

Government spending is shifting the expenditure line upwards, which in turn increases the equilibrium income (income). Decreasing the investment costs reduces the planned real expenditures (E) in the economy and shifts the graph of planned expenditures downwards, which in turn reduces the balance of income levels (Y), that is, the national income will increase due to government spending growth. We can easily see it by constructing a comparative graph for income (income). Note that the the increase in income ΔI exceeds the increase in government spending ΔG . Fiscal policy leads to a multiplicative increase in income. That is, G increase by ΔG then I increase by ΔI , where:

$$\Delta I = \Delta G , \quad 0 < MPC < 1 ;$$

MPC - Marginal Propensity to Consumption. The multiplier shows how much the income grows if the government spending is increased by one monetary unit .

References

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IMPACT OF TAX RATE ON THE GDP LEVEL IN TWO COUNTRIES: SYSTEM DYNAMICS MODEL

The research considers a Keynesian model that take into account relationship between aggregate demand, import and export of two countries. Aggregate demand is determined by the following formula:

$$AD(t) = C(t) + I' + G' + NX(t),$$

where I' and G' is a investment and government spending respectively, C(t) – consumption, NX(t) – net export,

$$C(t) = C' + b*Yd(t),$$

where C' is a consumption, b is a marginal propensity to consume and Yd(t) is a disposable income.

$$NX(t) = X' - m*Y(t) - M',$$

where M' is a import, X' is an export that are exogenous. Y(t) is a national income and m is a marginal propensity to import.

To study the dynamics of the described model we use the system dynamics, and this model is depicted in Figure 1.

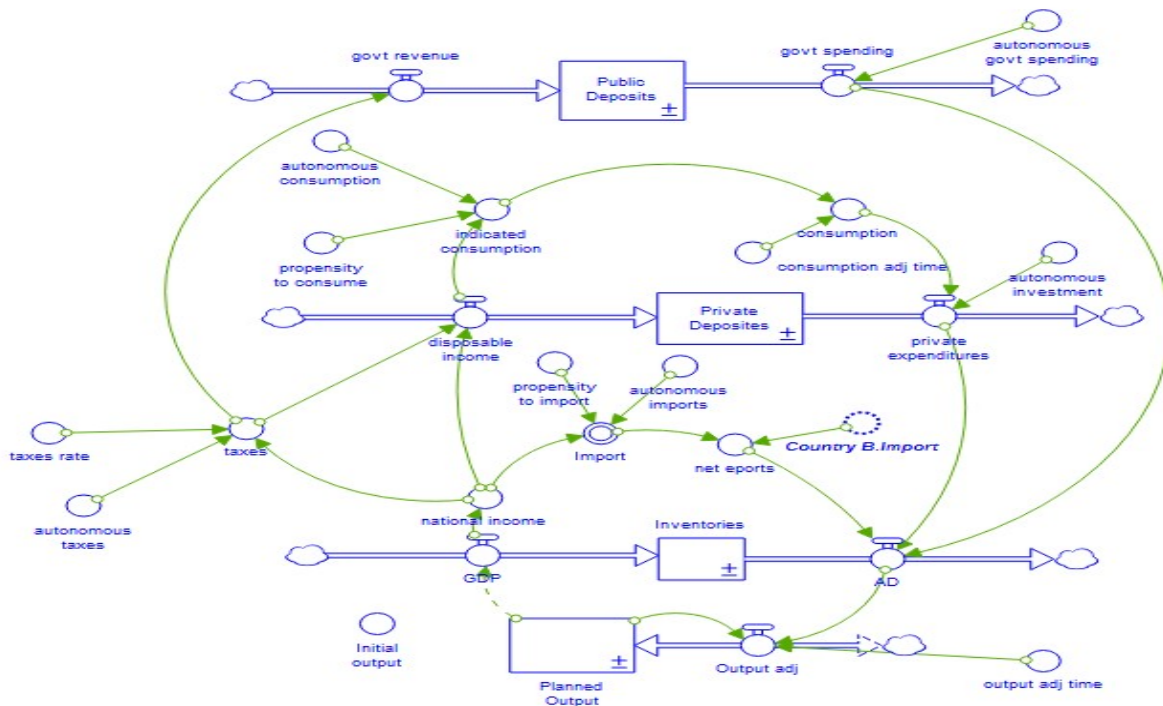


Figure 1. System dynamics model

To simulate trade between two countries, there were created two identical models, which were placed in different modules. The export of one country is the import of another, and vice versa. Firstly, we establish the equilibrium condition for the model, and afterwards we investigate how changes in marginal rate of tax (tx) influence on the country dynamics. The equilibrium value of tx is 0.20, and for GDP – 2675 euros per year.

If tax rate decrease to 0,15 in country A the level of GDP in countries A and B will be increasing to 2.88 and 2.75 thousand euros per year respectively (graph 2, left).

Accordingly, with an increase of tx to 0.25 in country A, level of GDP in A and B will be decreasing to 2.55 and 2.62 thousands euros per year respectively (Figure 2, right). As we can see, there is a direct relationship between two countries, when we changes tx in one of them.

