
ECONOMIC AND SOCIAL EVOLUTION OF ROMANIA DURING THE RECENT PERIOD – MULTIDIMENSIONAL ANALYSIS

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Abstract

This paper describes the main evolutions of the Romanian economy during the recent period. The authors provide key analyses on the dynamics recorded by the main macroeconomic indicators, and also for sector – level evolutions over the periods considered. Also, the authors propose a multidimensional database structure, capable to retain the approach indicators and their measures, which would enable the users to perform significant analyses on the values.

All the measures of the indicators are presented as deflated value, operation made on the basis of proper price indices. The main indicator approached in our analysis is the GDP, calculated via the additive model that sums the measures of the components, in current prices and constant prices. For each deflation, the most significant price indices were used. The gross domestic product at current prices is calculated as the sum of its components' values in current prices. Similarly, the GDP at constant prices is calculated based on the same relation, with the observation that the value of each component is estimated at constant prices by using appropriate price indices. The price index of GDP is calculated as a ratio between its value at current prices and its value at constant prices and includes the effects of all the changes in prices taking place in the economy.

The analyses are based on data series published by the National Institute of Statistics. As methodology, we have used statistical and econometrical models, and the interpretation of results was made according to the correlations which exist between various indicators from the selected system. From that specific analysis, it is easy to extend the study and to forecast the future evolutions of phenomena studied.

Key words: *investments, macroeconomics, factors, Gross Domestic Product, labor*

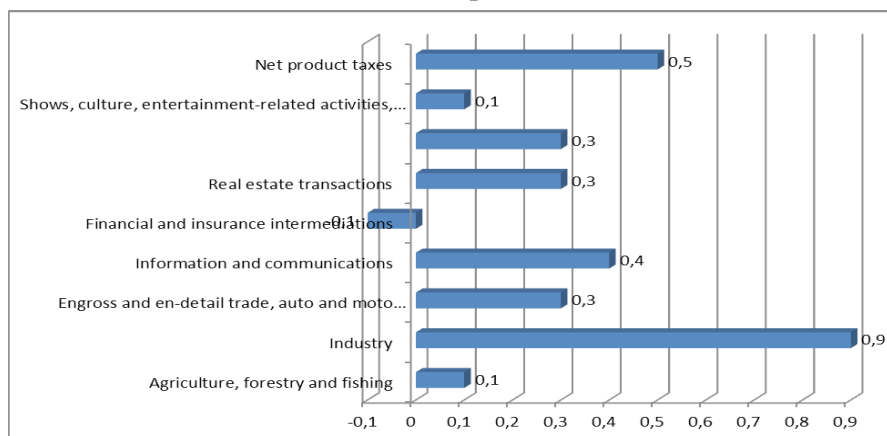
1. Some aspects on the evolution of GDP in 2014

The Gross Domestic Product for 2014 was estimated to 655.637,3 million lei, in current prices, and grew – in real terms – by 2.8%, as against 2013. The evolution of the GDP should be analyzed from two points of view, the formation and use components.

Analyzing the GDP formation, in 2014, the following economic branches recorded favorable evolutions: agriculture, forestry and fishing (+4.7%), industry (+24.1%), information and communications (+5.9%), professional, scientific and technical activities; activities of administrative services and of support services (+7.1%), real estate transactions (+9.5%). The Financial intermediation and insurance branch also recorded a positive influence on the formation of the Gross Domestic Product (2.9%), but has influenced in a negative manner the growth of the main indicator.

In 2014, the contribution of net taxes on the formation of Gross Domestic Product is 10.6%. The growth of GDP, that is 3.5%, was determined by the influence of industry, (+0.9%) agriculture (+0.1%) and, also, the branches of information and communications (0.4%), net product taxes (0.5%) recorded favorable contributions to the increase of GDP.

Figure 1. Contribution of the main activity branches to the GDP growth rate in 2014 compared to 2013

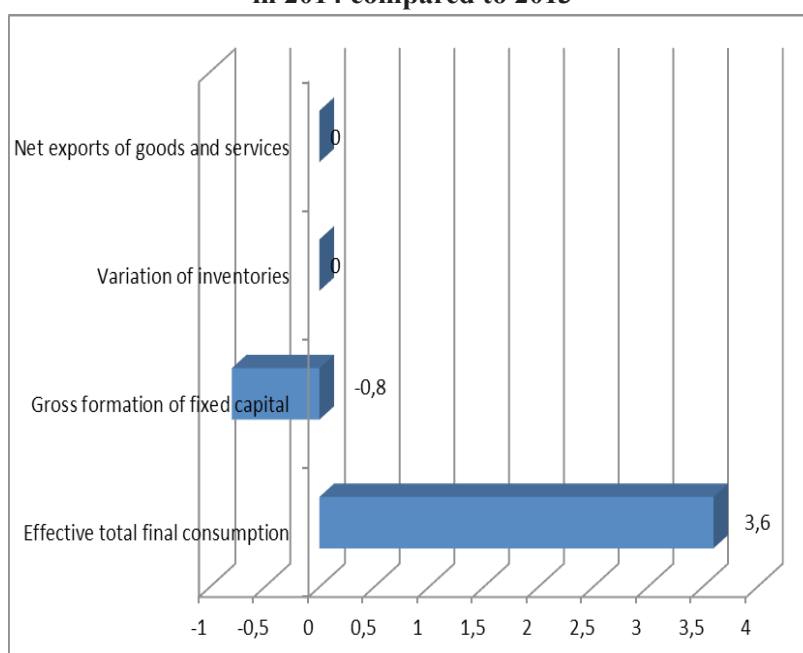


Source: authors' own representation based on data in NSI press release no. 81/2015

