IMPLICATIONS OF FISCAL STIMULI IN MACROECONOMIC PLANE AT THE LEVEL OF SOME DEVELOPED AND EMERGING COUNTRIES

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Abstract
Determining an optimal tax system is one of the main goals of fiscal policy applied in countries looking for sustainable economic development. Acknowledging that tax deductions affect a country's entire economic activity, in the research carried out, there were highlighted the correlations between tax revenues and mainmacroeconomic indicators, in order to highlight how developed and emerging countries are acting on changes as a result of fiscal stimuli. The study is based on data collected for a sample of 10 countries, systematized over a period of 18 years. The model was built using tax revenues as a dependent variable and six other macroeconomic indicators as factorial variables. For data analysis, the Statistical Package for Social Science (SPSS) software was used, using the prospective method (Forward). This research has revealed the gap between developed and emerging countries in terms of the link between the business environment and the economic development of the whole state in the context of the application of different tax policies.

Keywords: *tax revenues, macroeconomic indicators, regression analysis*

Classification JEL: E 62, E 63

1. Introduction

Taxes collected at the state budget have always been regarded as fundamental elements of fiscal policy aimed at governing economic activity, even though they appear to be just a tax burden at first sight. This paper will analyze the impact of taxes on macroeconomic indicators (government expenditures, number of hours worked per week, gross domestic product, investment, real labor productivity and public debt) by constructing linear regression models, bifactorial and multifactorial using the procedure Forward. The strong point of this procedure is the acceptance in model of only the independent variables whose determinant coefficient R^2 is the most statistically significant. The purpose of this analysis is to assess how taxes affect the business environment and the economic activity of a country. Yearly data, covering the period 2000-2017, from five emerging countries and five developed countries were used to construct the model. This analysis will allow identification of how developed and emerging countries respond to economic changes following taxation. A first impact of tax deductions is recorded at the level of the business environment as it is a defining feature of the economic development of a society. Thus, there was considered it of utmost importance to study the correlation between tax revenues and macroeconomic indicators that govern the good economic development of a country. In this way, it will be possible to see the differences in perspective that lead to a developed country in its economic evolution, to an emerging country. In order for fiscal policy to become effective in generating sustainable growth of potential GDP, it should focus on a productive increase in public spending (education, research and development, public investment) and capital taxes (Marinaş, M., C., 2010) [6]. Tax policy becomes the key to economic balance in a state, and enterprises are the main mechanisms by which it manifests its applicability. This study was based on the assumption that in an emerging country the business will act differently in managing fiscal pressure, as evidenced by the high number of hours worked weekly to increase the production value for payouts mandatory.

The present paper is further structured as follows: Section 2 Review of Literature, Section 3 Research Methodology, Section 4 Data Analysis and Results, and Conclusions outlined in Section 5, followed by bibliographic references.

2. Revision of the literature

There was a particular interest in studying the correlation between different fiscal variables, in particular between the amount of tax perceived by the state and various macroeconomic indicators, as they are perceived as

elements of fiscal policy management at the level of each state, directly affecting economic activity. Thus, it is appreciated that "trends in tax revenues can be explained mainly by economic changes but also by those of the tax legislation" [3]. An applied study on developed countries has resulted in a 10 percent increase in public spending associated with a decline in the economic growth rate of 0.7 to 0.8 percent, and in the moment when the model was created countries that are not part of the OECD have been added, both government expenditures and taxes have been shown to be negatively associated with economic growth (Fölster, S.; Henrekson, M., 2000) [4]. A 10 percent reduction in hours worked should lead to a six percent reduction in production, according to an analysis of economic growth in the United States (Denison, Edward, F., 1962) [2]. Hansen G. D., in his paper, states that "productivity defined in terms of efficiency units is much more pro-cyclical (the contemporary correlation with production is higher) than the productivity defined in terms of the current hours worked" [5]. Reinhart, C., M .; Sbrancia also appreciates that "repression has helped to reduce the size of public debt in many of the economies developed in the period before World War II and subsequently in emerging markets where financial liberalization has been relatively recent" [8].

