

RESEARCH OF THE SOCIO-ECONOMIC SITUATION OF THE POPULATION OF THE CZECH REPUBLIC BY WAY OF MACROECONOMIC FACTORS

David Mareš – Gabriela Dlasková

Abstract

Authors assess the socio-economic situation of the population of the Czech Republic by way of macroeconomic factors. They study interconnection of economic productivity of the Czech Republic which is measured by way of GDP in the years 2007-2014 on the socio-economic situation of the population of the Czech Republic. In the article, the situation is represented by macroeconomic factors such as final consumption expenditure of households and gross national savings in 2007-2014. All factors are firstly examined from the point of view of suitability – stability of statistical data based on a year-on-year growth or recession and average figures. These results are compared and further, the reliance of the consumption expenditures on gross domestic product is assessed by way of statistical apparatus (Pearson's Correlation Coefficients). The goal of the assessment is to discover reliance of the consumption expenditure of the households on productivity of the economy or the relation between savings and the productivity of the economy.

Key words: Gross domestic product, final consumption, expenditure of households, gross national savings.

JEL Code: E21, E60, E37

Introduction

Authors of the article try to find suitable indicators for measuring the socio-economic situation of the population of the Czech Republic by way of macroeconomic indicators which directly affect productivity of the economy measured by gross domestic product (GDP). These indicators are supposed to be directly related to the population of the Czech Republic and they are supposed to be linked to the productivity of the economy because – as was demonstrated before in the microeconomical view (Mareš 2013), (Mareš, 2012) and on

statistical data – it is convenient to measure the socio-economic standard of a population by way of consumption; a similar research can be found in (Svetlana, 2015). It is a well-known fact in the macroeconomic theory that the income of households (pension) is divided into consumption expenditures and savings, it is thus the reason why the authors chose the following representative factors which represent the socio-economic situation of the population in relation to the productivity of the economy: final consumption expenditure, gross national savings. The authors of this article are well aware of the socio-economic issues of the minorities, as described by (Kováčová, 2015) or the well-being of the population issues, as mentioned by (Bazzhina, 2015) and other authors. However, since the extent of the given article is limited, they will focus only on the macroeconomical – financial side and will take up some of the previous researches, (Frugoli, Almeida, Agostinho, Husingh, 2015) in particular, which measures the well-being factor by way of Gross Domestic Product, Gross Domestic Product per capita, Human Development Index, Happiness Index, Life Expectancy, Democracy Index, Ecological Footprint, Surplus Biocapacity, Wellbeing Index and Environmental Sustainability Index 2002. Or the study (Frugoli, Almeida, Agostinho, Husingh, 2015) which deals with a correlation between the fractions of renewable natural resources, non-renewable natural resource, resources from the economy and the energy indices with the known indicators, and indexes emerged with the literature indicators. The authors examined all available sources and realised that the given issues (i.e. examination of the socio-economic standard by way of macroeconomic factors) have not been sufficiently mapped and there are no appropriate sources or the sources are limited or they refer to different approaches.

1 Theoretical background

Only essential researches which directly affect our research and are on top of the list of things that contribute to our further study are described and cited subsequently. The research of the authors of this article take up previous researches which focused mainly on behaviour of a consumer, that is (Mareš, 2013) who analysed behaviour and living standard of a consumer from the microeconomic point of view through the structure of his expenditure in accordance to his income and possibility of making a socio-economic cushion for unexpected expenditure. He also divided the consumer expenditure on essential and non-essential by which he showed some flexibility in consumer expenditure and took up another research (Mareš, 2012) which analysed sensitivity of the living standard of the population with

minimum wages and their being at hazard. Further, the research takes up the research (Frugoli, Almeida, Agostinho, Husingh, 2015, p. 370) whose „the results suggest that the combination of socio-economic and biophysical indicators is essential to provide a better understanding of the limits of economic growth and while ensuring sustainable societal well-being.“ However, the authors of this article focus only on the macroeconomic and financial points of view. The importance of this study is emphasized by the research (Bouchaud, 2013 p. 567) who states that „Financial and economic history is strewn with bubbles and crashes, booms and busts,crises and upheavals of all sorts.“. The authors of this article chose the GDP indicator as a suitable indicator for the testing of its stability by way of horizontal analysis of the percentage analysis on the basis of Bouchaud’s opinions.

