"THE ST. LOUIS" MODEL USED IN THE ANALYSIS OF THE ROMANIAN ECONOMY

Mirela DIACONESCU[a], Mihai DIACONESCU[b], Liviu-Stelian BEGU[c]

Abstract

The paper is intended to be primarily a factual developments illustrate the main economic indicators in the context of Romania's crisis by creating a digital picture to illustrate the main effects of the country. We proposed the application of an econometric model using as a set of macroeconomic indicators compiled data for Romania for the period 2000 to 2012. This will allow certain scenarios and forecasting developments in the context of model assumptions (2013-2014). The St. Louis model can be used successfully in forecasting the Romanian economy. Another issue raised by the paper is related to the validity of the model used and how plausible conclusions can be reached after application.

Keywords: crisis, econometric model, endogenous variables, exogenous variables
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Author's/Authors' Affiliation

[a] - The Academy of Economic Studies, Bucharest, Romania, mirela.diaconescu@rei.ase.ro

[b] - The Academy of Economic Studies, Bucharest, Romania, mihai.diaconescu@mk.ase.ro

[c] - The Academy of Economic Studies, Bucharest, Romania, liviu.begu@csie.ase.ro

1. Introduction

In early 1960, Federal Deposit Bank of St. Louis developed in an economic analysis model, which stressed the role of monetary aggregates. Initial analysis of economic data was performed using diagrams that after 1960 will be used regression techniques as a tool of analysis. Some of the quantitative research efforts were consolidated in 1970 with publication of what followed is known as *"The St. Louis"*.

The first theoretical consideration that underlies the development model was the modern quantitative theory of money. The emphasis of the modern quantity theory is the behavior of economic units in response to changes in the stock of money. Moreover, the existing stock of money must be held by someone. As a result, a change in the stock of money will induce a discrepancy between the current owner and interested possession of money that will change because alternate portfolio of assets. Included in this adjustment is a change in spending on goods and services.

The second theoretical issue that has been implicit in the construction of the model, although not explicitly recognized by those who developed the model at the time, was the search and information costs on economic behavior. Information on the equilibrium price is not to gather cost and thus economic units should seek balance in market prices. As a result, prices do not necessarily have been adjusted instantaneously to the new equilibrium level in response to a step change in total spending.

As a result of these theoretical considerations, the relative impact of fiscal and monetary measures requires careful assessment. This assessment includes the differentiation between short and long, and granting special focus methods are to finance government expenditure.

"Model St. Revised Louis" allows analysis and forecasting economic fundamentals following developments: nominal national income; level of prices; real national income; rate of employment.

Main assumption in developing the model equations is that the evolution of nominal national income depends on the evolution of monetary and budgetary. In other words, changes in national income depend on monetary and fiscal policy. Thus, the merit of this model is that it provides information on developments in the basic macroeconomic variables in different ways of combining measures of monetary and financial policy, which allows the design of monetary policy in line with the overall objectives of economic policy in terms of income national employment and prices.

Equation of nominal national income

$$\Delta Y_t = f_1\left(\Delta M_t \ldots\ldots\ldots \Delta M_{t-n}, \Delta E_t \ldots\ldots \Delta E_{t-n}\right) \tag{1}$$

Equation of price level

$$\Delta P_t = f_2\left(D_t \ldots \ldots D_{t-n}, \Delta P_t^A\right) \tag{2}$$

Identity equation

$$D_t = \Delta Y_t - \left(X_t^F - X_{t-1}\right) \tag{3}$$

Identity equation of total expenditure (nominal national income)

$$\Delta Y_t = \Delta P_t + \Delta X_t \tag{4}$$

Equation of interest rate

$$IR_t = f_3\left(\Delta M_t, \Delta X_t \ldots \Delta X_{t-n}, \Delta P_t, \Delta P_t^A\right) \tag{5}$$

Equation predicted prices

$$\Delta P_t^A = f_4\left(\Delta P_{t-1} \ldots P_{t-n}\right) \tag{6}$$

Equation of unemployment rate

$$U_t = f_5\left(G_t, G_{t-1}\right) \tag{7}$$

Equation (1) expresses the evolution of nominal national income in the reference period according to the monetary developments during the period and in previous periods and costs budget in the reference period and in previous periods. Changing the nominal national income in the reference period is defined by identity (4), as the amount of change the real value of national income calculated in constant prices and the change of prices.

Equation (2) expresses the general movement of prices in the reference period, depending on the application period and in previous periods and in anticipation of future growth reference to the general level of prices. Behavior is expressed through the demand growth, defined by identity (3), as the difference between changing the nominal national income in the reference period on the one hand and spread between production potential associated full employment of labor in reference and actual production achieved during the previous period, on the other. Thus, demand is greater, the spread is less pointed, and increase national income in current period nominal is higher - and vice versa. The price equation is essentially a Phillips curve in the short term extended to include the changes in prices and total expenditure anticipated.

Equation (5) defines the interest rate, which depends on: monetary mass, changes in real national income during that period and index of prices.

Equation (6) describes the early movement in the general level of prices, namely as a variable dependent on previous trends in prices.

Employment equation in the reference period (7) expresses this degree as the coefficient irregularity of the actual production to production potential, related to full employment in the current period in the previous period.

To describe the model, its characteristics are summarized in relation to four key assumptions money. They are:

1. Monetary actions are the dominant factor contributing to economic fluctuations.

2. Monetary actions have little, if any, lasting effect on real variables, with effects lasting only for nominal variables.

3. Fiscal actions, defined as changes in government spending with a given stock of money, have only a transitory impact on economic activity.