3. Research methodology

The model was built using the annual data from 2000 to 2017 for five emerging countries and five developed countries, using the tax revenue as a dependent variable y, and government spending as independent variables x_1, the number of hours worked per week x_2, the gross domestic product x_3, investments x_4, the real productivity of labor x_5, public debt x_6. The analysis was made on the basis of multiple linear regression by the smallest squares method. The use of multiple linear regression is aimed at highlighting the relationship between a dependent variable and a set of independent variables. The linear model can be expressed by the following equation:

$$y = \alpha x + \varepsilon \quad (1)$$

y represents the dependent variable, x is the vector of the independent variables (denoted by x_1, x_2, x_3, x_4, x_5, x_6), α is the vector of the coefficients, and ε is a variable, more precisely the measurement error of the model. Thus, the multiple regression equation can be written in the following form:

$$y = \alpha_1 x_1 + \alpha_2 x_2 + \alpha_3 x_3 + \alpha_4 x_4 + \alpha_5 x_5 + \alpha_6 x_6 + \varepsilon \quad (2)$$

To measure the relation between the independent variable y and the system of independent variables x the multiple correlation coefficient R will be used. It is also defined as the Pearson simple correlation coefficient between the variable y and the group of independent variables x. An insignificant regression is given by the value of R close to zero. It should be taken into account that R will tend to overestimate the correlation between y and x, thus, there will be taken into account the coefficient of determination, denoted by R^2. The performance of the econometric model on the influence of taxes on the six independent variables can be deducted on the basis of the determination coefficient R^2, as following:

$$R^2 = \frac{\sum_i (y_i - \bar{y})^2 - \sum_i (y_i - \hat{y}_i)^2}{\sum_i (y_i - \bar{y})^2} \quad (3)$$

For the analysis of the econometric model, the prospective SPSS procedure - Forward which involves the gradual inclusion of the independent variables in the model, taking as a measure of selection the highest correlation coefficient of the equation of dependent variable and the set of independent variables. The chosen models can be single-factorial (a dependent variable and an independent variable), bifactorial (a dependent variable and two independent variables) or multifactorial (when more than three independent variables are used in the model). Since six independent variables have been used in this study, consideration should be given to the application of both bifactorial and multifactorial models, after variables that make a maximum contribution were chosen by the sequential test F. The ANOVA variance analysis will allow the evaluation of each model by testing the global significance of the independent variables. For a particular model to be kept in the analysis, it should meet the condition that value Sig.<α (0,05).

In the analysis of the influence of taxes on macroeconomic indicators, there will be considered the existence and nature of the link between dependent variable, tax revenue (also called taxes, denoted with GR) and the independent variables: government expenditure (GEX), number of hours per week (H) , Gross Domestic Product (GDP), Investment (GFCF), Real Labor Productivity (LP), Public Debt (PD). On the basis of the determination coefficient R^2, the degree of influence of the independent variables on the result will be measured. To measure the intensity of the link between variables there will be used the Pearson correlation coefficient, r, if the correlogram indicates a linear link. In verifying the relation $R = |r|$ there will be applied to linearity link test (Anghelache and Lilea, 2012) [1]. Choosing the right regression model will be done based on the F test for R Square Change, indicating the changes occurring in the R Square value. The higher the values for R Square are and the significance level Sig. F Change <0.05, the more it is recommended to keep a particular pattern. In other words, the model that explains more of the variance will be susceptible to application in the analysis.

4. Presentation and analysis of data

The influence of taxes on the main macroeconomic indicators is based on the effects of the fiscal policy applied for the development of the economy or its recovery in the case of a recession. Tax policy can not be seen as a unitary system for directing economic effects, as it has so far been applicable only at national level, taking into account

country-specific factors such as their economic development, fiscal pressure, revenue collection mechanism, and combating tax evasion, the way in which they support the evolution of the business environment through the tax incentives offered. Our main objective is to identify the existence of a correlation between taxes and the main macroeconomic indicators. The value of taxes will always affect the economic activity of a country, whether it can speak of a long-term or short-term effect. An important role in managing and collecting them is played by the fiscal policies implemented at the level of each state. These can have both positive and negative effects on economic activity. An increase in the value of tax collections may mean for the state an increase in revenues to the consolidated general budget, repectively compliance by taxpayers with voluntary payment. On the other hand, an increase in these revenues may adversely affect the business environment, in the sense of lower net profit (if this increase is based on higher tax rates). This may have repercussions on investments as a reduction in the net profit to be reinvested will directly affect the development of economic activity. In Chart no. 1 is the share of tax revenue in GDP in order to be able to track the main changes that occur in each country and how they affect government spending, the number of hours worked per week, gross domestic product, investments, real labor productivity and public debt.

