Azerbaijan's Economic Modeling Syndrome

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The main subject of discussion for evaluators of Azerbaijan's economic policy is to what extent it reflects real challenges, and whether medium- and long-term goals are properly defined. Opponents accuse the government of not relying on research in setting economic priorities, for example, of making poor use of economic modeling capabilities. Since the economic modeling tends to be in the background, there is not much detailed information about its quality and scope, even among experts. In this regard, the actual state and capabilities of economic modeling in the country are of interest primarily to economists themselves. But at what level are efforts the government expends for economic modeling, what distance has it covered since independence more than 30 years ago, and what is the contribution of economic models created now to policy, and finally, what are the obstacles to the qualitative growth of the modeling process? This article will seek to answer these and other questions.

What is an economic model and why is it needed?

Although the practice of model building in solving economic problems has its origins as early as the 18th century and is closely linked with Francis Kane, economic models in the full sense matured in the middle of the last century. Examples include the Cobb-Douglas Production Function, the Solow Growth Model and the Romer Model. The need for building economic models stems from the specificity of economics as a social science. In economics, unlike, for example, in physics, the phenomena occurring in nature cannot be measured and studied in a laboratory. For economics, the social environment itself is the laboratory, and the number of variables is much greater. Therefore, in this case, one of the main tools in

economics is to assess the impact of economic variables in relation to each other and to results, and to build a model for predicting economic development. An economic model is a simplified mathematical structure designed to describe complex processes. Even a model that does not fully justify itself in another environment is useful for predicting economic scenarios.

In the modern era, economic models as a rule allow us to forecast the macroeconomy, to predict the rate of economic growth, to identify governments' economic policy priorities, to estimate financial and social indicators, and to track the variability of many other economic indicators. Existing economic models can be divided into 3 groups: i) Stochastic models usually serve to measure economic change within a reasonable time frame using statistical data. Econometric models of this type allow us to hypothetically trace the economy as a whole and the dynamics of its individual segment; (ii) Non-stochastic models are built mainly on qualitative parameters. Social choice theory can serve as an example; (iii) Qualitative models, as the name implies, serve to track qualitative variability. The scenario method may be an example of this.

While no alternatives to models have been found, numerous economic models discovered so far continue to be applied in one form or another. Even the experimental economic approach, which has recently come into vogue, does not diminish the value of models. It is possible to present, as illustrative of the experimental economics approach, examples from the 2019 [Nobel Memorial Prize](#) in Economic Sciences awarded to Abhijit Banerjee, Esther Duflo and Michael Kremer's experimental approach, a method known as *Randomized Controlled Trials (RCTs)*. But while this approach is more useful at the micro level or for evaluating investments (social projects), it is very difficult to apply it to macroeconomics. And most importantly, models suitable for economic growth can by no means be measured and predicted by the above-mentioned method.

So, we are still obliged to work with economic models. In addition, today's economies, which change dramatically and are generally growing, especially due to new technologies, are more in need of modeling than ever before.

Particular modeling challenges

The more important the simulation (modeling), the more difficult it is to apply it and get reliable results. Even the best databases (perfect databases do not exist) do not guarantee that a particular model will produce the right result. In contrast to the laws of physics, regularity in economics is relative. For example, factors contributing to economic growth or decline in the US are quite different from factors in another country, so a statistical database that has the same essence may produce different results in different places. But even this is not a serious obstacle to modeling. Broadly speaking, models serve to display a trend, not just to produce an accurate statistical result.

Factors important for modeling can be divided into 3 groups.

The data factor is extremely important in modeling. The accuracy of the statistical database included in it is a key condition for a model to give the right result. It is from this database that modelers derive their results, using appropriate algorithms. Naturally, the wrong database will never give the right results.

The data factor is not a technical issue at all. In other words, the reliability of the data serving any model is related to the existing *institutional environment*, not to its calculation methodology. In economic spaces where the rule of law is absent, the statistical database, as a rule, is accompanied by serious deficiencies because the relevant authorities may distort or politicize the data in their corporate interests. In such a case, of course, it is impossible to talk about reliable statistics and a model that can produce realistic results.

In modeling, the third factor *is processing*, which is more related to knowledge and skills. As a rule, in developing countries, modelers are the weakest link in the economic team. Training well-qualified modelers is costly; it requires a relatively long time, training, and experience. Modern methods of data management and econometrics are developing so rapidly that it has become very difficult to prepare high staff potential quickly. In turn, the monopolization of this profession by global financial institutions (IMF, World Bank) makes the training of local personnel even more inaccessible. In fact, today the IMF and World Bank themselves satisfy local needs and have, so to say, introduced this issue. On the one hand, the IMF and World Bank's funding of such personnel significantly expands the range of knowledge and skills of these specialists, but it also increases the need for local experts because the evaluation of a foreign expert, who does not know the local context, casts doubt on the workability of even the most well-built model result.

Macroeconomic features of Azerbaijan as an oil-producing nation

Azerbaijan like other post-Soviet countries is among those who started their history of economic modeling relatively late. In the 1990s, one of the areas of cooperation with international financial institutions (IFIs) was precisely the experience of building economic models for the country. But in this context, the main goal was to improve the statistical database. It was thanks to cooperation with IFIs that helped bring statistical reporting nearly in line with international standards. But modeling receded into the background. The low interest in models was for several reasons. During the oil boom of the 2000s, macroeconomic forecasting and a long-term view of economic development in this context were not popular. On the other hand, the Ministry of Economy, which is more tailored to work on economic modeling, took almost no serious steps to make modeling a priority. Finally, there hasn't been a focused effort to build a team of modelers. Because of this, the

business of economic forecasting has slowed down greatly and is now far below the desired level.

