

THE MONETARY MODEL OF THE IMF, ITS CHARACTERISTICS, DEVELOPMENT AND PROBLEMS

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In 1947 the International Monetary Fund (hereinafter the IMF) opened its gates to its member countries with an offer of financial assistance in solving the problems of deficits in their balances of payments. The IMF had to know the causes of these deficits, as well as the essential economic measures necessary to undertake in order that these deficits could be prevented in the future. In this context it developed in the Fifties a macro-economic model, which remains, and this needs to be stressed, still a rare economic instrument. Agreements on support provided by the IMF, as well as further specified financial agreements remain oriented on monetary targets serving as realisation criteria for the repayment of the financial aid provided, or as guiding points, playing a substantial role in evaluating the results achieved on the basis of these agreements.

Let us concentrate now on describing this model, as well as its further development. First of all we must state that the model in question is characterised primarily by its simplicity. The simplicity of the model on the one hand was required due to the lack of basic (decisive) data on macro-economic variables, such as the national product and its further derivatives arising in the processes of division, re-division and use. It is necessary to respect the fact that this was a period shortly after the end of the Second World War and some models that would have analysed the processes being played out in individual economies simply did not exist. The macro-economic model was conceived so that it required for the needs of the practical application two series (time sequences) of macro-economic data, relating to the banking sector's activities and foreign trade activities. On the other hand, the model was oriented on the fundamental, key macro-economic variable, which directly depended on public power, i.e. the government, and primarily on its national economic policy, which it developed and realised. This variable was the creation of internal loans, which was seen as absolutely essential for correcting and solving balance-of-payments problems. Of these statistical discrepancies it was known, they were mitigated, but for many member countries and especially for developing countries the possibility of compiling a similar simple empirical model that would enable the study and analysis of the results of national economic policy was very problematic.

The monetary model and its structure

By means of the model it was possible to examine the effects on the creation of the gross national product and the balance of payments depending on two exogenous variables of primary significance in any market economy: autonomous changes of export operations and the creation of internal bank loans, or expressed in monetary terms autonomous external and internal growths in the money supply in a given national economy. The model therefore had to explicitly include the function of the demand for money. Factographic data in a large number of countries indicated that the simplest form of this function (working from the hypothesis that the demand for money is in a proportional relationship to the gross national product or the national income) may provide an approximate, but nonetheless reliable variable. A second equation describes the behaviour of the function of the demand for imports.

In basic terms this model may be expressed with the help of the following system of equations:

$$dMO = kdY \quad (1)$$

where

dMO – the absolute change in the money supply in the national economy,

dY – the absolute change in the gross national product, k – an inverse variable expressing the speed of money circulation in the national economy.

Y/MO , or $k = MO/Y$, where (k) in this case expresses the time for which the money (a certain part of it) is held at the treasury and thus does not circulate.

The economic interpretation of this equation is then as follows: the absolute change (growth) in the money supply is equal to the absolute change (growth) in the gross national product, which is multiplied by the variable (k).

$$M = mY \quad (2)$$

where

M – the demand for imports,

Y – the gross national product,

m – the marginal propensity to imports, i.e. M/Y .

The economic interpretation of this equation is then as follows: the demand for imports is a function of the gross



national product, which is multiplied by the marginal propensity to imports.

$$dMO = dR + dD \quad (3)$$

where

dMO – the absolute change in the demand for money,
 dR – the absolute change in the external (foreign) reserves of the national economy,

dD – the absolute change in the internal (domestic) loans provided by the banking sector.

The economic interpretation of this relationship is easy; the sum of dR and dD must correspond to the absolute change in the demand for money.

$$dR = X - M + K \quad (4)$$

where

dR – expresses the absolute change in the external (foreign) reserves of the national economy, which equals the volume of export operations X, decreased by the volume of import operations M, and this balance is increased by the net capital inputs of the non-banking sector K.

These four equations represent a model creating the logical basis of the IMF programming, in practice known by the name of financial programming.