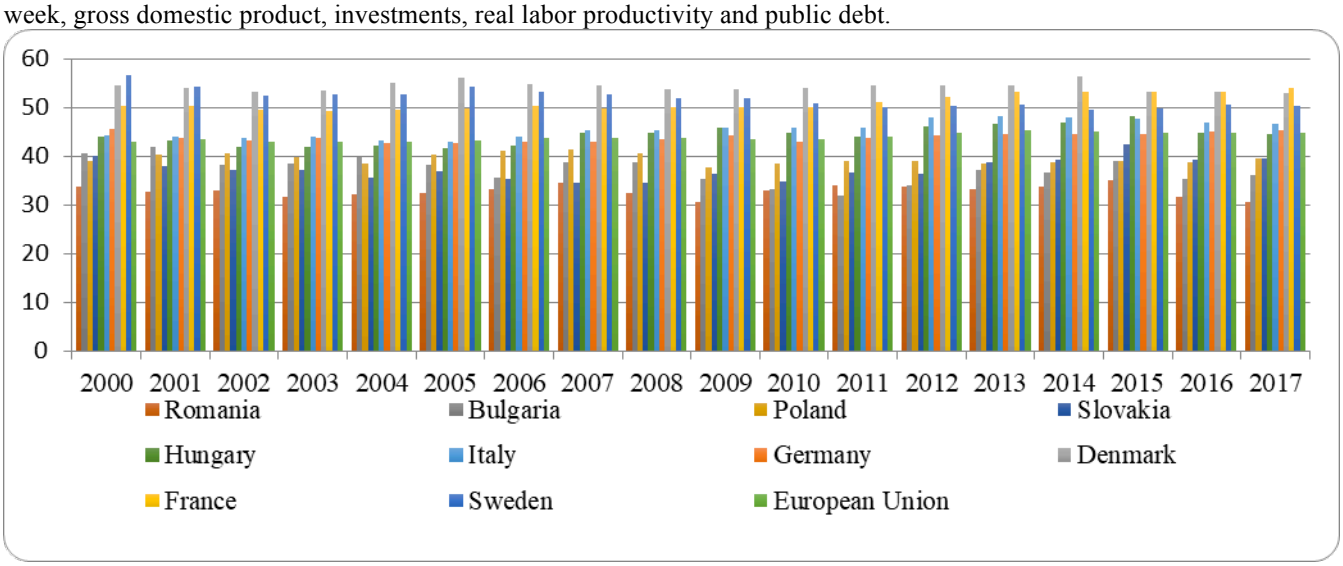


Chart no. 1 Share of tax revenues in GDP between 2000 and 2017

As for the share of tax revenue in GDP, there is a clear gap between developed and emerging countries. In Romania, throughout the analyzed period, it can be noticed that the tax revenues registered the smallest share of GDP related to the other countries, reaching the threshold of only 30.5 percent in 2017. A similar situation is also found for Bulgaria, where the share of tax revenues in GDP reached 36.1 percent in 2017, 39.6 in Poland, and 39.4 percent in Slovakia. In contrast, the share of tax revenue in GDP in Hungary is 44.5%, at only 2.1% from Italy and 0.7% from Germany in the same reference period. The highest percentage recorded in 2017 is in France of 53.9%, followed by Denmark by 52.9% and Sweden by 50.3%. The average European Union tax revenue reached 44.9 percent of GDP in 2017. Thus, it can be mentioned that there is a visible difference in the fiscal policies adopted and the revenue management mechanisms at the level of each state. A diminished rate of tax revenue does not necessarily represent a reduced tax burden on the part of the state. A major problem faced by emerging countries is related to combating tax evasion and the underground economy. An optimal fiscal management mechanism would make it possible to keep a real-time record of business activity, while facilitating the connection between the state and taxpayers. In developed countries such as Sweden, Denmark or France, an increased share of tax revenue in GDP is ensured by optimizing the tax system and focusing fiscal policies on supporting the development of the business environment. The effectiveness of taxation in these countries has been the main pillar of long-term compliance with tax legislation, so that they do not have an adverse effect on the business environment. Thus, the enterprises were able to adopt the necessary decisions in their economic development, being aware of the existing legislative provisions for the entire period of a fiscal year.