In its own turn, another institution—the Central Bank—did a considerable amount of work on the construction of econometric models. A special macroeconomic analytical body established in the bank began to build general macroeconomic models along with those, which are important for adjusting the structure of monetary policy. True, at present, the pace of this work has slowed relatively, yet practice showed that using economic modeling as an important tool in solving an economic problem makes it possible to build appropriate capacity and suggest a specific product.

At present, the Ministry of Economy is working quite steadily in this direction. Along with the previously functioning macroeconomic forecasting team, a new economic statistics team is operating, which should serve to closely integrate the statistical database with modeling and demonstrate a more rational approach in this area. In the recent period, within the framework of cooperation with international institutions, macroeconomic forecasting has been significantly improved in this ministry, and a number of models are continuously being built. An example of this is the calculation of inflation expectations and a number of other models. Another institution, the Ministry of Labor and Social Protection of the Population, has been seeking to build models focused on the social sphere for several years, and now it builds models of a sectoral nature as well.

At the same time, the Ministry of Finance and the State Oil Fund (SOFAZ), do not yet consider economic modeling a priority. Although the role of public finance in economic growth is generally high, in resource-dependent countries such as Azerbaijan, one of the main objectives should be to measure the relationship of fiscal constraint or fiscal deficit (surplus) to economic growth.

For Azerbaijan, the volatility of current and capital expenditures is essential for GDP growth in terms of measuring the multiplier effect of public expenditures on GDP. Taking into account that, as a rule, the government achieves a balanced budget by increasing capital budget expenditures amid positive external shocks (such as when oil price on the world market is higher than the forecast), and trimming them amid negative shocks (the opposite situation). However, it is very difficult to achieve sustainable economic growth under such an approach, as investments are at the core of economic growth. Based on the above we can say that models related to public finance are of great importance for forecasting and ensuring sustainable economic growth.

Adaptation of the economic growth model to the existing macroeconomic environment, that is, to oil prices, which are important for Azerbaijan as an oil-producing country, should push the government as a whole, not only individual structures, to build appropriate models as a priority. Given the high dependence of the state budget and macroeconomic equilibrium as a whole on these prices, these models should be compiled on a regular basis, even by individual sectoral bodies.

Obstacles to the promotion of economic modeling in Azerbaijan

Economic models both enable and require a long-term vision. In this regard, building them depends on the strategic vision of the government. In other words, the economic strategy of the government, its priorities in the medium and long term should be determined based on the results of economic models. The main strategic documents of recent years—the [Strategic Road Map](), Azerbaijan 2030: [National Priorities]() for Socio-Economic Development and the objectives and targets of the [Strategy]() for Socio-Economic Development in 2022-2026 of the Republic of Azerbaijan—should have reflected precisely the results of economic models. It is difficult to prove or deny that the priorities and targets reflected in the strategic documents

are based precisely on economic models. But the reality is that economic modeling must be greatly strengthened. This requires connected and continuous activity in at least three *directions*.

In addition to the fact that modeling is the work of individual line ministries (in other countries, they usually model their segments and form their policies on the basis of models), it can be *one of the top priorities of the government as a whole*. If the Ministry of Labor and Social Protection of the Population wants to prove or deny whether the dynamics of the average monthly salary are correlated with the level of inflation, it is not only its sectoral interest, but also an integral part of the government's action plan as a whole. The result will serve not only individual social indicators, but, first of all, social economic development as a whole.

Of course, predicting economic growth is essentially the task of the Ministry of Economy, but the connection with other parallel models and ultimately obtaining a verified result would create a synergistic effect. Such an approach would also contribute to a more relevant formulation of strategic documents and the right choice of goals in the medium and long term. In this regard, the government could significantly increase the value of this work by declaring modeling as its priority.

The question of data, as always, remains relevant. The common observation of outsiders is that the data from the State Statistical Committee (SSC) do not reflect reality, and this happens because statistical data are sometimes politicized, and methodology and competence do not fully meet international standards. In reality, however, the problem is different. The committee's competence is a technical issue in the broadest sense, and with the government's current capacity, it is possible to alleviate the problem in a short time. The available capacity is estimated to be quite high. From this point of view, it would be wrong to look for a problem here.

If economic modeling activities become a government priority, it is possible to involve existing and potential future personnel.

As paradoxical as it may sound, the problem of the quality of statistical data in the country today is more related to public administration. The information provided by relevant ministries and the scenarios they develop should fully reflect reality. In practice, however, the information provided by them and other bodies to both the SSC and the Ministry of Economy has inaccuracies. This is a problem because its data are the main inputs into any economic model, which would ultimately contribute to the correct determination of the rate of economic growth. Thus, the greater the importance of data for the improvement of modeling, the more important is the improvement of the public management system for the reliability of the data.

As for *increasing knowledge and skills*, purposeful and continuous work should be done in this direction. The recent development of data-driven learning and teaching opportunities gives hope for the improvement of this field. The organization of MIT's MicroMasters program in *Data, Economics and Development Policy* and Azerbaijan's organized participation in the program not only raise these hopes, but also suggest real potential to achieve the above-mentioned goals.