From the presented equations it is clear that this is a dynamic model, because it describes and characterises concurrently the gross national product and its changes. Solutions to this model are provided by variables (gross national product and development of foreign reserves) as average equilibrate variables, for present and past periods they provide data on exports, capital inputs of the non-banking sector and changes in domestic loans to the banking sector.

In identifying the equations it is necessary to emphasise that the IMF permanently verified the validity of these equations and the quality of the results provided by them. A further extraordinarily interesting and current fact is that the model combines Keynesian (fiscal) and monetaristic elements. It combines them not by chance, but intentionally. The model is thus concurrently both Keynesian and monetaristic. The Keynesian elements are represented by the multiplier, the marginal propensity to expenditure equal to 1 and the monetaristic elements are represented by the speed of money in circulation. In contrast to other models constructed later it expresses not only weighted values of endogenous variables, but at the same time indicates the direction leading to the equilibrate final variables.

We encounter the same issues in conceiving a national economic policy in general and especially in transforming economies, since in the theoretical and practical field both supply- and demand-focused national economic policies exist. These types of national economic poli-

cies are commonly known as supply-side economics and demand management. Practical experience leads to a general recognition that a strict orientation on one or another type of national economic policy need not necessarily lead to the expected positive results. Many practitioners of national economic policies from developed countries are inclined to the opinion that an optimal national economic policy may be one which functionally, rationally and effectively combines the elements of supply-side economics and demand management; a policy mix. A prerequisite of such a type of national economic policy is to know and manage the existing scenario of supply- and demand-focused national economic policies. Elaborating a generally valid scenario for a national economic policy mix has no sense, since the combination of supply- and demand-side elements of the national economic policy must reflect and respect the specific characteristics of individual economies, which may be and as a rule also are various. The monetary model, which we described, is notable proof of this.

The IMF monetary model is simple, something which for of some experts can represent a certain negative feature, although at the same time experts argue that an indisputable advantage in the practical application of this model is its simplicity.

Some member states of the IMF, such as France and Belgium, have prepared special models for their own needs with an incomparably broader scope and dimension. In France in the mid Seventies the INSEE (Institut National de la Statistique et des Études Économiques) elaborated for the needs of the indicative planning model FIFI (Physical-Financial medium-term projection model). This model contains 1 600 equations, 3 500 parameters and exogenous variables and 4 600 programming instructions. Similarly, also in Belgium at the end of the Eighties the central planning authority elaborated a model of a macrosectoral analysis of the Belgian economy. The model is econometric, simulatory, medium-term; its essential aim is the analysis and projection of the development of the macroeconomic structure of the Belgian economy. It contains 1 348 variables, of which 200 are exogenous variables, 1 150 econometric equations, of which 315 are equations characterising the behaviour of the economic system¹. Both in the first and second case it may be said that these concerned extensive, complex and dynamic models. They were prepared for the needs of indicative planning realised in France and Belgium. If we look at both models, comparing them

¹ The data on this model come from the study "The Instrument of Macrosectoral Analysis of the Belgian Economy", which is a component of the complex model, known by the abbreviation HERMES (Harmonised European Research for Macrosectoral and Energy Systems).



in terms of scope with the IMF model, we are struck by the extraordinary simplicity of the IMF model. To speak of any comparison of the models is impossible, since their functions and orientations are fundamentally divergent.

Further development of the IMF model

Although the IMF's credit contracts with member states are still based on the stated monetary model, over the course of years these contracts have been expanded and deepened. For example, a variable, or the item "the creation of loans" was sub-divided into loans for the private sector (these loans have been generally supported) and loans provided to the state (these loans have not been supported, or have been supported only in exceptional cases and following the provision of the respective guarantees). Diversification continued further. The IMF began to express its preferences as to certain variables and items. For example, certain taxes and fees considered as acceptable received preference over other taxes and fees. Preferences related also to various categories of expenditure, in consequence of which expenditures were preferentially directed towards social purposes, on basic and to a certain extent also higher education; whereas loans for military purposes and for other unproductive aims no longer received preference.