As enterprises are the main sources of income to the state budget, the applied tax policies will have an effect on their economic activity. In this context, the most important aspect, namely the business response to fiscal stimuli, has to be taken into account, as it is possible to see a different behavior of enterprises in a developed country compared to an emerging country. For example, in case of an increase in fiscal pressure, an emerging country will increase the number of hours with the aim of increasing the value of production in order to pay taxes and fees, instead we may observe the opposite behavior in a developed country. In *Figure no. 1* was observed the evolution of the number of hours worked in the analyzed countries. There is a clear discrepancy between the five emerging countries and the five developed countries. In the case of emerging countries, the number of hours worked decreased in 2017 below 40, with a maximum of -0.3 in Romania and -0.2 in Slovakia and Hungary. On the opposite side, of course, there are developed countries, where the maximum number of hours worked was 39.1 in Italy in 2000, and in 2017 it will drop to 37.2. The lowest number of hours worked weekly is 33.2 in Denmark, also in 2017, the European Union average being 37.1.

However, it can be noticed that there is a significant difference between the average of the European Union and the number of hours worked in emerging countries.

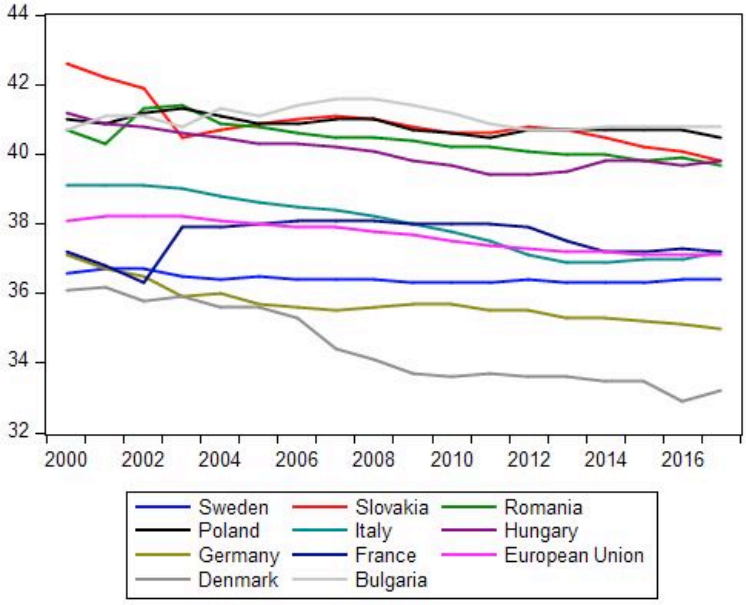
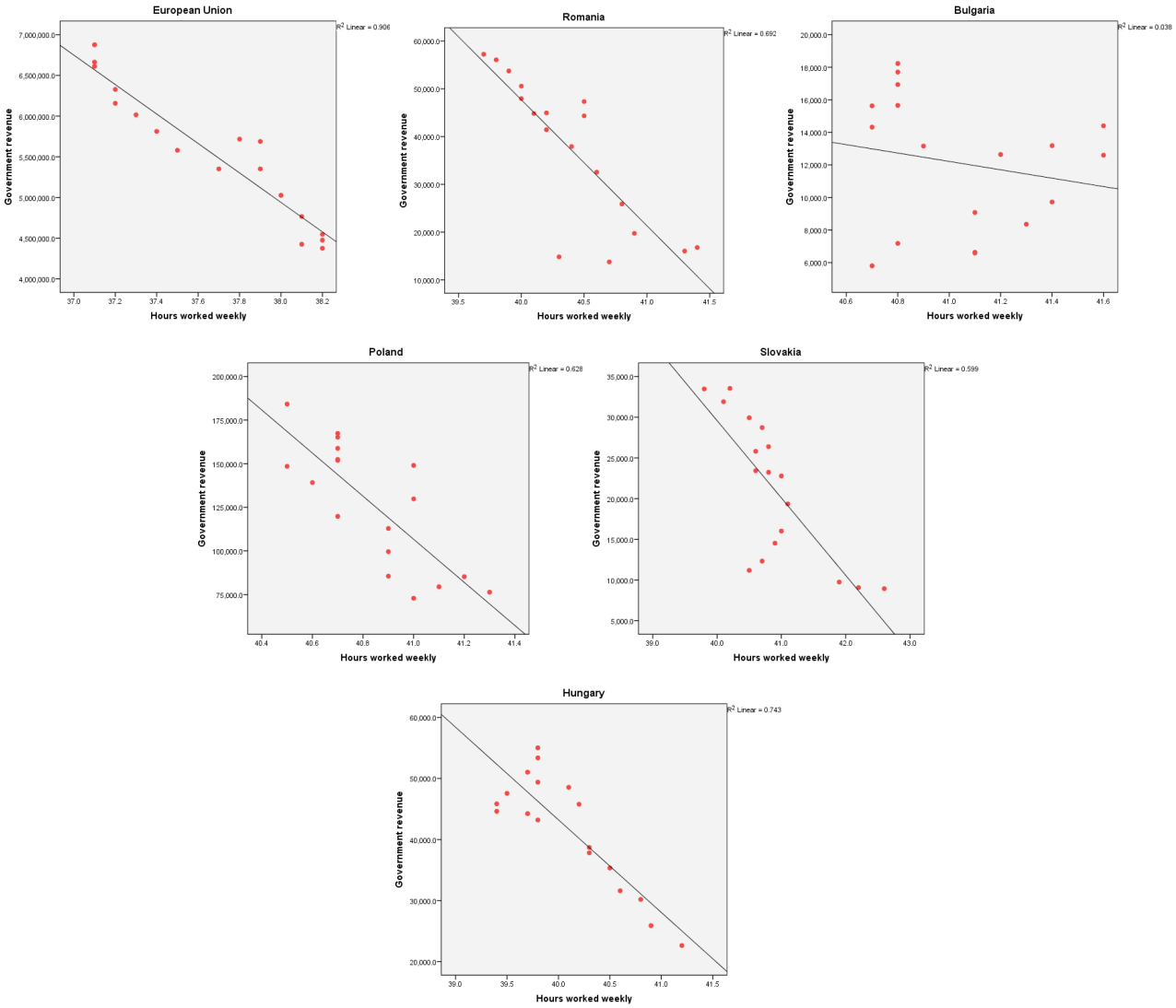


