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APPROACH TO MODELING THE ACTION OF TRANSMISSION MECHANISM THROUGH THE INTEREST RATES OF COMMERCIAL BANKS

Transmission mechanism is a system of interdependent economic variables that transmit certain impulses from monetary policy instruments to the financial market and the real sector of the economy. Therefore, the transmission mechanism is a broad concept, which includes not only the relationship of the monetary variables with the real sector of the economy, but also the process of regulating the economy through the monetary impact on aggregate demand and the aggregate supply of all economic agents. The concept of the monetary transmission mechanism related to the implementation of the regulatory policy by the Central Bank.

There are many factors affecting the transmission mechanism in the economy. It depends on specific economic conditions, the structure of the country's financial system and the methods of monetary regulation that are inherent in a country, as well as on the behavior of economic agents. The effects of monetary regulation for developed countries and for developing countries differ significantly. For example, in countries with high inflation monetary policy has a much lower impact on aggregate demand than in countries with low inflation. This is reflected in various monetary indicators and models of the transmission mechanism.

One of the main channels of the transmission mechanism is the interest rate channel. The interest rate channel describes how changes in discount rate affects interest rates of commercial banks which in turn affects savings, investment and price stability. Many countries in their monetary policy use this channel, especially when the monetary regime is inflation targeting, in this case, this is the main channel. The effectiveness of this channel depends on economic conditions in country.

In a simplified form, the scheme of transmission mechanism functioning in Ukraine looks like:

1. National Bank of Ukraine (NBU) determines the discount rate;

2. NBU determines the deposit certificates rate (In liquidity surplus deposit certificates plays more important role than refinance or other liquidity injection instruments);
3. Commercial banks take this rate as a reference price for financial resources;
4. Commercial banks change their interest rates;
5. Economic agents change decisions on savings, consumption, lending and investment;
6. This affects aggregate demand, supply and price level.

Meanwhile, the decision on the discount rate are made by the NBU with the information regarding the current and forecasted inflation. Moreover, inflation is the main targeted indicator for the NBU. Inflation is important macroeconomic indicator; therefore, it is necessary to make accurate forecast for it. Figure 1 depicts causal loop diagram of interest rate transmission channel.

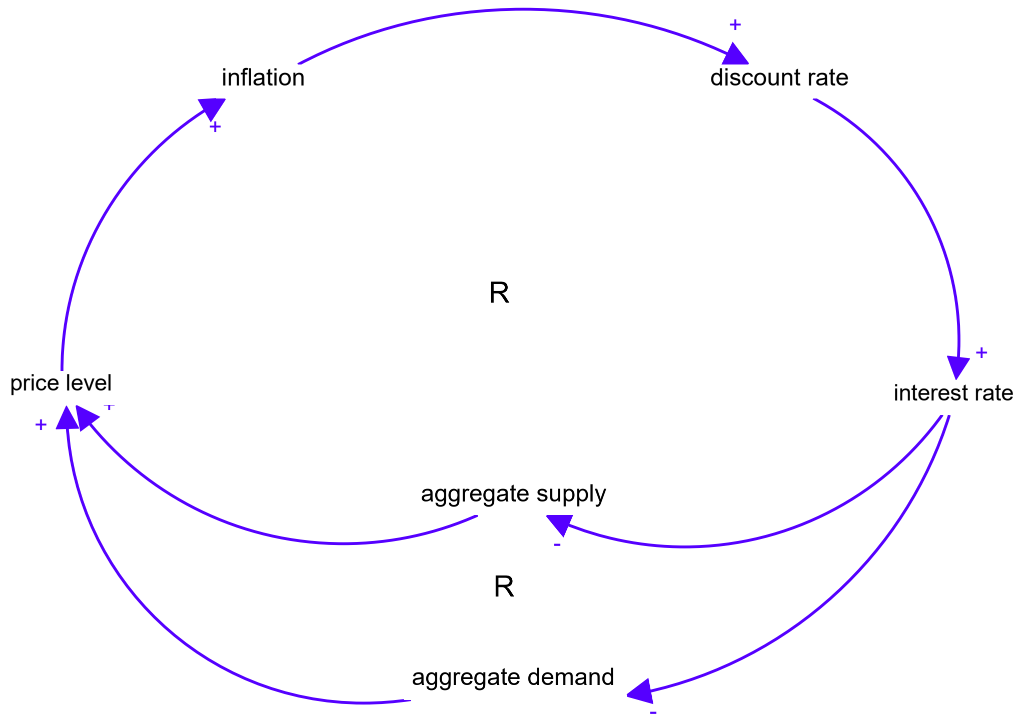

Figure 1. **The simplified view of the interest rate channel**

National Bank of Ukraine affects level of inflation by changing discount rate. After that commercial banks change their interest rates, taking discount rate as a reference price for financial resources. Interest rate change negatively affects change in aggregate demand and aggregate supply. The aggregate demand and aggregate supply in turn affects price level and inflation. But the action of this mechanism is not unidirectional. The projected inflation level is used as input for the decision making on discount rate.

In practice, the transmission mechanism is often described by econometric models that shows the connections between monetary and economic parameters. There are models of direct transmission and indirect transmission. Central banks have two main levers of influence on the economy: direct – the monetary and financial indicators under their control, as well as the indirect – the impact on the spending of economic agents It is possible to show interconnection between the elements with system dynamics model but not only unidirectional effect, so it will be useful to build system dynamics model of transmission mechanism.

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MODELING OF MIGRATION FLOWS AS A REGULATOR OF ECONOMIC GROWTH

International migration is a part of a transnational revolution that changes society and politics around the globe. The dichotomy between donor countries and recipient countries is collapsing. Most states face both problems with emigration, and with immigration (although they usually dominate one over the other), while other countries have assumed the residential zones for migrants. At the same time, there is a lack of scientific work on this issue with the help of mathematical tools that promote the need for in-depth study and the search for new ways of resolving the problem of external migration in Ukraine and the world. The current research proposes the solving of modern issues with movement, which makes a significant contribution to the investigation of the field. The new system dynamics model of migration is based on the data analysis, theories of migration and previously obtained results.

The main factors that influence the regulation of mobility in Ukraine will be assessed not only qualitatively but also quantitatively: the ratio of wages in Ukraine and recipient countries, differences in per capita GDP, the possibility of acquiring (renting) housing, differences in the level of marginal propensity to consume, etc. Based on the created simulation model (see Figure 1), the main problems of current regulation of migration flows existing in Ukraine were identified. The main elements of the model are the stock of workforce in the donor country, the stock of potential migrants, the total population, the number of employed in the economy, the number of unemployed, and the number of working age population.