The research (Decancq, Schokkaert 2016) is also worth mentioning illustrated „that it is possible to calculate measures of the level of wellbeing and its inequality in a coherent way by making use of data that can easily be collected with a representative questionnaire study. This is not to say that our empirical results are beyond doubt. Let us therefore state clearly the four different levels in our reasoning“ (Decancq, Schokkaert 2016) tested well-being indicators. Further our research takes up the research of consumer expenditures in U.S.A. Concerning the GDP The authors are aware of the contribution of the research (Fleurbaey, Beyond 2009). However, we cannot but note that the current knowledge is disintegrated.

2 Research Methodology, Objective, Data and Results

If we are to deal with a socio-economic standard of the population, we have to proceed from the fact that the inhabitants take part in the productivity of the economy through savings and consumption expenditures but at the same time the GDP takes part in consumption expenditures and savings, which is right the opposite state. We work from the assumption that the pension (income) of the households is divided to consumption expenditures and savings.

2.1 Stability of the gross domestic product

The Czech economy in the years 2007-2014 went up to the below given figures from which the percentage change was calculated, see below. The above mentioned table shows a culmination of the average GDP figure around 4015,6 billions. We are about to carry out an analysis on whether the statistical file does not show external figures and will be suitable for a further statistical research.

Table 1. GDP (billions CZK)

Years	2007	2008	2009	2010	2011	2012	2013	2014
GDP	3 831,8	4 015,3	3 921,8	3 953,7	4 022,5	4 041,6	4 077,1	4 260,9

Source: Czech Statistical Office (2016)

We will deal with the stability of the gross domestic product below by way of the horizontal analysis which will show percentage changes of the given GDP in the given year in comparison with the preceeding year. The goal of the below performed analysis is to find out whether the GDP is a suitable indicator for studying a socio-economic standard of a population and whether this indicator is a stable factor in the CR which does not yield to huge cyclical deviations in the given time row.

Table 2. GDP billions CZK year to year

GDP	2008/07	2009/08	2010/09	2011/10	2012/11	2013/12	2014/13
Percentage change	4,78 %	-2,32 %	0,81 %	1,74 %	0,47%	0,87 %	4,5 %

Source: compiled from Czech Statistical Office (2016)

The above mentioned table demonstrates that the statistical file of the GDP doesn't show important deviations in the given year in comparison with the preceeding year. The maximal deviation is 4,78%. The fall of 2009 compared to 2008 could have been caused by aftermath of the economic recession. Totaly we can thus consider the GDP a stable and a suitable indicator of the socio-economic standard of the population of the CR.

2.2 Stability of the final consumption expenditure of the households

The Czech economy reached the below given figures in the years 2007-2014. The below given table shows culmination around an average 1927,3 billions.

Table 3. Final consumption of the households expenditures

Years	2007	2008	2009	2010	2011	2012	2013	2014
Final consumption	1 749,5	1 887,0	1 890,9	1 919,9	1 957,5	1 970,6	2 001,4	2 041,5

Source: Czech Statistical Office (2016)

Further, a data analysis will be performed with a goal of finding out whether the given statistical file does not show external figures and will be suitable for futher statistical examination.

Table 4. Final consumption of the households expenditures year to year

Final consumption	2008/07	2009/08	2010/09	2011/10	2012/11	2013/12	2014/13
Percentage change	7,85 %	0,20 %	1,53%	1,95 %	0,66 %	1,56 %	2 %

Source: compiled from Czech Statistical Office (2016)

If we compare the percentage change of the final consumption of the households of the given years by way of the percentage change of the GDP, we arrive to the same results, i.e. a year-on-year growth or fall of one factor is at the same time a growth or fall of the other factor, see the table below. We can find an exception when observing the years 2009/2008 where there was a fall in GDP but a growth in the final consumption expenditures of the households. This difference between the two given years can be explained in the way that GDP did not play a positive role – meaning that consumption expenditures grow with the growth of the GDP and households wealth; the inhabitants indulge in bigger luxury by consuming more expensive goods or just more goods. When GDP decreased between the years 2009/2008, the consumption of the households grew, although not dramatically (+0,20%). This can be explained in the way that there could have been an increase of the prices of the goods while the GDP decreased and thus the living standard of the households decreased while there was the same number of the goods and services.