Figure no. 1 Evolution of the number of hours worked per week (annual data 2000 - 2017)

Although a large number of weekly working hours do not necessarily produce positive effects on the individual of a company, at the level of the business environment, a higher number of hours worked can be an increase in labor productivity and productivity. The detailed analysis of the impact of taxes on macroeconomic indicators must be preceded by an individual check of the linear correlation between tax revenue and the number of hours worked. This analysis provides information on the economic activity of companies, respectively if they are affected by a tax increase. Thus, in Figure no. 2 is reflected the correlation between tax revenues and the number of hours worked in the analyzed countries, including the European Union average, assuming that the emerging countries will positively respond to the increase in taxes by increasing the number of hours worked weekly in order to increase the value of production , while expecting developed countries to behave differently. Taking as a dependent variable the tax revenue depicted on the *Y* axis and the number of hours worked weekly on the *X* axis, the possibility of a linear correlation was examined. As can be seen, the correlograms obtained indicate a negative association between the two variables, with the exception of Bulgaria where the determinant coefficient R^2 has a value of 0,038, more exactly the independent variable only explains in a proportion of 3,8 percent the variance of the dependent variable , but also with the exception of France and Sweden, where R^2 has a value of 0.005 and 0.416, respectively. This shows that in the three countries there was no link between tax revenue and the number of hours worked. In the developed countries, there was a negative linear association, as the determinant coefficient was higher than in the emerging countries. In Denmark, the correlation shows a negative association between the variables and the determinant coefficient R^2 has a value of 0.877, being the largest of all the analyzed countries. It suggests that in Denmark an increase in tax revenues will lead to a reduction in the number of hours worked. At a very short distance from Denmark is Italy, where R^2 has a value of 0.875. Germany's situation is slightly different, although it is a developed country, the number of hours worked weekly explains only 63.9 percent of the variation in tax revenue. Instead, a particular situation is identified in Hungary, where the determinant coefficient R ^ 2 is 0.743. This phenomenon can also be explained by the fact that Hungary is an emerging country but is fast moving towards prosperity. At European Union level, the most representative negative association was identified, the determination coefficient of 0.906 being higher than that of the developed countries. Emerging countries respond differently to an increase in tax revenues. In Slovakia there is the lowest value of the coefficient of determination of 0.599, which shows that an increase in tax revenues will maintain a high number of hours worked weekly. Poland and Romania respond similarly to an increase in tax revenues, as the determination coefficient R ^ 2 is 0.628 and 0.692 respectively.