Besides this, the IMF incorporated into its model further specifications of a non-monetary character relying on a great diversity and variety of economic measures often concerning fields of competence of the World Bank.

Many programmes conceived and supported by the IMF in recent years have been reminiscent of important conventions concerning the structural adaptation of the individual economies of member countries, price liberalisation, foreign trade, labour market deregulation, privatisation processes, etc. Since none of the mentioned aspects can be easily expressed in a system of econometric equations a way of incorporating them directly into the model was not sought. Financial programming and the simple model still continued to represent a natural framework for concluding contracts and agreements between the IMF and member countries.

Since the content and complexity of processes has permanently grown, further modifications of the model were considered and subsequently realised. These modifications were made to take into account terms of trade, economic growth from a medium-term aspect and the regulating of inflationary processes and tendencies.

Terms of trade. – shortly following the end of the Second World War the model reflected the two basic characteristics of the world economy of the period: the permanence of trade parities and the permanently growing tendency of world demand. Problems concerning balances of payments led individual member countries towards

the IMF challenge, from which as a rule resulted sharp inputs of surplus domestic demand, which it was possible to prevent through financial restraint. When the pressure caused by the expansion did not abate, but rather persisted and led to a rise in the price level at home in comparison with the level of prices abroad, the compensating modification of the parity began to appear as inevitable. Apart from this, because chronic inflation concerned only a limited number of countries, it was essential to incorporate (reflect) in programmes supported by the IMF a normal rate (dose) of devaluation compensation. Respecting the fact that the world economy at that time found itself on the road to full employment in the meaning of a market economy, member countries were not at all encouraged (in contrast to the Thirties, i.e. from the period of the Great Depression of the world economy), but nevertheless undertook currency devaluation. Because the system of parities fluctuated greatly and changed often, trade relations came to receive more and more attention in IMF agreements with member countries, without requiring a certain degree of reworking of the original monetary model. Exports and export operations now represented exogenous variables. It was relatively simple to reflect (add) trade relations into import equations. Certainly, it was necessary to take account of the direct impacts of the changes in trade relations on prices, production, public finances and capital movements. However, it was not possible to develop a complete system of structural equations that would relate to all IMF member states. Also the incorporation of trade relations as a variable had a unique effect – to complicate, but to not transform iterative processes. Likewise, it enabled the explicit assessment of two economic aims: to maintain a balanced (healthy) balance of payments in the national economy and to utilise efficiently the economy's productive capacities (potentials).

In order to achieve the state where trade relations remain sufficiently competitive throughout the life of IMF agreements with member countries, the IMF incorporated sufficiently in them a clause on the minimum level of net international reserves that the individual countries must maintain to be continually able to issue securities, since it was assumed that a member state would use trade relations in order to be able to respect the clause on the mentioned minimum. The IMF in this context expected the following solution: to determine an upper limit to the expansion of the internal assets of the central bank in order that the balance of payments is acceptable (the flow concept), and the designation of a lower limit (the stock concept) of external assets in order for it to be possible to achieve a satisfactory (acceptable) level of external reserves. Concurrently, it was necessary to make sure that the central bank did not intervene extraordinarily, with the aim of standing up to market pressures, attempting to reduce the effect of trade relations.



Trade relations are currently an extraordinarily important economic factor that not indirectly, but directly influences the efficiency of export and import operations and thereby also the effectiveness of foreign trade as a whole. In a market economy a certain process exists and is under way that may be described as an international transfer, the transmission of economic disturbances, which are ranked as follows: crisis, depression, economic stagnation, inflationary processes and in the end the already-mentioned trade relations.

In 1978 at an international conference in Washington Kenen and Tyson delivered an introductory paper entitled the International Transmission of Disturbances (meaning economic): a Framework for Comparative Analysis. An adverse change in trade relations as an economic disturbance in comparison with other economic disturbances has certain specifics, lying in the fact that this disturbance and its impact on the economy is direct, potentially of significant scope, and this primarily depending on the size and speed of the change. Changes in trade relations in relation to the economy have a parametric character, and it is thus necessary in order that the economy adapts appropriately in line with internal links.

