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THE IMPORTANCE OF KONDRATIEV'S ANALYSIS OF LONG CYCLES FOR THE DEVELOPMENT OF MACROECONOMIC THEORY

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Abstract: *A combination of qualitative (historical and descriptive) and quantitative (mostly statistical) methods of economic analysis in the research of long cycles as the basic form of economic development in capitalism represents a central contribution to Kondratiev's economic analysis. Kondratiev treated economic history as a part of social evolution and he also used statistical analysis instruments at that time. Despite its simplicity, Kondratiev's long-cycle research represents the greatest premise of early literature on economic statistics and economic history. Therefore, in the methodological sense, the research of long cycles by Kondratiev is of great importance for the development of macroeconomic theory and politics.*

Keywords: *economic trends, long cycles, economic analysis, methods of economic analysis.*

1. Introduction

Economic cycles are the basic form of expressing economic dynamics in every market economy. In simple terms, they represent a pattern of growth and decline in economic activity at the national level over time. The cyclical movement of the economy is characterized by rises and falls and is caused by various factors.

Economic fluctuations vary considerably by regularity, duration and causes of formation. The basic forms of economic dynamics are:

- short-term fluctuations - the production of economic activity due to various seasonal phenomena,
- midterm changes (investment and spatial cycles)
- long-term or semi-continuous cycles (Cvetanović, 2015).

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The interest of economists in studying the cyclical movements of the economy appeared at the end of the 19th century as an interpretation of the key changes in capitalist mode of production as means of integrating socio-political elements into a long-term economic analysis.

Russian economist Nikolai Kondratiev (Russian: Nikolai Dmitrievich Kondratev) is considered to be a representative of the long cycle theory. Great contribution to this theory was given by the US economist Simon Kuznec and Jozef Schumpeter.

Nikolai Kondratiev is certainly one of the most influential Russian economists in the first half of the twentieth century. In his research, he came to the conclusion that long or half-life cycles are a form of economic movement in capitalist economies. Schumpeter, later, called the presentation of long fluctuations in the development of the capitalist economy "Kondratiev's Cycles", which has remained recognizable in economic literature to this day (Cvetanović, 2015).

The long-cycle phenomenon has been discussed quite a lot in economic science. We mention the works of Sterman (Sterman, 1986), Maddison (Maddison, 1991), Freeman and Louca (Freeman & Louca, 2001), Metz (Metz, 2010) and many others. Among other things, very competent views on the existence of long cycles, as well as the key factors of their manifestation can be found in many parts of Serbian economy of a recent date. Macroeconomics (Sekulović et al, 1997), History of economics (Jakšić & Prašević, 2011), The concept of technological paradigm and cyclical movement of the economy (Cvetanović et al., 2012) are just some of the titles of Serbian economists in which, among other things, some interesting thoughts about the phenomenon of long cycles can be found. The authors mostly presented their own views of reality of the existence of long cycles, as well as the dominant factors of their formation. In real terms, this aspect of looking at the phenomenon of long cycles can be relevant even today, due to the fact that there is no unanimous opinion of economic researchers on most issues related to this topic. In this light, it should be noted that it is not a rare idea that Kondratiev's cycles neither exist nor can exist. For example, according to American economist Marey Rotbrad, they are the only source of statistical manipulation. As such, they are, according to this author, without any realm in reality (katalaksia.com/2012/07/03/economic-cycles/). However, debates about the existence of long cycles, as well as their possible causes, are not the subject of research in this paper. After all, there is an extensive research on this. In particular, the authors of this inscription are primarily interested in the nature of the methodological approach applied by Nikolai Kondratiev when studying the cyclical movement of the capitalist economy. The subject matter of this research is directly related to the name of this meeting, on the one hand, but also on the more and more present discussions regarding the scope of these two methodological approaches in macroeconomics, on the other hand. The research question is: Can the used analytical instrument of Nikolai Kondratiev in the study of long cycles, as a form of economic dynamics in capitalism, be considered relevant today, eight decades after the creation of this teaching?