This behavior of the emerging countries is determined in particular by the instability of the economy and the impossibility of the business environment to predict future financial statements. Businesses will maintain a high number of hours worked to ensure a steady volume of production. In the literature, there is an opinion that "a large number of hours worked weekly or a large number of hours worked daily does not necessarily lead to an increase in production" and "employees who are in work for a longer period of time can show signs of fatigue and stress that not

only reduces productivity but increases the likelihood of errors, accidents and illnesses that involve costs for employers" [7].



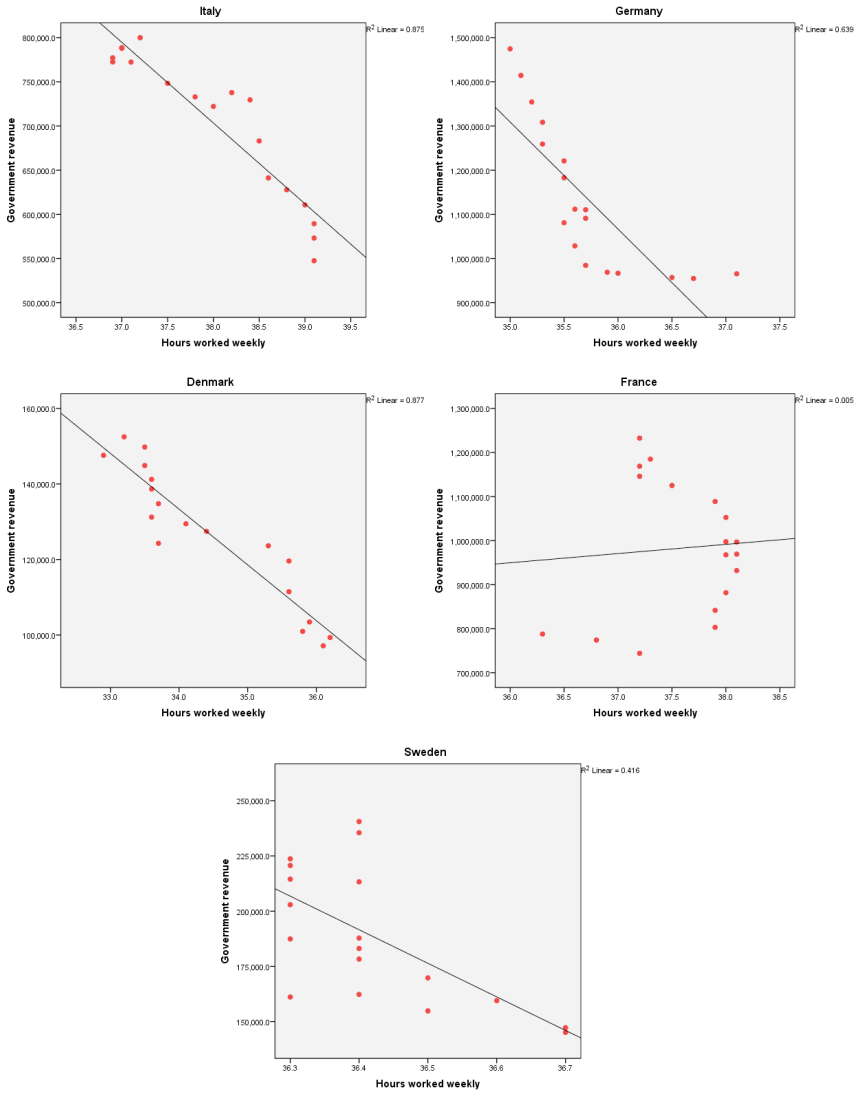


Figure no. 2 Corelogram and linear link between tax revenue and weekly hours worked

In fact, the situation is completely different from the above. From the analysis of *Figure no. 1* and *Chart no. 2* there can be systematizee conclusions about how the number of hours worked weekly influences productivity. If so far it has been found that the number of hours worked is higher in emerging countries and lower in developed countries, there may be a hypothesis that a higher number of hours worked will negatively affect productivity. In all the analyzed countries, labor productivity peaked in 2017, except for Italy, with the highest indexed productivity of 98 being reached in 2000. However, the highest value of labor productivity was recorded in Romania 136, followed by Bulgaria 118.8, Poland 118 and Slovakia 110.6. Here an increased number of hours worked weekly led to maximizing labor productivity. On the opposite side is Sweden with an indexed labor productivity index of 105.5, followed by Denmark with 105.4, Germany 104.8 and France with 104.7. In the case of Hungary there was also expected an increased productivity due to the high number of hours worked per week, the situation is different. In this country, the high number of hours worked weekly did not lead to an increase in productivity, with an index of 102.8, the lowest of the analyzed countries. The value of labor productivity in Hungary is lower by -3 than the European Union average.