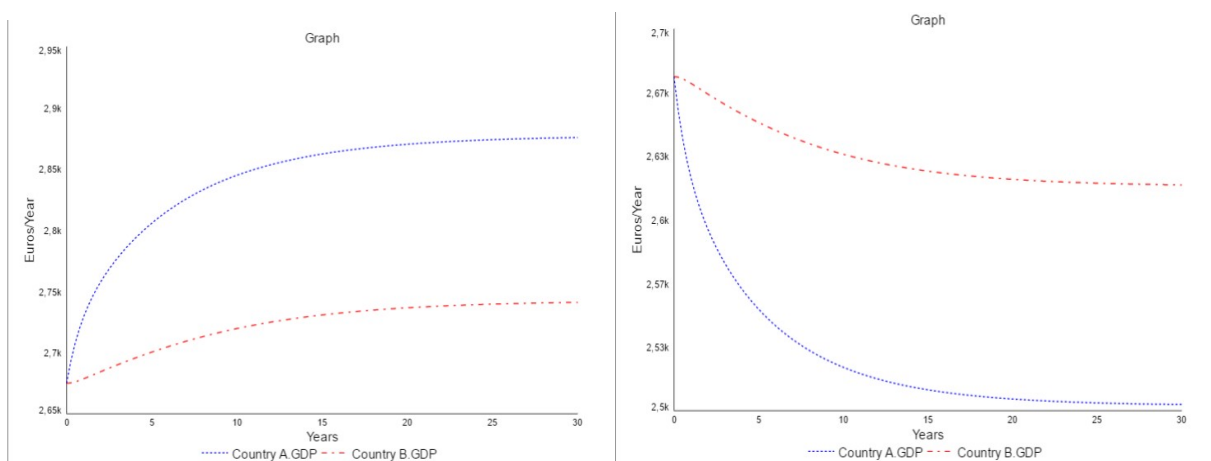


Figure 2. Influence of tx changing on dynamics of the countries.

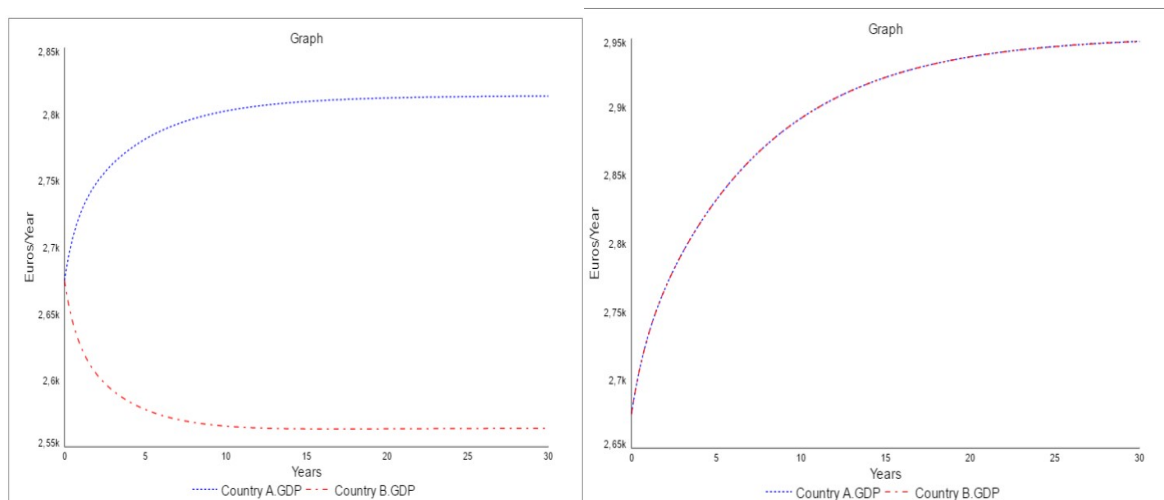


Figure 3. Influence of tx changing on dynamics of the countries.

Now consider changing tx in both countries. Increase tx to 0,15 in country A and decrease tx to 0.25 in B. The level of GDP in country A will be increasing to 2.81 thousands euros per year, and in B will be decreasing to 2.56 thousand euros per year (Figure 3, left). In graph 3, on the right shows the GDP dynamics, with a decrease tx in both countries to 0.15. As we can see, the dynamics are identical in both countries, and increasing to 2.95 thousands euros per year.

Comparing similar model for one country and the model discussed above, if we change the same parameters, then we can observe that the GDP will be lower in a model with two countries than in a model with one.

References

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SYSTEM DYNAMIC APPROACH FOR SOVEREIGN DEBT REGULATION

The debt issue and repayment problem are strongly correlated with appropriate national macroeconomic policy and strategy instruments. Macroeconomic incrementalism tools in evaluating informative signals to determine the optimal level of sovereign debt helps to understand the nature and possible outcomes of national debt policy. The very basic simplified structure of sovereign debt issue is presented on Figure 1.