The composition of the work is the following. First of all, within the separate subheading, some facts about the essence and types of economic analysis are presented. Then, it turns out that Kondratiev's key thinking about economic dynamics, especially the difference between the evolutionary (irreversible) and wavy (reversible) processes, seems to be a reflection. Finally, the last subheading gives an overview of the qualitative and quantitative interpretation of the nature of economic oscillations by Kondratiev.

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2. Economic analysis: the basic task and types

Economic analysis is a set of economic theory, economic statistics and economic history. "Economic analysis links theory and practice. In order for the economy to progress, such a combination is necessary, as neither the economy is a pure theory, from which, like mathematics, it would not be required to be applicable to actual events, nor can the economy be regarded as a collection of things dumped at the landfill, for which no one asks how they are related "(Burda & Viplos, 2012, 26).

All economic phenomena are expressed in terms of quantities that change over time (e.g. production, consumption, investment, exports, imports, etc.). Economic phenomena are mutually dependent, i.e. the change of one of them affects to a certain degree the changes of others. The determination of the interdependence of economic phenomena, in order to explain the anatomy and predict their movements in the future, is a key task of economic analysis. To accomplish this task, the economic analysis seeks to monitor the effects of changes in concrete economic phenomena in a more detailed time and spatial manner.

the perception of the distinction between economic analysis and description is of particular importance. It is possible to explain it by giving an example of biology. "The fact that living organisms composed of different cells represents biological descriptions; how these cells function and how they affect one another is within the domain of analysis "(Burda & Viploš, 2012, 26).

For each emerging phenomenon, economic analysis, through a number of principles and logic, seeks to answer the questions: what has happened, and to what extent has the economic variable changed, why the change occurred, what are the consequences of this change to other economic variables, what is the probability of repeating the event, what should be done to repeat the desired event, and undesirable evasion, what are the possible and expected directions for the development of the occurring event, what is optimal from the potential directions of the development of the phenomenon, how to direct the development of the phenomenon in the optimal direction?

Looking for answers to previously identified issues, economic analysis realizes the necessary prerequisites for action on economic phenomena and processes in order to direct them. Solving the perceived economic problem implies possession of a picture of a real economic situation in which the treated economic problem appears. The movement of the observed economic phenomena in time is also interpreted and anticipated by using economic statistics and economic theory. However, the movement of concrete economic developments in the most desirable directions has the precisely defined economic goals for the basic starting point to which it strives. Achieving precise goals means that a concrete economic policy is effective.

Economic analysis fulfills its task and responds in different ways to the questions asked. Qualitative and quantitative economic analysis is distinguished depending on the techniques employed, used in the process of formulating answers to the questions raised.

When it seeks to establish legality in the economic world through various descriptive methods, it is a qualitative economic analysis. For example, if during the time

with the change in appearance a , the phenomenon b changes too, it can be concluded that under the assumption that the phenomenon a changes, there is a change of appearance b .

By means of various mathematical methods, quantitative economic analysis measures the interdependence between economic phenomena and processes in the real economic world. Economic analysis involves theoretical and empirical research. The conclusions are valid if the starting assumptions on which the observations are based do not change.

The choice of the assumptions underlying the observed economic phenomenon is an important prerequisite for a proper empirical research. Empirical research allows a comparison of theoretical conclusions with the real facts.

Based on the setting of qualitative analysis of economic laws and economic theory, the existence of interdependence between economic phenomena and processes is noted. Quantitative economic analysis, based on the conclusions of qualitative economic analysis as a prerequisite, selects the relevant data that distinguishes this interdependence by its methods and quantifies its direction and strength.

It is necessary to distinguish a static from a dynamic economic analysis. Static economic analysis determines interdependence in a set of economic processes and phenomena that exists at a specific time. It studies the relationships between certain economic variables (economic phenomena and processes) of a system, where the functional form of interdependence and parameters are not in function of time. Static analysis is devoted to the study of the equilibrium state, which among economic variables exists at a given moment. It can include an analysis of the equilibrium state before and after changing certain variables. Comparison of two equilibrium states (initial and final) is at the basis of comparative statics.

