Cyclical fluctuations of the Russian economy

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Abstract. The economy is subject to changes. It is characterized by the uneven nature of expanded reproduction: periods of increased production and consumption are combined with recessions and crises; new development trajectories emerge. The cyclical nature of economic development means that the main indicators and parameters of this process are wave-like. Interest in cyclical fluctuations is increasing, especially during crises. Each cycle has its own development and technological structure. New technologies and innovations spread during the upward wave of the subsequent cycle. During the downward wave, the development of the technological structure is slowing down, facing economic and social constraints caused by market limits and insufficient production efficiency. Previously dominant technologies and institutions become exhausted. It creates conditions for the development of new leading technologies, a new technological order and new social institutions. Thus, crises stimulate technological development. The article discusses Kitchin, Juglar, Kuznets, Kondratyev cycles and their regularities. The indicators used for tracking economic cycles, their turning points whose dynamics coincides with cyclical fluctuations of the economy are as follows: GDP growth rate; unemployment rate; consumer price index; investment growth rate; industrial production growth rate; gross saving growth rate; refinancing rate.

Introduction

There are different forms of wave reproduction expressed in a complex time structure of cycles. The macrodynamics of systems is determined by large cycles or long waves of cyclic oscillations, which have a material basis for periodic updating of fixed assets. At the same time, within the large cycles, microcycles are formed. They implement individual elements of the reproductive systems which form material, financial and information resources for reproduction of fixed assets.

Materials and Methods

The first systematic analysis of periodic economic crises was carried out by Jean Charles Léonard de Sismondi in 1819 [15]. Classical economics denied the existence of business cycles. In the middle of the XIX century, H. Clark began to study the long-wave dynamics. In 1847, he paid attention to the 54-year period between crises. By the beginning of the XX century, three types of cycles were distinguished: “large cycles” (40-60 years), “medium cycles” (7-11 years), and “short cycles” (2-3.5 years). There is no doubt that the crisis is a natural state of a production mode.

The "Periodic system of world capitalist development" is based on several theories developed by different authors in different periods: N. Kondratiev theory of large cycles; the theory of evolutionary
cycles by V. Pantin [11]; studies on the Kondratieff cycles carried out by S.M. Menshikov [8]; the theory of technological modes by S. Glazyev [4], K. Peres [12], M. Hirook [6]; the theory of systemic capital accumulation cycles by J. Arrigi [3]; the theory of “creative destruction” by J. Schumpeter [13]; "Capital" by K. Marx.

The scientific ideas formulated by the author are sufficiently substantiated and supported by the corresponding logical and analytical arguments. The idea of economic cycles is not disputed and is generally accepted.

The theoretical and methodological basis was the works by domestic and foreign scientists belonging to various economic schools. The greatest contributions were made by H. Clarks, K. Marx, J.M. Keynes, J. Schumpeter [13], K. Friman, N. D. Kondratiev, L. I. Abalkin, J. Yakovets [1], L. E. Grinin [5], A.E. Aivazov [2] et al.

The authors used periodical materials and data presented by the Federal State Statistics Service. On the basis of the materials used, the authors drew theoretical and practical conclusions that are reliable, scientifically grounded, quite representative and aimed at identifying crisis periods, recovery periods to develop effective economic development programs.

The economic indicators (GDP growth rate; unemployment rate; consumer price index; investment growth rate; industrial production growth rate; gross savings growth rate; refinancing rate) whose dynamics coincide with cyclical fluctuations allows for tracking economic cycles of the Russian economy and identifying promising areas of development, as well as resources needed for launching an innovative mechanism.

In carrying out the study, the method of scientific knowledge was used to describe the cyclical nature of the Russian economy. Other methods for this study are as follows: the method of economic statistical groups, the study of statistical series, correlation analysis, analytical smoothing methods. Seven indicators whose dynamics coincides with the cyclical fluctuations of the national economy have been selected.

### Results

In 1935, J. Schumpeter developed the theory of three cycles - Kondratieff, Juglar and Kitchin ones. The imposition of one wave on another explains the general state of the conjuncture at any given moment. The final economic development curve can be represented as a sum of oscillatory processes with different frequencies relative to the trend development trajectory.

The analysis of the dynamics of economic development through the synthesis of three cycles proposed by Schumpeter was named “Great Unification” [5].

| Table 1. K-waves and their phases [2]. |
|--------------------------------------|
| No of the long wave | Phase of the long wave | Beginning of the long wave | End of the long wave |
|---------------------|-------------------------|----------------------------|----------------------|
| I                   | A: upgoing              | Конец 1780–начало 1790 гг. | 1810–1817 гг.        |
|                     | B: downgoing            | 1810–1817 гг.              | 1844–1851 гг.        |
| II                  | A: upgoing              | 1844–1851 гг.              | 1870–1875 гг.        |
|                     | B: downgoing            | 1870–1875 гг.              | 1890–1896 гг.        |
| III                 | A: upgoing              | 1890–1896 гг.              | 1914–1920 гг.        |
|                     | B: downgoing            | 1914–1920 гг.              |                      |

Post-Kondratieff long waves
Most of the economists adhere to the following dating of Kondratiev long waves. The dating of K-waves is divided into two stages: identified by N. D. Kondratiev and Post-Kondratiev long waves. N. D. Kondratiev identified three K-waves and designated phases and periods of beginning and ending. There are disagreements about the subsequent waves related to the dating of the waves and the periods of downgoing and upgoing phases.