What should be the reaction of business subjects in the conditions of a market economy? In consequence of an adverse change in trade relations (regarding the ratio of export and import prices) it is necessary to increase the volume of exports necessary to offset the given (original) import, or reduce the import, which may be offset by a given, original volume of export. The resultant loss of the used gross domestic product is then dependent on the size of the change in trade relations, as well as on the dependence of the national economy on foreign trade. Therefore, it may be justified to expect that the impact of an adverse change in trade relations will be greater in an economy that is more engaged in external markets.

Here, too, there may be countervailing factors at work. If an economy has free production capacity, it will not be a problem to ensure additional production for export. If, however, an economy does not have free production capacity, it must reduce imports. In such a situation it is necessary to analyse in detail the commodity structure of imports. If in imports complementary products prevail over substitute products, the possibilities to reduce the import will be substantially fewer than in the opposite case. It may with some justification be predicted that a market economy determined by supply-side economics will have free production capacity, and therefore ensuring additional production for export will be substantially easier.

An adverse change in trade relations as an external disturbance may not be interpreted as an obstacle to economic development and economic growth. It may be interpreted as the potential cause of a disequilibrate

situation, which the economy is passing through in its trajectory of economic growth. In this connection it is necessary to emphasise that unless the adverse change in trade relations is at least partially balanced by foreign credit operations, it will directly influence real flows of goods by the fact that it will reduce import availability and induce the need for export expansion. If we think back to the words of Gunnar Myrdal, that "the world of foreign trade is a world of constant change", then this statement applies particularly to expectations of further development in trade relations as regards intensity and direction.

Problems of economic growth from the medium-term aspect. – It is necessary to state that the strong expansionary tendencies, which were characteristic for the third quarter of the 20th century, were squandered. In consequence of this the IMF and individual member countries were more and more dissatisfied with the effects of IMF programmes on the prospects for economic growth of countries borrowing funds from the IMF. In this context economic growth had two important features:

- growth in the real gross domestic product in the country, specifically when it was caused by a shock, in consequence of the use of control and current production capacities, potentials,
- growth in production from the medium-term, as well as long-term aspect, which it was possible to achieve precisely through an expansion in the mentioned capacities.

As regards this second dimension, it is curious that the World Bank as well as the IMF used economic growth models of a Harrod-Domar type (invented at the end of the Forties) for macro-economic projections of a medium-term nature, which essentially ignore, or do not take into consideration what the IMF and World Bank consider as the dominant factors of economic growth in general and specifically in developing countries. This concerns an orientation on foreign relations, prices based on reality, privatisation processes, reform of the financial sector, monetary policy and last but not least the behaviour of the state, public power in the economy as a whole.

The IMF did not develop its model further; it did however endeavour to achieve, as a goal, stability in economic growth, focusing itself on assessing the individual components of the model from the aspect of their potential contribution to economic growth. In the first stage the creation of a maximum limit for the provision of loans to the state guaranteed an adequate supply of credit for the private sector. Further measures concerning taxes and expenditures showed that the IMF had an interest that the measures agreed by the IMF with member countries concerning the stabilisation of economic growth from the short-term aspect contributed to economic growth also from the medium-term aspect.



