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FORECASTING AND MODELLING OF SOCIAL ECONOMY: CHALLENGES IN CRISIS CONDITIONS

The author in this article describes the current theoretical approaches to the forecasting and challenges of modelling modern social-economic systems. The innovation factor is considered to be a dominant factor of the stable development taking into account the restrictions in inner and outer environment of business and corporate entities. The author also analyze the factors that lead to the delay in policy reaction, including the lack of timely information about the severity of this crisis, the inadequacy in the methodology economic analysis, particularly in the analysis of the linkages between the financial sector and the real economy. This work shows that the forecasting and planning are two interrelated procedures, aimed at development and implementation of the scientifically grounded basis for modelling of social-economic systems of macro- and micro-levels.

Key words: forecasting, modelling, social-economic system, methodology economic analysis, social economy.

Мульска О. П. ПРОГНОЗУВАННЯ І МОДЕЛЮВАННЯ СОЦІАЛЬНОЇ ЕКОНОМІКИ: ВИКЛИКИ В УМОВАХ КРИЗИ

У статті розглянуто сучасні теоретичні підходи до прогнозування соціальної економіки та здійснена спроба дослідити виклики, які виникають під час моделювання економічних процесів в умовах мінливого середовища. Значну увагу автор приділив аналізу факторів, які призводять до формування нових структурних перешкод у політиці реагування, зокрема відсутність своєчасної інформації про причини кризи, неповна методологічна база аналізу, відсутність взаємозв'язку між фінансовим сектором і реальною економіка. Доведено, що інноваційний фактор залишається домінуючим фактором сталого розвитку економіки з урахуванням обмежень як у внутрішньому, так і у зовнішньому середовищі. У статті доведено, що прогнозування і планування є дві взаємозалежні процедури, спрямовані на розробку і реалізацію науково обґрунтованої бази для моделювання соціально-економічних систем на макро- і мікрорівнях.

Ключові слова: прогнозування, моделювання, соціально-економічна система, методологія економічного аналізу, соціальна економіка.

Challenges and threats that arise in the current economic state of the country necessitate prediction on objective grounds at least some scenarios of what could happen. The need to increase the effectiveness and scientific validity of economic decisions in our time is becoming increasingly important at all levels of government. The first attempts to obtain objective knowledge about the future primarily associated with the development of new and the use of traditional methods of mathematics and statistics. As a result, powerful method is created; methods of linear and nonlinear regression analysis as one-dimensional and multidimensional; methods of simulation; econometric models and others.

Over the last years in the literature is observed a kind of "boom" scientific subjects related to the research of modelling and forecasting economic processes. In publications of Ukrainian scientists, much attention is paid to socio-economic factors influencing the social economy (Libanova, E. M., Malinovska, A. A., Kuzyk, B.N., Kushlin, V.I., Yakovets, Yu.V. Sadovnichiy, V.A., Akaev, A.A., Korotaev, A.V. Dudin, M.N., Lyasnikov, N.V. etc.), foreign scientists like Hymans, Saul H., Joan P. Crary, and Janet C. Wolfe. Howrey, E. Philip, Saul H. Hymans, and Michael R. Donihue. However, there are no accepted methods of forecasting socio-economic processes and modelling methodology in the social economy in crisis. The pursuit of science is significantly complicated by lack of information support in this sphere, the lack of concrete developments and experience of implementation of such research in Ukraine. As scholars and practitioners aware of the complex mechanism of the formation of a unified methodology for modelling and forecasting, however, without having a clear idea about the best technique of study of this problem.

The aim of research is to deepen and systematize the contemporary concepts of modelling and forecasting.

Social and economic models contain hundreds, sometimes thousands of equations. Assembling these equations is the process time-consuming and complex. But this is the only way to check and decision-making close to the optimum, the action "on a whim" or "let's see what happens"? Economic experiments over the country without any confidence in the result we have a trend fraught with its irreversible consequences. The main purpose of such models is to answer the question: what is the quantitative impact will the weekend rates (aggregate demand and aggregate supply, prices, national income, interest rates, exchange rates, etc.). Changes controlled data (fiscal, monetary policy, taxes, government spending, money supply, investment capital, etc.). Therefore the problem of the development of quantitative modelling techniques socio-economic development to predict possible scenarios of its development is very relevant.

