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MODELLING OF FISCAL TRANSMISSION CHANNELS USING SYSTEM DYNAMICS METHOD

In the process of fiscal transmission, impulses from the State fiscal service of Ukraine are transmitted through dedicated channels to the real economy and facilitate the stimulation or slowdown of business activity of business entities, which leads to a change in macroeconomic indicators and revenues in budgets of all levels, and therefore affects the level of economic development in country.

Each of the taxes is transformed into a channel of fiscal transmission in the process of determining its main components: the taxpayer, the object of taxation, the tax rate, as well as tax benefits, restrictions and payment frequency [3].

The problem of tax system is an insufficient amount of tax earnings to the budget. The amount of tax earnings is increasing last years, but Ukraine still has the deficit of the state budget. This is due to the fact that Ukraine has a large share of the shadow economy as we have high tax rates compared to other countries. That is why, state budget doesn't have enough revenues and it becomes the main problem of economy. To solve this situation, it is necessary to use mechanism of the fiscal transmission.

Considering the main hypothesis in the model, it may be accented that:

taxes ↓ → available income ↑ → aggregate demand ↑ → consumption ↑ →
production volume ↑ → unemployment rate ↓ → state budget revenues ↑ → ;
taxes ↑ → available income ↓ → aggregate demand ↓ → consumption ↓ →
production volume ↓ → unemployment rate ↑ → state budget revenues ↓ → [3].