Table 5. Final consumption of the households expenditures year to year a GDP year to year

Years	2008/07	2009/08	2010/09	2011/10	2012/11	2013/12	2014/13
GDP Percentage change	4,78 %	-2,32 %	0,81 %	1,74 %	0,47%	0,87 %	4,5 %
Final consumption percentage change	7,85 %	0,20 %	1,53%	1,95 %	0,66 %	1,56 %	2 %

Source: compiled from Czech Statistical Office (2016)

According to the above mentioned results, we can consider the final consumption of the households expenditures in relation to year-on-year changes a suitable indicator for socio-economic standard of the CR measurement.

2.3 GDP and Final consumption expenditures of the households

In case of above stated data we can expect linear correlation. For linear correlation calculation we can carry out correlation analysis.

$$r = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}} \quad (1)$$

Figure 2 : Pearson's Correlation Coefficient

Source: (Škaloudová, 2015)

We can alter the above given formula to study linear dependence of gross domestic product and final consumption expenditures of the households.

$$r = \frac{\sum_{i=1}^n (GDP_i - \overline{GDP})(CH_i - \overline{CH})}{\sqrt{\sum_{i=1}^n (GDP_i - \overline{GDP})^2 \sum_{i=1}^n (CH_i - \overline{CH})^2}} \quad (2)$$

Figure 3: Pearson's Correlation Coefficient – GDP consumption expenditures of the households

Source: own workout based on (Škaloudová, 2015)

Wherein:

r – Pearson's Correlation Coefficient

GDP – Gross Domestic Product

CH – Final consumption expenditures of the households

Pearson's Correlation Coefficient – Final consumption of the households amounts to 0,8939. Pearson's Correlation Coefficient says that the final consumption expenditures of the households (CH) are influenced by 89.39 % GDP (the unexplained part of the variability, i.e. 10.61 is caused by other factors, probably by recession). The case here is a positive correlation with rising values or their order. Values of one variable rise, the order respectively, values of the other variable see (Řezanková, Löster, 2009). We can also conclude that nonzero value see (Škaloudová, 2015) shows that the quantities are interdependent. This interdependence can also be called dominant when the quantity reaches the value of 89,39%. The rest of 10,61% can be seen as unimportant.

2.4 Stability of gross national savings

Further we will deal with the stability of gross national savings by way of a horizontal analysis which will show percentage changes of gross national savings in the given year in

comparison with the preceding year. The aim of the horizontal analysis is to find out whether the gross national savings are a suitable indicator for studying the socio-economic of the population of the CR and whether this indicator is a stable factor which doesn't yield to huge cyclical deviations in the given time row.

Table 6. Gross national savings - GNS

Years	2007	2008	2009	2010	2011	2012	2013	2014
GNS	1 051,2	1 050,9	888,1	869,1	904,4	973,3	963,5	991,5

Source: Czech Statistical Office (2016)

Gross national savings reach a value of 961,5 in average. We are going to find out whether the statistical file shows extreme figures in the course of the years.

Table 7. Gross national savings billions CZK - GNS year to year

GNS	2008/07	2009/08	2010/09	2011/10	2012/11	2013/12	2014/13
Percentage change	-0,028 %	-15,49 %	-2,13 %	4,06 %	7,61 %	-1 %	2,9 %

Source: compiled from Czech Statistical Office (2016)

We can draw from the above mentioned that the file shows important deviations in comparison with the preceding year. Maximal deviation is -15,49 %. The given file shows significant deviations and it is necessary to consider it unsuitable, i.e. highly unstable. A significant decrease between the years 2009/2008 can be seen above, influence of the economic recession on the GDP is implied. The important fall of the gross national savings implies that the households cut back their savings in the time of the economic recession due to their increased consumption expenditures.