Analysis of existing methodological approaches will find that none of the proposed approach implements a systematic approach. In any model did not determined whether inflation or real financial phenomenon. In no model estimated potential GDP and the rate of utilization of production facilities and the consequent economic efficiency. Production function suppleness calculated by statistical methods that initially contain errors. Approximation macroeconomic relationships by linear regression equations did not seem to reflect the real economic dynamics in a transitional economy, which is the economy of Ukraine. Correlation and regression analysis reveals relationships macro pattern averaged only and does not provide strict and exact match in each case, and there is only the average line.

Methodological specificity systematic approach to building a macroeconomic model determined that this approach focuses on research integrity disclosure facility and the mechanisms it provides, to identify various types of complex object relationships and bringing them into a single theoretical picture. The systems approach is based on the principle of the integrity of the research object, the study of its properties as a whole, unified system.

Based on this principle, the model of macroeconomic Ukraine based on the interaction of aggregate demand (Keynesian approach) and aggregate supply (classical approach) in Keynesian interpretation, considering that the national economy as a whole with the assumption that prices affect economic activity. This interaction determines the overall economic balance in the country, as relationships into account all economic agents (households, businesses, states, abroad) at all aggregated markets (goods and services, money, labour and securities) [6]. All incoming and outgoing model parameters are interrelated and change any of the input leads to a change in all the others.

The economical model is characterized by the following features at this stage:

1. Dynamic (without lags or delays between inputs and outputs (excluding the impact of the delay fixed capital investment to increase production capital));

2. Continuous;

3. Determined (with the exception of some exogenous variables for which no model links)-nonlinear;

4. Analytical dates [7, p.185].

The model makes it possible to answer two main questions:

1. What if? That is, how to change the macro output (GDP growth rate, inflation, unemployment), when changing tools of monetary and fiscal policy.

2. What should be done? Or how should change the parameters controlled within specified limits at the entrance to ensure specified performance output.

The main distinctive features of the model are as follows:

- Mathematical calculation (not trend extrapolation) integral indicator of inflation in the economy (the GDP deflator forward from the condition of the overall economic equilibrium);

- Calculating potential GDP as a criterion for assessing the state of the economy, optimal supply and demand of labour, natural rate of unemployment;

- Calculation of economic efficiency (or efficiency) for country activities and regions);

- Calculating the impact of changes in macro regulatory tools by using monetary and fiscal policy on future periods, which are essential for decision making when developing strategies for economic development;

- Synthesis control actions to ensure that the set of indicators of economic growth and inflation (targeting macro);

- Calculating of output and gross value added growth rates, inflation rates and other indicators in industry, agriculture and services;

- Forecasting the CPI based inflation indices in industry, agriculture and services.

- Identification and forecasting of socio-economic development;

- Calculation of quantitative indicators and growth of the shadow economy [2, p. 34].

Thus, a systematic approach to building macroeconomic models allow to reflect the economic impact of exogenous impulses that occur when changing the conditions of production and handling of macroeconomic subjects. Thus changes of aggregate demand and aggregate supply are the result of interrelated processes at all multiplicative macroeconomic markets. This allows you to calculate the current cost-effectiveness of Ukraine's economy and its potential to develop an effective strategy for economic development.

Application of the approach to the main activities of the country (industry, agriculture, services, and construction) and all regions including enables to get the same output. The calculation of deflators of gross value added in industry, agriculture, services and construction can expect consumer inflation - the consumer price index.

The dynamics of social-economic development and the quality of its display on macro- and micro-levels is determined by innovativeness or objective existence or influence of the factor of science in expanded reproduction and constantly growing role of knowledge content of economic processes [3].

Innovations and innovativeness are considered today as the basic factors or meta-factors that provide the transformation of social-economic development peculiarities on macroeconomic and microeconomic levels. However we should not forget the fact that the traditional sector of national and world economy is still active in its development and the resistance to the implementation of innovations within the framework of business and corporate entities is still high. We cannot say that the resistance to innovations in traditional sector is the today's creation; according to some researchers the realization of the existence of an innovation resistance problem in the industrial production and in service sector can be referred to the early-middle XXth century. J. Schumpeter mentioned the fact that the chain of command and the staff of industrial production enterprises are not ready to the creation of innovations and usage of the results of their implementation [6]. The character of innovation resistance is mostly subjective-psychological, which can be seen on the level of individually taken business and corporate entities in their impossibility to create new combinations of production factors aimed at

maximizing of economic and other benefits and intensification of development.