4. The economy is in a private stable inert.

2. Effects of crisis in Romania

Under the model assumptions can build national income equation in the form of a linear econometric model multi-factorial:

$$I^{PIB} = \alpha_1 I_{t/1}^{ChGuver} + \alpha_2 I_{t/1}^{M} + b \qquad (8)$$

where the indicators used are: real GDP index, index of real monetary, government spending index.

$$I^{PIB} = 0{,}22 + 0{,}94 I_{t/1}^{ChGuver} + 0{,}42 I_{t/1}^{M} \qquad (9)$$

Therefore, we interpret the estimated parameters as to an increase of 1% of government expenditure, national income has increased in the review, on average, 0.94%, respectively an increase of 1% of average monetary income of national increased in the range examined, on average, 0.42%, which confirm the theoretical results of the influence of fiscal and budgetary policy.

To accept the hypothesis of linearity is calculates the coefficient of linear correlation:

$$r_{y/x} = \frac{\text{cov}(y,x)}{\sigma_x \sigma_y} = \frac{\sum (y_i - \bar{y})(x_i - \bar{x})}{n \sigma_x \sigma_y} = 0.98 \qquad (10)$$

Linear correlation coefficient is defined in the interval [-1, 1], that the value 0.98 obtained indicates a stronger linear correlation between the two variables. Test Fisher-Snedecor shows that the results are significant, with a significance threshold of 5%. $F_c = 39{,}7768 > F_{0,05;2;6} = 10{,}43$.

So, we can say that the model is good. Checking the significance of default and correlation coefficient of linear correlation is done using the test Fisher-Snedecor:

$$F_c = \left(\frac{n-2-1}{2}\right)\frac{R^2}{1-R^2} = 3 \cdot \frac{0,9298}{0,0702} = 13,24 > F_{0,05;2;6} = 10,43 \tag{11}$$

Therefore, the model correctly describes the dependence of the three variables, the independent in explaining the proportion of 93% of total variation in the dependent variable.

3. The effects of economic crisis – evolutionary scenarios

If the equation of our revenue to perform a forecast for next year after the 2 scenarios: optimistic, and pessimistic.

If we consider the following scenario optimistic assumptions: government expenditure will increase in real terms by 3% and average money will increase in real terms by 5%.

For the pessimistic scenario, consider the following assumptions: government spending will decrease in real terms by 3% and average money will remain constant. Substituting the above equation for each scenario in part refrained forecast for the period 2013-2014.

Thus:

- In the optimistic scenario where the pace of growth will be 2.5%.
- If pessimistic scenario was obtained a decrease in growth of 2.5%.

Interest Rate equation is:

$$IR = \alpha_1 IPC + \alpha_2 I^{PIB} + \alpha_3 I^M + b \tag{12}$$

Where the indicators used are: interest rate, index of consumer prices, monetary mass, average GDP dynamics.

$$IR = 50,72 + 1,2 \cdot IPC - 0,065 \cdot I^{PIB} - 5,7 \cdot I^M \tag{13}$$

The interest rate is influenced by positive and negative dynamic pricing dynamics of GDP and the monetary. All influences are analyzed in accordance with economic theory. Romanian economy to the equilibrium interest rate is 10.12%. Influences factors are analyzed as follows: for each percentage increase in the CPI rate increases by 1.2% for a percentage of GDP growth rate falls to 0.065% for each percentage increase in monetary leads to lower interest rates with 5,7%. The lowest influence has therefore GDP.

Coefficient of linear correlation shows that there is a strong linear correlation between variables (0,94).

Test Fisher-Snedecor shows that the results are significant, with a significance threshold of 5%. $F_c = 8,54 > F_{0,05;3;5} = 7,3$.

Significance F = 0.02 <threshold of significance (0.05). Checking the significance of default and correlation coefficient of linear correlation is tested using the Fisher-Snedecor:

$$F_c = \left(\frac{n-3-1}{3} \right) \frac{R^2}{1-R^2} = \frac{5}{3} \cdot \frac{0,8367}{0,17} = 8,2 > F_{0,05;3;5} = 7,3$$

(14)

Therefore, the model correctly describes the dependence of the four variables in explaining the independent proportion of 83% of total variation in the dependent variable.

4. Scenarios

And if the interest rate equation in our model build a forecast for next year after the 3 scenarios: optimistic, pessimistic and average.

If we consider the following scenario optimistic assumptions: government expenditure will increase in real terms by 3% and average money will increase in real terms by 5% and a CPI of 4.5%.

For the pessimistic scenario, consider the following assumptions: government spending will decrease in real terms by 3% and average money will remain constant while the CPI is 3%. Substituting the above equation for each scenario in part refrained forecast for the period 2013-2014.

Solutions in the short term trends indicate libratory interest rate. Thus, the optimistic scenario where the interest rate would record a level of 8.87% in case of moderate 10.21% while the pessimistic scenario it will rise to 12.27%.

5. Conclusions

Current economic crisis, burst into the U.S. to quickly propagated globally affecting international economic system. Put on the irresponsible policies of financial institutions, the crisis raises worrying questions about the security.

The model is able to present several scenarios of Romanian economy. Transmission of the crisis was not only geographically but also in society, the financial plan in the real economy, both social and gradually installed and psychological level. The latter seems to be the most dangerous contaminants, whereas the frozen actions practically blocking economic growth for fear and mistrust.

The effects of the crisis are felt in Romania. This is seen primarily at economic indicators, which after a period of growth began to come together with this crisis on a downward trend.

Regarding short-term evolution of economy and living standards in Romania, according to evolutionary scenarios outlined in the model St. Louis reviewed the pessimistic scenario (which is most likely in the current context) GDP will decrease by 2.5% and interest rate (real) will be an average of 12.27%.

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