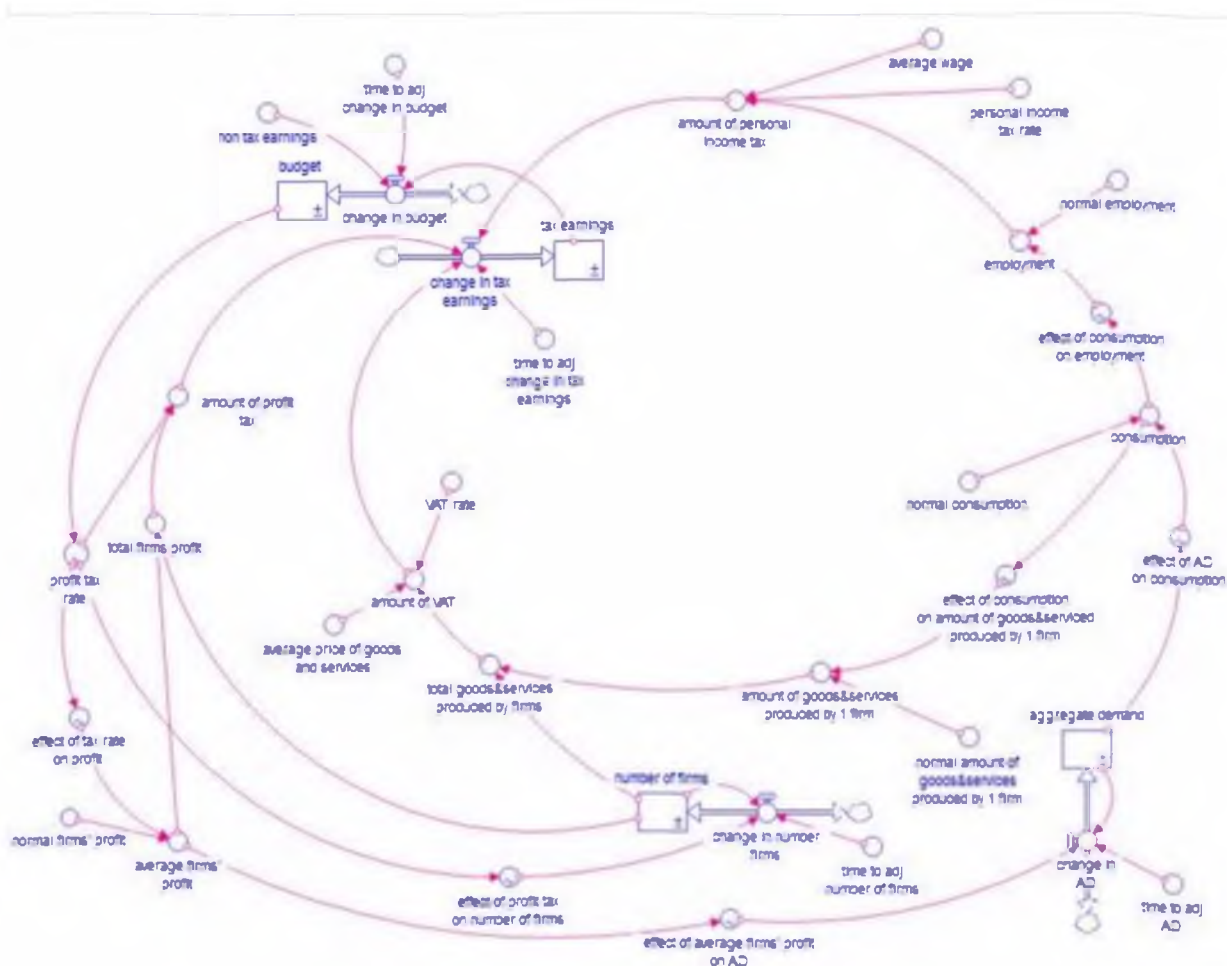


Figure 1. Fiscal transmission channels model

Following the trend of historical data of the tax earnings, we can see that simulating the model shows that the model and historical data almost coincide and they have the similar tendency of curve. During the period from 2011 to 2014, the curve is slowly increasing. This variable is growing more sharply from 2014 to 2018. During the period from 2014 to 2018, it was needed more revenues in the state budget for reforming different spheres of the economy and military defense funding.

Using this type of modeling, we can get an idea of the real processes and analyze their behavior that we want to explore. However, various tests are also required to verify and draw conclusions the model's results. Therefore, it was conducted analyzing the effects and sensitivity test. Effects help us to consider what effects model has between the indicators. One of the effects is the more tax earnings, the more budget revenues. It is logical and corresponds to real life as the most part of budget revenues consists of tax earnings. Applying the sensitivity test of the different variables, it was shown that the time to adj number of firms has the greatest impact on tax earnings.

Having considered the limitations of impact of taxes on economic indicators, simplifications were used for building this model. These simplifications concern the types of taxes as it was chosen only those taxes that occupy most of the tax earnings in the revenues of state budget. This model has only 3 types of taxes are profit tax,

personal income tax and value added tax. But there are other types of taxes such as excise tax and duty tax. For further improve the model, it can be added these 2 types of taxes for better problem research and representation of results of the model.

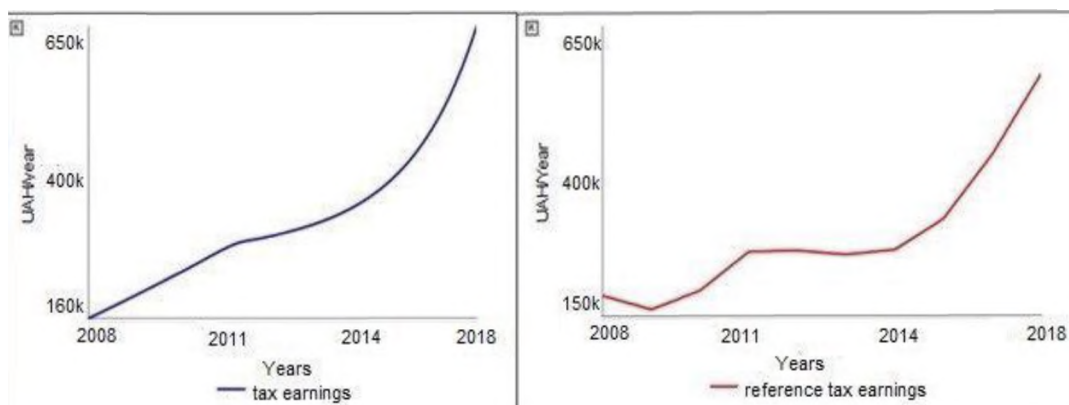


Figure 2. Comparison of model and historical data of the tax earnings

Another way to improve the model is adding the other factors that are affected by taxes. These factors can be budget expenditures, state debt (external and internal debt) and budget deficit. Budget expenditures show how budget revenues are spent and used. Budget expenditures also are spent for covering the debt. Tax earnings increase throughout the entire period, but Ukraine still has a budget deficit. So, to improve this model it can be added the deficit of the budget. But it has some problems to do it because budget deficit measures in negative numbers and it can influence on all model.

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