The preserved specific character of the extensive development in traditional sector does not contribute to the growth of innovation activity on micro- and macro-economic levels. The main problem here is that the national development strategy was until recently built more on market than on fundamental growth promoting factors. We can state that the macro-economic model has two main development directions: inertial and innovative breakthrough.

These are the factors or the first-order parameters to the changes and transformations of which the second-order variables are adjusted [1, p. 260]. The first-order variables can be classified as the slow parameters as their change cannot be characterized as high space; in other case at reaching high paces of changes of one variable the formed connection with the other variables is violated. Structural changes which take place in this situation do not provide the system's acquiring new features, i.e. they do not provide the system evolving, but they do provide its entropy. To forecast the innovative development of small and big social-economic systems different methods and models are now used (Table 1).

Table 1.

Methods and models of forecasting innovative development of social-economic systems*

Designation of the model or method	Used factors/parameters
Mathematical macro-modelling	The model is mainly based on the resource factor, other factors are used to a lesser degree (labour, nation, technologies)
Foresight-technologies (technologies of future formation)	The method is mainly based on two factors / variables (technologies and resources)
Designation of the model or method	Used factors/parameters
Mathematical macro-modelling	The model is mainly based on the resource factor, other factors are used to a lesser degree (labour, nation, technologies)
Foresight-technologies (technologies of future formation)	The method is mainly based on two factors / variables (technologies and resources)
Global integral forecasting of the world dynamics	The method is based on the usage of three factors: nation, technologies, resources, the capital factor is excluded from the integral forecasting
Non-linear mathematical models, which describe the hierarchy of demographic, social-economic and political development	The modelling uses full linkage and interdependence of all the factors / variables: resources, nation, technologies, labour

* Source [1, p. 260-261]

We consider it necessary to study two models more detailed: global integral forecasting and non-linear mathematical models, which describe the hierarchy of development. The first of these two models was suggested by B.N. Kuzyk, V.I. Kushlin, and Yu.V. Yakovets [9].

The model uses two main approaches: genetic and normative.

These two approaches are mutually exclusive, moreover, these approaches are recommended for the practical use collectively. Genetic or exploratory approach is based on the tendencies (history and heritage) of an economic object development, the hypothesis are formed and conclusions on the specifics of the further genesis of the object are proved / rejected on the basis of emphasizing the stable tendencies. Normative or teleological approach is based o the search of results of directed impact on the social, economic and other processes which are to be forecast.

This approach the hypothesis of genetic character ("what is to be expected if...") transform into teleological hypothesis ("what efforts are to be made or what actions are to be made to get final results...") [9, p. 457]. The joint use of the above mentioned approaches allows to forecast not only the desired states of social-economic system taking into account its innovative development, but also the possible, the best (optimal) motion patterns of this system from present to future.

Forecasting serves as the basis for developing of plans for functioning and development of social-economic systems of different levels [4, p.1869] including business structures of production-industrial and service sector. Today the planning is both the instrument and function of management activity in the sphere of creating and realization of strategy, and the management process of functioning and developing of small and big social-economic system. Planning as the procedure is the realization of the action sequence according to which an optimal resource distribution within definition of directions, the set goals and tasks of functioning and developing of social-economic systems is taking place [9, p. 459].

The more the planning falls behind the forecasting of innovative transformation of social-economic system, the higher is the possibility of revealing factors which were not previously taken into account and which can be considered as critical. That's why it is agreed to form plans according to the set schedule of functioning and developing of big or small social-economic system upon hierarchy for more successful realization of planning. It is also agreed to speak of the total of plans (as a rule there is one strategic or overall plan for development and tactical and operative plans for functioning subsystems of social-economic system which are subordinated to the above mentioned plan).

The realization of plans which are based on objective and possibly true forecasts in the practice of management of different social-economic systems including business structures, are the actions aimed at providing stable development of the said using the innovation growth factor as the main one [2, p. 23].