The analysis of the gross domestic product growth by use components reveals the favorable contribution of *exports in goods and services* (+3.0%). As the import of goods and services contributed with an equal percentage to the increase of GDP, there is a null contribution of the net exports.

In 2014, the households actual individual final consumption had a contribution to GDP growth of +2.6%, it was influenced in a positive manner by the expenses for household final consumption (+2.7%), expenses for the final consumption of non-lucrative institutions in the service of households (0,1%), and negatively by the expenses for the individual final consumption of public administration (-0.2).

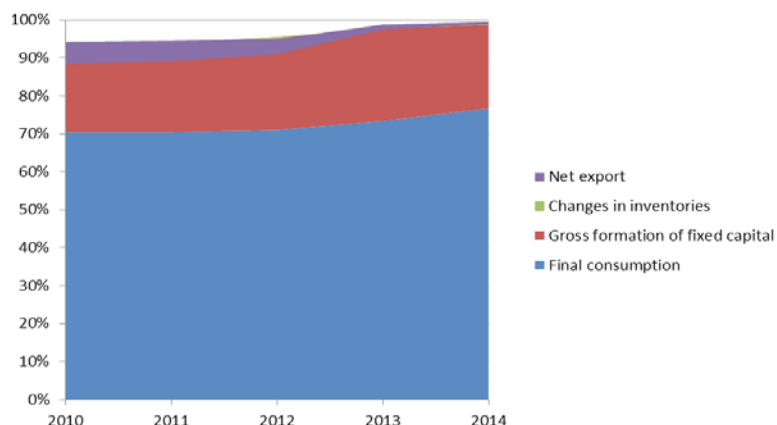
Figure 2. Contribution of the use components to the GDP growth rate in 2014 compared to 2013



Source: authors' own representation based on data in NSI press release no. 81/2015

The calculation of the GDP, according to the method of expenses, reveals the following influence factors that have determined the evolution of the main indicator of the Romanian economy during the 2010-2014 interval:

Figure 3. Factors that contribute to GDP evolution, according to the expenses method

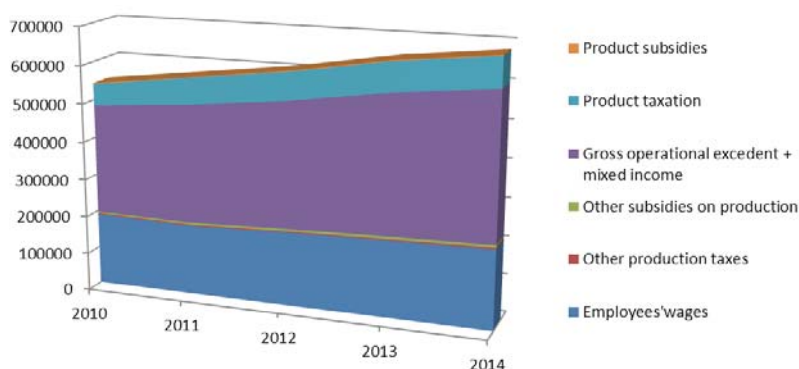


Source: authors' own representation based on data in TEMPO online database, <http://statistici.INSSE.ro/shop/>, indicator set CON111G.

It can be seen that the contribution of the final consumption has the greatest share in the achievement of Gross Domestic Product in Romania. The changes in inventories record a negligible amount for the period considered, while the second place in the hierarchy of factor importance is held by the gross formation of fixed capital.

Also, the incomes method provides the following characteristics of GDP evolution (the graph is represented for the same interval as figure 3):

Figure 4. Factors that contribute to GDP evolution, according to the incomes method



Source: authors' own representation based on data in TEMPO online database, <http://statistici.INSSE.ro/shop/>, indicator set CON111M.

It can be observed that *gross operational excedent + mixed income* account for the largest share in the formation and evolution of GDP. Another significant contribution comes from *employees' wages*.

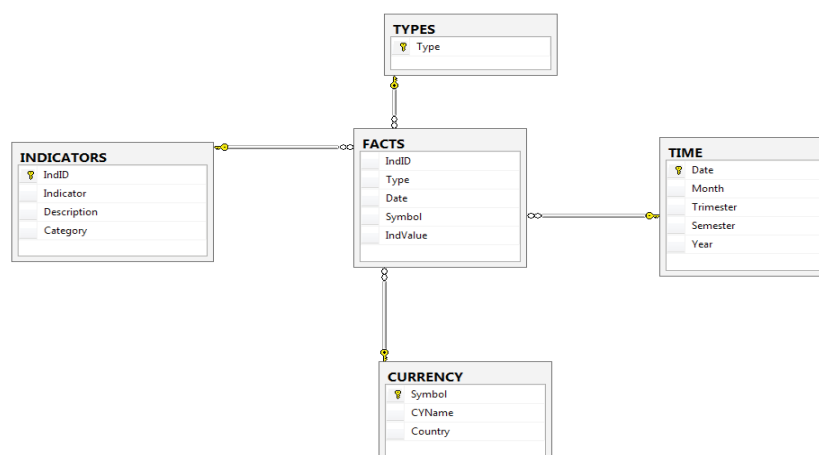
We further propose to design a multidimensional database that is able to provide users with a central data source for macroeconomic analysis.