Understandably, issues of economic growth came to be permanently at the forefront of the IMF's interests. Evidence of this was also the statement by the now former managing director of the IMF Michel Camdessus before the United Nations Economic and Social Council on 11 June 1990 in Geneva. He focused primarily on economic growth in the world, with special regard to economic growth in developing countries. He emphasised that the IMF's priority is economic growth. By means of economic growth it is possible to correct imbalances in the balance of payments. However, he concurrently strictly emphasised that when speaking of economic growth, he had in mind economic growth of a high quality, and not false notions of economic growth. False notions of economic growth are, according to Camdessus, the attaining of economic growth at "any price" and financing it through inflation and permanently burdening the state with debt; economic growth only for privileged layers of society; or achieving economic growth through the permanent depredation of existing natural resources and the natural environment as a whole. The issue of economic growth is not merely economic, but also a social and environmental issue. On the basis of these facts Camdessus defined high quality economic growth as growth that is primarily permanent and measured, resistant to external economic shocks, accompanied by external and internal financial stability, dynamic, permanently creating conditions for effective economic development in the future (through investing in human capital), such as growth that cares for the poor, weak and vulnerable groups of the population, protects the atmosphere, forests, rivers, seas and essentially everything that creates and represents the common property of the people. Put briefly, high quality economic growth is characterised by the realisation of a complex of economic, social and environmental targets; to neglect some of the complex of these aims is to neglect the aims en block.

From the above it is clear that economic growth understood in this way must be connected with the realisation of structural changes, with the efficient utilisation of resources and overcoming potential barriers, such as defects in the tax system, concerning prices, interest rates, trade relations. It must support the development of competition, private initiative and significantly reduce administrative interventions and corruption.

Fears of inflation and inflationary processes. – The limits set for the creation of loans can guarantee a minimum development of balances of payments, but cannot prevent certain inversion processes. When a target relating specifically to reserves was exceeded, an expansion in the money supply, stronger than the IMF programme originally forecast, was often the result. This fact was not seen as a cause for concern, indeed quite the oppo-

site, up until the Seventies it was seen as a desirable development, which could cause the earlier repayment of loans provided by the IMF. Although what happened in the Eighties and, subsequently in the Nineties clearly indicated that these excesses could have also lead to extraordinarily high rates of inflation similarly in member countries that in the Eighties began to be threatened by a crisis due to relatively high levels of debt, as well as in new IMF member countries -this concerned in particular Eastern European countries, countries of the Commonwealth of Independent States and the Baltics. In all these new countries control, or better said macro-economic regulation of inflationary processes, became a significant priority and took precedence over the solution of potential balance-of-payments problems. The IMF had to reflect this target in its model. This development necessitated changes in three directions:

– The flexibility of international capital movements (flows) did not admit this variable to be considered as exogenous. It was essential to take into account and respect its dependence, at least partial, with regard to the internal interest rate and to anticipated trade relations. This modification presented a certain problem.

– It was necessary to take account of the fact that the internal interest rate, which did not figure in the simple model, may be strongly influenced (burdened) by the extent of the public finance deficit, financed by the banking system or newly-emerging capital market.

– Trade relations had to figure in the model in question not only due to the fact that they influence trade flows, but also due to inflation expectations. Governments responsible for realising national economic policy, an organic component of which is understandably also monetary policy, can in essence choose between two alternatives: trade relations will be floating, in order that the inflationary impact on the surplus supply of "foreign-origin money" may be neutralised, or trade relations will be fixed (or respectively crawling), in order that there is created a certain psychological catch-point (anchor) for the price level with regard to the risk of a certain loss of competitiveness, when inflation in the national economy is constant, or changes only minimally.

From the purely formal aspect, the insertion of the stated three elements in the model did not present any special difficulties; the problem however lay in the fact that the respective data on the variables and coefficients that the model required was not available.

Problems of macroeconomic regulation of inflationary processes and tendencies in a market economy even with regard to the rate of unemployment are essentially known and used in practice, for example, the Phillip's Curve and its various modified types. In this connection we want to make a reference to a certain less well-known and consequently less used concept of

macro-economic regulation of the rates of inflation and unemployment. This concerns the NAIRU project (Non-Accelerating Inflation Rate of Unemployment), quotas of unemployment that do not lead to accelerating inflation.