The above said allows us to draw a conclusion that to forecast the development of small and big social-economic systems first of all it is necessary to determine the scenario of the further development; to our mind this scenario should be based on the innovative breakthrough. Secondly during the forecasting of the innovative development it is necessary to take into account the whole combination of the first-order growth factors (labour,

nation, technologies, and resources) with their world, regional and state dynamics. However the forecasting should be not only and not so much exploratory as teleological, allowing to define the most ideal development patterns of demographic, social-economic and political processes of the system from present to future taking into

An econometric model is one of the tools economists use to forecast future developments in the economy. In the simplest terms, econometricians measure past relationships among such variables as consumer spending, household income, tax rates, employment, and the like, and then try to forecast how changes in some variables will affect the future course of others.

Before econometricians can make such calculations, they generally begin with an economic model, a theory of how different factors in the economy interact with one another. For instance, think of the economy as comprising households and business firms. Households supply business firms with labour services (as tailors, accountants, engineers, etc.) and receive wages and salaries from the business firms in exchange for their labour [10, p.25]. Using the labour services, businesses produce various outputs (clothing, cars, etc.) that are available for purchase. Households, using the earnings derived from their labour services, become the customers who purchase the output. The products the businesses produce wind up in the households, and the wage and salary payments return to the businesses in exchange for the products the households purchase.

Actually, no econometric model is ever truly complete. All models contain variables the model cannot predict because they are determined by forces "outside" the model. For example, a realistic model must include personal income taxes collected by the government because taxes are the wedge between the gross income earned by households and the net income (what economists call disposable income) available for households to spend. The taxes collected depend on the tax rates in the income tax laws. But the tax rates are determined by the government as a part of its fiscal policy and are not explained by the model. If the model is to be used to forecast economic activity several years into the future, the econometrician must include anticipated future tax rates in the model's information base. That requires an assumption about whether the government will change future income tax rates and, if so, when and by how much. Similarly, the model requires an assumption about the monetary policy that the central bank will pursue, as well as assumptions about a host of other such "outside of the model" [8, p.578] (or exogenous) variables in order to forecast all the "inside of the model" (or endogenous) variables.

It is not always easy to "see" the stability that can be counted on to provide a reliable forecast, and econometricians have developed sophisticated procedures to tease out the stability and measure it. In general, the time-series procedure and the structural model procedure seem to produce comparably good, or bad, forecasts for a year or two into the future. But the time-series procedure has the distinct advantage of being far simpler [8, p.580]. We can forecast spending on clothing and shoes without having to worry about the theoretical relationship between

spending and household income. It need not be specified and its parameters need not be estimated; just focus on the clothing variable itself.

Finally, and related to the preceding discussion, structural models are the "only game in town" when it comes to the important area of econometric policy analysis or other "what if" calculations. Thus, a baseline forecast may be calculated using a structural econometric model and the best information available to the forecaster. And then someone asks, "What if Congress raises the income tax rate by five percentage points?" This single perturbation is then imposed on the original calculation, and the forecast is recalculated to show the model's evaluation of the effect on the economy of the posited change in government fiscal policy.

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ОЦІНКА ЕФЕКТИВНОСТІ HR-МЕНЕДЖМЕНТУ СУЧАСНОЇ ОРГАНІЗАЦІЇ

У статті розглядаються стратегічні можливості розвитку організацій через призму політичної, економічної та соціальної нестабільності. Даний стан національного розвитку розглядається з позиції економічної безпеки. Для фінансового моделювання та прогнозування суспільної поведінки в статті визначено та застосовано тренд нейроменеджменту. Запропоновано вирішення проблеми загальнонаціональної економічної безпеки через систему мікроекономічного регулювання. А саме, через HR-менеджмент, як елемент соціального управління. Основний акцент персонал-менеджменту зводиться до того, що однією з головних умов реалізації корпоративної стратегії є задоволення соціальних потреб працівників, які вважаються ключовим моментом у методології управління персоналом. За нинішніх умов стратегія управління персоналу повинна спрямовуватися на збереження найкращих співробітників та оновлення колективу. Дискусійним питанням розвитку персоналу є система оцінювання ефективності HR-менеджменту щодо загальної результативності діяльності організації. Проведено аналіз показників оцінки ефективності персонал-менеджменту організації. Визначено основні тенденції та можливості формування стратегії менеджменту персоналу в сучасних умовах розвитку організацій.

Ключові слова: *середовище функціонування організацій, національна та міжнародна безпека, управління персоналом, стратегія менеджменту персоналу, оцінка ефективності менеджменту персоналу.*