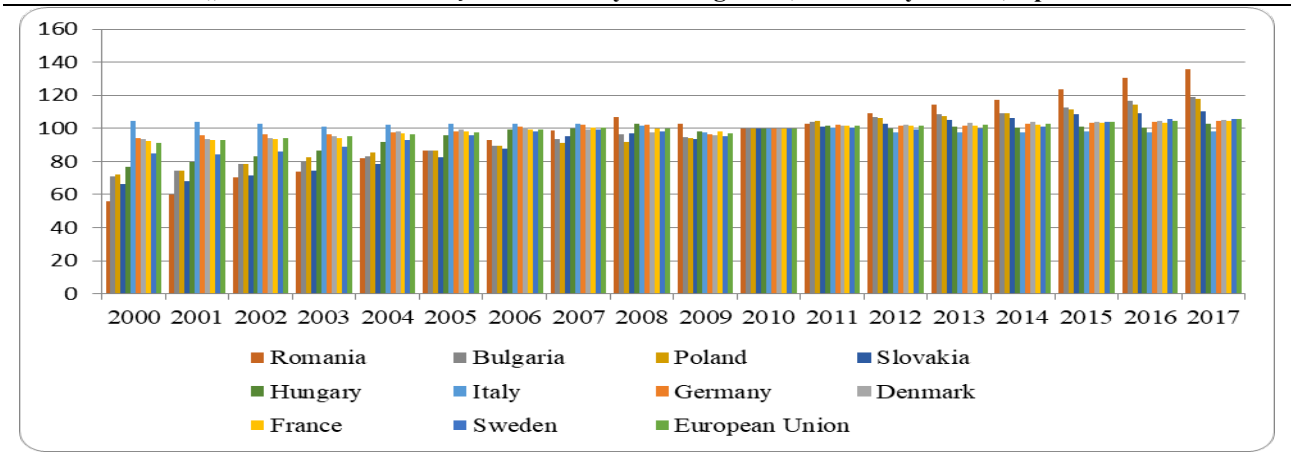


Chart no. 2 Evolution of the real productivity of labor/person (2010 = 100)

One of the research objectives was to identify the correlation between tax revenues and macroeconomic indicators (government expenditures, weekly hours worked, gross domestic product, investment, real labor productivity, public debt), starting from the assumption that emerging countries behave different to the different fiscal stimuli towards developed countries. For the analysis, the SPSS procedure – Forward was applied, including in the model only the set of independent variables whose multiple correlation coefficient R and determination coefficient R^2 are statistically significant, the results being presented in *Table 1*.

Independent variables	**EU** 99,80%	**RO** 99,40%	**Bulgaria** 97,90%	Poland 99,50%	Slovakia 99,10%	Hungary 98,80%	Italy 98,90%	Germany 99,80%	Denmark 98,70%	France 99,30%	Sweden 99,20%
GDP	✔	✔		✔		✔	✔	✔	✔	✔	✔
Hours worked weekly (H)	✔									✔	
Government debt (GD)	✔	✔		✔	✔	✔					
Gross fixed capital formation (GFCF)	✔	✔				✔	✔				✔
Government expenditure (GEX)		✔	✔		✔		✔	✔			
Labour productivity (LP)			✔		✔			✔	✔		

Table 1 Correlations between tax revenues and main macroeconomic indicators (R^2)

At the EU level, the procedure rejected the GEX variables - government spending and LP - labor productivity as insignificant, keeping for the construction of the model only the variables GDP - Gross Domestic Product, H - weekly hours worked, GD - public debt and GFCP - investments. Using a multifactorial model, it has been demonstrated that the variables GDP (Gross Domestic Product), H (Weekly Working Hours), GD (Government Debt) and GFCF (investments) influence the variable GR (Tax revenue) in proportion of 99.8%, the remaining 0.2% being the influence of other factors.