Dynamic economic analysis follows the time flow, that is, observes the process of creating and spreading a whole series of changes that is caused by the initial change of one or more variables. It explores how some economic variables change over time. In a dynamic analysis, the value of an economic variable is completely or partially determined by the value of these and / or other variables from another period of time. In short, the time has the status of a variable, not the parameter status. It focuses on recognizing the path by which the observed economic variable moves over time. It tries to answer questions - whether the development of the variable in time inclines to the equilibrium state, and whether the equilibrium state is stable, etc.

3. Kondratiev's facts about the existence of long cycles

Investigating the economic dynamics, Kondratiev distinguishes between evolutionary and wavy processes. The characteristic of the first processes is the unrepeatability, i.e. irreversibility. On the contrary, the feature of wavy changes is repeatability, or reversibility. "While the first processes take place in a certain direction, i.e. there is no return to any previous phase, other processes can be returned to the starting state" (Sekulović, et al., 1997, 253). In the real economic life, both forms of economic process take place simultaneously. The long-wave theory of Nikolai Kondratiev refers to repeatable cyclic processes.

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Kondratiev identified three long cycles of the capitalist economy in the time interval 1780-1920.

- The first from 1780 to 1850,
- The second from 1851 to 1890 and
- The third from 1891, which moved to a descending phase in 1920.

Stressing the fact that he is not interested in the causes, but rather the characteristics of the long cycle flow, Kondratiev distinguishes four stylized facts of their manifestation:

The first stylized fact consists of the following: a) Twenty years before the upstream cycle, new technological discoveries occur; b) immediately before the beginning, and at the very beginning of the ascending phase, the use of these inventions in the industry begins; c) the orbital expansion of international economic relations occurs; In the second and third cycles, there is a change in the production of precious metals and in money circulation.

Another stylized fact is that the periods of the upward phase of the cycle are accompanied by large social shocks (revolutions, wars), as opposed to downstream phases.

The third empirical regularity is that the downward phase of the cycle is accompanied by long depression in the field of agricultural production.

Finally, the fourth stylized fact is that the medium-term cycles differ, depending on whether they are on an ascending or descending path of a long cycle.

Kondratiev emphasizes that strict periodicity in social phenomena cannot exist because the new cycle occurs in new historical circumstances and at a new level of economic development, which is why it is never easy to repeat the previous cycle. Also, the author believes that the rhythm of long cycles to a significant extent follows the rhythm of the production of physical capital, primarily due to the fact that investments cannot run the same intensity. Kondratiev notes that the period of time from the age of 140 years is not enough for an unambiguous confirmation of the existence of long cycles, but it is still sufficient to acknowledge the probability of their existence (Kondratiev, 1989).

Although the problem of long-term fluctuations remains a matter of interest among a large number of economic researchers, it is clear that the initial consensus on the significance of these long-term changes is no longer relevant. After the rapid development of econometrics and economic theory, any claim for the existence of long-term cyclical patterns of structural change loses much significance.

4. Qualitative and quantitative interpretation of the nature of economic oscillations

In the study of cyclical movements, Kondratiev used a qualitative and quantitative economic analysis. In the group of qualitative methods, the dominant place came from the historical and descriptive method, while the second approach to economic analysis was characterized by the so-called approach to the application of early-econometric techniques. In the initial interpretation, the historical and descriptive interpretation of the nature of the oscillation is a method that provides a visual overview of the time series relating to

production, consumption, prices and trade data. The analysis also includes political and social developments (including major breakdowns, such as wars and revolutions).

Econometric analysis of statistical data on the dynamics of iron and lead production, coal production and consumption, the average level of raw material prices, interest on capital, wages, foreign trade and other indicators of the economic development of England, France, Germany and the United States for a period of about 140 years, Kondratiev decomposed empirical series of these indicators in three components:

- General trend of changes (trend) with its speed, which is incorporated into the theoretical curve of the series, or corrected curve of the empirical series;
- Acceleration of this trend, it is a change in the rate of growth, characterized by a deviation between the empirical and theoretical series as a magnitude vibration, reflecting the cyclical changes in economic conditions;
- Random deviations in these curves.