The basic assumptions of this project are as follows:

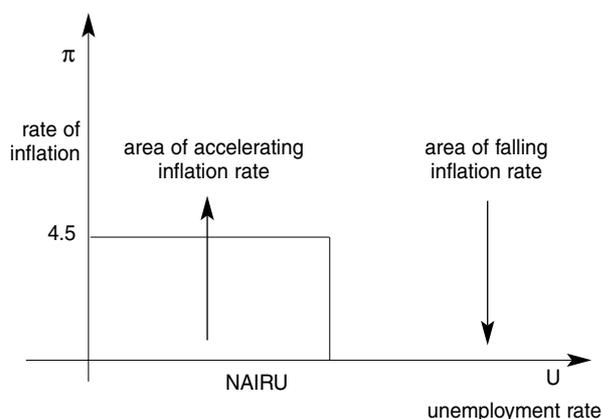
In a national economy at a certain time moment there exists the variable NAIRU, which represents a certain definite rate of unemployment, that moves in conjunction with a stable rate of inflation upwards or downwards. If the government at this base point by means of monetary or fiscal measures attempts to influence aggregate demand, the following situations can occur:

a) measures stimulating demand can completely suppress the rate of unemployment to a level lying below the NAIRU point, in consequence of which the national economy moves into a field in which the rate of inflation accelerates;

b) measures reducing demand have precisely the opposite effect, shifting the real rate of unemployment above the NAIRU point, pushing the national economy in the opposite direction into a field in which the rate of inflation falls.

Thus no Phillip's Curve type relationship exists between inflation and unemployment. In the case of deviations from the NAIRU point it is not at all possible to determine any functional relationship between inflation and unemployment.

The following diagram presents the above argument:



The NAIRU concept is based on the assumption that aggregate demand is a cause of a movement in employment and inflation. If, for example, the central bank at a certain point gives preference to taking care of the rate of inflation (as required by monetarists) and realises measures reducing demand (for example, by means of limiting the amount of money in circulation), then this disruption in demand has the consequence that the inflation rate falls, whereas the rate of unemployment rises above the NAIRU point.

If, however, counter to this, the government effects a demand expansion policy (as called for by Keynesians) and reduces the rate of unemployment (for example by means of greater state expenditures), the rate of unemployment will fall, but the rate of inflation will grow. According to this, NAIRU represents for the government and the central bank a restriction, which significantly limits the effectiveness of economic instruments used.

The NAIRU project did not remain simply at the theoretical level, but was applied in the realisation of national economic policy in several rich countries, for example in France, Belgium and Italy. Empirical research has shown that the NAIRU variable grows slightly with the simple passage of time. The causes of this growth are as a rule exogenous factors, for example supply-side shocks. A rise in the NAIRU variable however means that a stable rate of inflation leads to a higher rate of unemployment, or conversely, a stable rate of unemployment leads to a higher rate of inflation. If the real rate of unemployment exceeds the NAIRU variable, this can be caused by an orientation of monetary and fiscal policy that is strongly restrictive, limiting demand, and is focused on maintaining the rate of inflation at the original level. This success in the field of prices must be paid for by a higher rate of unemployment.

In conclusion to this review we will attempt to compare NAIRU with the concept of the natural rate of unemployment in the sense espoused by monetarists:

- A rate of unemployment stable in terms of inflation is not identical with the natural rate of unemployment in the Friedman sense, although in their content they may be similar. A rate of unemployment stable in terms of inflation represents a limit variable to which the rate of unemployment may be decreased without being connected with an accelerating rate of inflation.

- It can be very difficult to quantify the natural rate of unemployment, since primarily it describes structural or frictional unemployment.

- A further significant difference is in terms of definition: the natural rate of unemployment is reached when the expected and real rate of inflation are identical; whereas the rate of unemployment stable in terms of inflation is reached at a constant real rate of inflation.

From the above it ensues that the rate of inflation and the rate of unemployment in the conditions of a socio-market economy cannot be left to themselves, but must be the subject of effective and efficient macro-economic regulation. Ways how to realise this macro-economic regulation obviously exist and are used in advanced market economies. The importance of the NAIRU concept grows continually. The causes of this situation are, among others, also negative supply-side shocks, which do not operate permanently, but are of a transitional or temporal nature.