In the case of Romania, the procedure rejected the H and LP variables as insignificant, keeping only the GDP, GFCF, GD and GEX variables for the construction of the model. The use of the multifactorial model allowed explanation of the correlation between tax revenues and macroeconomic indicators. Thus, the variables GDP, GFCF, GD and GEX influence the GR variable in porportion of 99.4%, the remaining 0.6% being the influence of other factors. In Bulgaria, a bifactorial model was created because the procedure rejected the variables GDP, H, GD and HFCF as insignificant, keeping only the GEX and LP variables for the construction of the model. Here the GEX together with LP variables influence the dependent variable GR in proportion of 97.9% GR . Unlike in Bulgaria, a multifactorial model was developed in Slovakia, including besides the variables used for Bulgaria and GD. The data in Poland led to the creation of a bifactorial model as well as for Bulgaria, only that the GDP and GD variables were used to construct the model, which explained the variation of the dependent variable in a ratio of 99.5%. The multi-factorial model in Hungary is similar to the one in Romania, but in its construction there was excluded the GEX variable.

In developed countries, in most cases (Denmark, France, Sweden), bifactorial models have been applied, with an independent common variable GDP. In Italy, the procedure rejected the GD, LP and H variables as insignificant, keeping only the GEX, GFCF and GDP variables for the construction of the model, influencing the variable GR in proportion of 98.9%. The data in Germany led to the creation of a multifactorial model, keeping only the GDP, LP and GEX variables for the construction of the model, which explained in proportion of 99.8% the variation of the variable GR - tax revenues.

5. Conclusions

Since economic activity has never experienced a linear evolution, anti-cyclical policies have gained a growing reputation and the government of each country has as its primary objective to apply those fiscal and budgetary policies that are best suited to the state of the evolution of an economy based on demand and supply. Thus, attention was directed to tax revenues and government expenditures, regarded as the main tools for coordinating economic activity. In this way, fiscal policies have played an important role in the harmonious development of the business environment, the main stabilizer of a country's economy. It should be taken into account that a fiscal policy inappropriate to the economic needs of a country can have serious repercussions, even in the long run. This study highlighted the link between tax revenue and six macroeconomic indicators that govern the economic and social development of a state.

The results captured a major discrepancy between the economic activity of emerging countries and that of developed countries. At first analysis, the business response to the tax revenue changes was identified. Starting from the hypothesis that a large tax burden will lead to an increase in the number of weekly working hours in order to increase production value for the payment of compulsory deductions, it was found that there is a considerable discrepancy between emerging and developed countries. A greater number of hours worked visibly in developed countries was also an increased productivity. Among the analyzed countries, Romania experienced the highest labor productivity at an indexed value of 136, due to the high number of hours worked weekly in the same period of 39.7. At the opposite end, there was a developed country, Italy, where the indexed productivity did not reach the threshold of 100 and the number of hours worked weekly in 2017 was 37.2. This analyzed issue has shown that an emerging country will always respond differently to an increase in tax revenues. Thus, a large number of hours worked weekly in emerging countries show a positive association with productivity, but not before mentioning that it is in a negative association with tax revenues. Emerging countries have shown a poor correlation between time spent by a workplace employee and tax revenue, while in developed countries this correlation was much stronger.

Secondly, on the basis of Forward prospective analysis, six factorial variables (government expenditures, number of weekly working hours, gross domestic product, investment, real labor productivity, public debt) were introduced into the model, also keeping as a independent variable the tax revenues. In most developed countries there was a positive correlation between gross domestic product, government spending, investment and productivity, taken as independent variables the tax revenues. This phenomenon can be explained by the fact that in a developed country revenue growth will generate an increase in productivity in order to be able to pay for mandatory levies. Increased productivity will require an infusion of capital into investment, needed for technology and efficiency, and an increase in spending. Ultimately, all this will generate an increase in gross domestic product. At the level of an emerging country, the economy will manifest itself differently in the face of rising tax revenues. This growth is positively correlated with a rise in government debt and spending as well as productivity.

This analysis allowed a fundamental conclusion to be drawn, namely that developed countries will tend to GDP growth, and emerging countries will focus on better debt management, in the context of rising incomes to the state budget. Tax policies to be adopted should guide developing countries to prosperity, as public debt and government spending are only pioneers in society evolution and not an impediment.

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