estimates of presented income approach is based on ESA 2010 methodology and should be fully compatible with official figures published by the CZSO from 1990 onwards. The rate of gross profit counted 43.5% in 1970 and 48.5% in 1990. In our recent economy this indicator fluctuates around 50%. Similar trend is described by the development of the share of net

profit that decreased from 25.8% to 25.1% between 1970 – 1990. In recent times, this indicator is about 29%.

Table 4: Income approach to GDP, current prices, CZK/CSK mil.

	1970	1975	1980	1985	1990	2000	2010
GDP	306,431	401,755	480,605	546,326	672,776	2,372,630	3,953,651
COMP	138,868	174,709	207,833	236,787	296,310	915,193	1,589,052
CFC	54,212	76,534	94,646	120,936	157,823	542,747	849,717
Tax	34,224	38,187	42,149	46,112	50,075	204,673	370,782
GOS	133,339	188,860	230,623	263,427	326,391	1,252,764	1,993,817
NOS	79,127	112,326	135,977	142,492	168,568	710,017	1,144,100
%GOS	43.5%	47.0%	48.0%	48.2%	48.5%	52.8%	50.4%
%NOS	25.8%	28.0%	28.3%	26.1%	25.1%	29.9%	28.9%

Source: the authors based on the Czech Statistical Office (2015).

5. Conclusion

Income approach to gross domestic product represents mainly additional view on economy. For the period between the years 1970 and 1989 it is not possible to estimate gross domestic product directly by income approach since primary data is not available. Our approach is based on the reconstruction of account of goods and services. After that we recalculated compensation of employees and consumption of fixed capital into national accounts methodology. Since we have no information about net taxes on production, we were not able to separate it from operating surplus.

The share of wages on gross domestic product and operating surplus illustrated situation in the Czech economy in 1980s. Despite radical changes that came after 1989, economy can be compared at least on the aggregated level. Even changes in quality of goods and services can be hardly measured. However, time series based on national accounts indicators can provide valuable information about our history.

The main aim of the paper was the presentation of preliminary results of our research that should provide the view on our economic history. We also briefly described main aspects of the transformation procedures that provide the link between the System of National Accounts and the System of Balance of National Economy.

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