Multidimensional database model for macroeconomic analyses

The data model proposed will be focused on macroeconomic indicators and will provide a unique database for storing the values of those measures, as they are drawn from official data sources and publications.

For analysis purposes, we consider that the activity measure is to be defined as the value of the indicator for a certain time reference. The classification of measures allows the construction of dimensions, and we started from the specifications presented by Dinu (2014) and have designed a physical structure, achieving the following model:

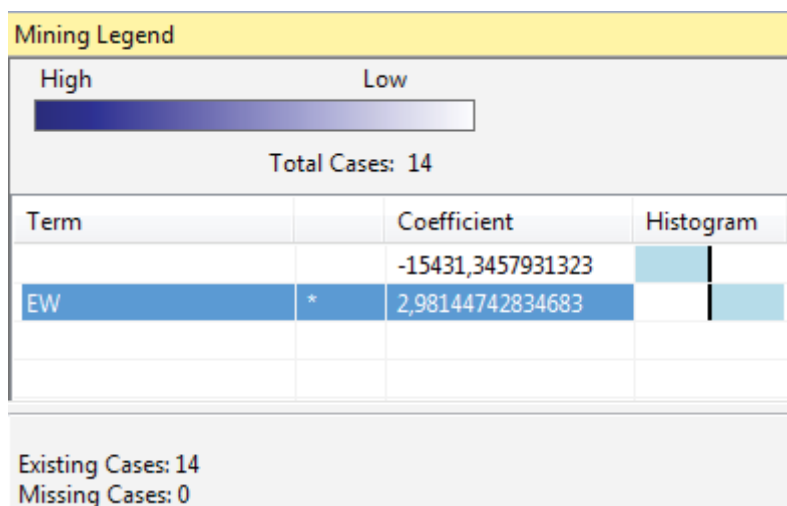
Figure 5. Macroeconomics database physical model



The database was loaded with a dataset for the analyses of the Gross Domestic Product, based on the incomes method, as reflected in figure 4. Then, the appropriate data structures were built, that is a data source, a data source view, a cube and a set of mining models. Our approach focused on the simple linear regression method.

The first model considered, as influence factor, the employees' wages. The results of the model processing procedure is shown in figure 6:

Figure 6. Regression model describing the correlation between GDP and employees' wages



Therefore, the formula of the model can be represented as:

$$\text{GDP} = \text{EW} * 2,9814 - 15431,3457$$

The same dataset was exported in another software application, to evaluate the parameters for the same type of regression. The model is not much different than the model provided by this software, the characteristics of the processed model are presented in the figure below:

Figure 7. Regression model describing the correlation between GDP and employees' wages – 2nd version

| | | | | | | | | | |
|-----------------------|--------------|----------------|--------------|----------|----------------|-------------|--------------|-------------|--|
| SUMMARY OUTPUT | | | | | | | | | |
| Regression Statistics | | | | | | | | | |
| Multiple R | 0,990770363 | | | | | | | | |
| R Square | 0,981625912 | | | | | | | | |
| Adjusted R Square | 0,98060513 | | | | | | | | |
| Standard Error | 32854,53395 | | | | | | | | |
| Observations | 20 | | | | | | | | |
| ANOVA | | | | | | | | | |
| | df | SS | MS | F | Significance F | | | | |
| Regression | 1 | 1,03801E+12 | 1,03801E+12 | 961,6405 | 4,46425E-17 | | | | |
| Residual | 18 | 19429567220 | 1079420401 | | | | | | |
| Total | 19 | 1,05744E+12 | | | | | | | |
| | | | | | | | | | |
| | Coefficients | Standard Error | t Stat | P-value | Lower 95% | Upper 95% | Lower 95,0% | Upper 95,0% | |
| Intercept | -12297,13738 | 12504,95668 | -0,983381046 | 0,338454 | -38569,07648 | 13974,80172 | -38569,07648 | 13974,80172 | |
| X Variable 1 | 2,939552157 | 0,09479268 | 31,01032851 | 4,46E-17 | 2,740400126 | 3,138704188 | 2,740400126 | 3,138704188 | |

The reliability of the model is represented by the value of the R Square coefficient, whose value, slightly over 0,98, demonstrates that the model is correct and can be used in further studies of the GDP dependence on the employees' wages. Similar models can be presented also for the other factors, and by generalizing our approach, the evolution of the GDP of Romania can be analyzed in correlation with all its factors, by applying regression techniques, by exploiting the data structure proposed.

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