Table 7. Gross national savings -GNS year to year and GDP year to year

years	2008/07	2009/08	2010/09	2011/10	2012/11	2013/12	2014/13
GDP Percentage change	7,85 %	0,20 %	1,53%	1,95 %	0,66 %	1,56 %	2 %
GNS Percentage change	0,028 %	-15,49 %	-2,13 %	4,06 %	7,61 %	-1 %	2,9 %

Source: compiled from Czech Statistical Office (2016)

Moreover, the above mentioned figures of gross national savings do not correspond with the percentage change of the GDP, either in the percentage change of the GDP, or in comparison of a mutual increase or decrease. From the point of view of the maximal objectivity and scientific exactness, we will calculate the Pearson's Correlation Coefficient which will confirm the given theory.

$$r = \frac{\sum_{i=1}^n (GDP_i - \overline{GDP})(SA_i - \overline{SA})}{\sqrt{\sum_{i=1}^n (GDP_i - \overline{GDP})^2 \sum_{i=1}^n (SA_i - \overline{SA})^2}} \quad (3)$$

Figure 4 . Pearson's Correlation Coefficient – GDP and gross national savings

Source: own workout based on (Škaloudová, 2015)

Wherein:

r – Pearson's Correlation Coefficient

GDP – Gross Domestic Product

SA – gross national savings

Pearson's Correlation Coefficient – gross national savings amount to 0,05649. Pearson's Correlation Coefficient – gross national savings says that gross national savings (SA) are affected by 5,6% GDP. This result can be considered a marginal influence and we can draw from it that GDP has little influence on gross national savings and thus it is not suitable to use gross national savings as an appropriate indicator for measurement of the socio-economic standard of the population by way of the GDP.

Conclusion

The goal of the authors was to choose a suitable indicator of the socio-economic situation of the population of the CR on the basis of the theoretical overview; such indicator was to be related to the productivity of the economy measured by the GDP. The indicators, final consumption expenditures of the households and gross national savings, were chosen. On the basis of statistical data on GDP, final consumption expenditure of the households and gross national savings in the years 2007-2014 an analysis of the individual statistical files was performed (their suitability for further measurement was examined). Their stability was also examined by way of average figures and also by way of year-on-year comparison. With the help of Pearson's Correlation Coefficient an appropriate indicator of GDP and final consumption expenditure of the households were chosen for measurement and further

examination. There were significant deviations in the measurement of the GDP indicator which did not correspond with the development of the GDP (a year-on-year comparison of GDP and a year-on-year comparison of the gross national savings). However, the Pearson's Correlation Coefficient was carried out with the GDP and gross national savings to maintain the objectivity. It reached 0,05649. This result was evaluated as marginal and as non-confirming the mutual dependence between the gross national savings and the GDP. We can thus conclude that the gross national savings are not a suitable indicator in the relation to the GDP. On the contrary, there was a positive correlation in final consumption expenditure of the households in relation to the GDP with the result of 0,8939 which means direct and strong dependence of GDP and final consumption expenditure of the households. The authors assume on the basis of the results that the socio-economic situation of the population of the CR does not make a sufficient reserve in the form of savings which would secure them in case of unexpected and important changes in the productivity of the GDP and consider the final consumption expenditure of the households a suitable indicator of the socio-economic standard of the population of the CR. The indicator is strongly related to the productivity of the economy measured by way of the GDP. In a further study, indebtedness of the households should be taken into account, as partially worked out by (Mareš, 2013), (Mareš, 2012), or the study should be perfected, as seen in (Ottaviani, Vandone, 2011).

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Contact

David Mareš

Faculty of Economic Studies

Department of Finance

University of Finance and Administration

Estonská 500

101 00 Prague 10

The Czech Republic

mares.dav@volny.cz

Gabriela Dlasková

Faculty of Economic Studies

Department of Finance

University of Finance and Administration

Estonská 500

101 00 Prague 10

The Czech Republic

dlaskovag@gmail.com