Contrary to these descriptive and historical methods of research, statistical methods have led to early, intense discussions of long waves.

In statistical and econometric methods, three main groups of techniques are distinguished:

The first set is related to techniques for "fine" determination of average trends and estimates of deviation trends. If an average growth rate is calculated below or above a long-term trend over a long period, this is considered to be evidence of the existence of a "wave" within a long wave.

The second set of techniques is related to the transformation of the rate of growth and the analysis of the behavior of long-term deviations in relation to the behavior of short-term deviations;

These methods, although widely used, are often disputed and used as a complementary analytical tool by historical and narrative methods.

In his work, Kondratiev made a distinction between three types of cycles: a long wave of fifty years, a mean wave of seven to ten years and a short one, three to four years. He is the author of a long wave by breaking up time series - eliminating the trend and pointing to deviations that have been mitigated by a nine-year average. The nine-year average was sufficient to remove the influence of one or two shorter types of cycles. His analysis covered the period from 1770 to 1920, while long cycles include periods of 40 to 60 years. Based on the analysis of wholesale prices for France, the UK in the United States, which are relatively open economies; it has revealed that trends in prices are similar (especially after adjusting the price index to eliminate the effects of change.) On the basis of these indicators, Kondratiev found that long waves are comparable at the international level. In general, in most of the Kondratiev's indicators, the price is an important element (e.g. wages, interest rates, foreign trade values, bank deposits).

The following statements became the starting point for answering the defined research question. First, according to Kondratiev and many other advocates of the idea of the existence of long waves (Schumpeter, above all), cyclical movement is the basic form of economic development in capitalism. Second, there is a relatively small chance of repeating a completely identical environment, so that in economic history *ceteris paribus*

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conditions are not fulfilled - each event is unique. However, according to Kondratiev, there is a stable causal structure, which determines the correctness of the phenomenon. Kondratiev reluctantly concluded that there were three long waves of economic life (a very vague term, but its intention was to include production and price movements). This chronology does not apply to specific years, but to intervals where only two phases, rises and drops, are distinguished in each wave. He does not discuss the extent of these waves, which differ between strings, but are obviously large enough to exclude the need to discuss emerging trends.

5. Conclusion

Kondratiev's research was one of the first, large, extensive researches in economic history. He established the existence of long-term economic movements, and formed the pattern by which they occur in capitalism. In order to arrive at an acceptable concept, Research Approach of Kondratiev is characterized by the application of both qualitative and quantitative methods of economic analysis, with the former being dominated by historical and descriptive methods and within other statistical methods. In this sense, without considering the question of the quality and relevance of the statistical data that the author uses, one can say that the way in which this economist combines these two methods of economic analysis can be a model for researchers today. Despite the simplicity, Kondratiev's long cycle analysis is important for the development of macroeconomic theory and policy.

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ZNAČAJ KONDRATIJEVE ANALIZE DUGIH CIKLUSA ZA RAZVOJ MAKROEKONOMSKE TEORIJE

Rezime: *Kombinacija kvalitativnih (istorijskih i deskriptivnih) i kvantitativnih (uglavnom statističkih) metoda ekonomske analize u istraživanju dugih ciklusa kao osnovnog obrasca ekonomskog razvoja u kapitalizmu predstavlja centralni doprinos Kondratijeva ekonomskoj analizi. Kondratijev je ekonomsku istoriju tretirao kao deo društvene evolucije, a takođe je koristio u to vreme dostupne instrumente statističke analize. Uprkos jednostavnosti, Kondratijevo istraživanje dugih ciklusa predstavlja najveći domašaj rane literature o ekonomskoj statistici i ekonomskoj istoriji. Zbog toga je u metodološkom smislu istraživanje dugih ciklusa od strane Kondratijeva od ogromnog značaja za razvoj makroekonomske teorije i politike.*

Ključne reči: *privredna kretanja, dugi ciklusi, ekonomska analiza, metodi ekonomske analize.*