**Table 2. Features of the fifth and sixth K-waves and their phases according to the theory of production principles and revolutions [5]**

| No of the wave and phase | Feature which does not follow from the K-wave theory | Explanation based on the theory of production principles and revolutions |
|--------------------------|------------------------------------------------------|---------------------------------------------------------------------|
| Fifth K-wave, A-phase (1982–2007) | 1) Lower GDP growth compared with the A phase of the fourth wave.  
2) Weak growth in the center of the World-System and, conversely, high growth in the periphery.  
3) Underdevelopment of new generation technologies | At the second (distribution and modernization) stage of the scientific and cybernetic production principle, new generations of innovations are not created, since main development vectors are improvement of already implemented innovative technologies, pulling the periphery levels towards the center, and the spread of innovations in the maximum number of territories. The overall growth rates are slowing down. Differences in the development of the regions having different economic indicators become less pronounced. The alignment causes a higher peripheral growth and a lower center growth. |
| Fifth K-wave, B-phase (2007–2020) | A very severe mid-term crisis of 2008–2013. Development in the center is more intensive than in the periphery | The need to pull the periphery to the center at the second stage of the scientific information principle of production to align the development levels; the need to push the political component of development towards the economic one. |
| Sixth K-wave (2020–2060) | The A-phase will be significantly more powerful than the A-phase of the fifth K-wave, and the B-phase will be less depressive and short. If the final phase of the cyber revolution is delayed, the A phase of the sixth wave will be less powerful, but the seventh K-wave will manifest itself. | The final phase of the cybernetic revolution begins, the density of innovation is growing and remains high for a long time. The A phase will be more powerful, and the B phase (like the B phase of the first wave) will be less depressed. |

It was expected that the 1990s and 2000s would bring a new radical wave of innovation, comparable with the advent of computer technologies and capable of creating a new technological structure. The breakthroughs were those areas that will become a basis for the sixth K-wave. However, development and diversification of digital electronic technologies and rapid development of financial
technologies became a basis for the fifth wave. Those innovations that actually took shape during the fifth K-wave, such as, for example, the technologies of green and low-carbon power engineering, occupy a small share in the total energy industry [9,10].

The basis of the entire “Periodic system of world capitalist development” is the large Kondratiev cycles (K-cycles) [14] which consist of two waves: the downward and upward ones. During the downward wave, the world economy is experiencing difficult long-term crises, and during the upward wave, crises are not very long and not too deep.

**Discussion**

Based on the analysis of approaches, it can be assumed that each Kondratiev cycle is characterized by development and dominance of a certain set of technologies - the technological structure. The effective use of new technologies is related to the development of economic, social and political institutions. The emergence of a new technological order begins during the downward wave of the preceding Kondratiev cycle, and its development and distribution occur during the upward wave of the subsequent cycle [7]. During the downward wave, the development of the technological structure is slowing down facing economic and social constraints caused by limited markets and insufficient production efficiency. Previously dominant technologies and institutions become exhausted which creates conditions for the development of a new set of leading technologies, a new technological order and new social institutions. Thus, crises stimulate the renewal of technologies and social institutions [11].

**Table 3. Classification of economic cycles [16].**

| Cycle                              | Period   | Causes                                                                 |
|-----------------------------------|----------|------------------------------------------------------------------------|
| Kitchin Short Term Cycles         | 3–4 years| Movement of inventories. At present, the mechanism of cycle formation is usually associated with time delays (time lags) in the movement of information affecting the decision-making process |
| Juglar Medium Term Cycles         | 7–11 years| Fluctuations of volumes of inventory and investment in fixed assets    |
| Kuznets cycle                     | 15–20 years| Demographic processes, the influx of immigrants and construction changes. Kuznets rhythms are infrastructure cycles. |
| Kondratiev long waves (K-cycles or K-waves) | 45–60 years| Conclusions drawn by Kondratiev were based on the empirical analysis of a large number of economic indicators of various countries over 100–150 years. These indicators included price indices, government debt securities, nominal wages, foreign trade figures, production volumes of coal, gold, lead, cast iron, etc. |

The first wave of studies of large Kondratiev cycles ended with the publication of the monograph by J. Schumpeter “Business Cycles” (1939). He considered business cycles as a result of the innovation process. Back in 1931, he considered the importance of the Juglar cycles in the light of the theory “Great cycles of economic conjuncture” developed by Juglar in 1907–1912. The work was published in 1934 [13].

The arrangement of economic cycles is shown in Figure 1. It demonstrates the phases of growth and decline of each cycle:
- small and medium cycles are imposed on large Kondratiev cycles. They are not located side by side,
- since the economy does not return to the previous level of development and moves to the next stage, the development goes along the spiral which has an upward trend,
- many economists distinguish other cycle boundaries depending on the chosen mathematical method or scientific research,
- these boundaries may change under the influence of the acyclic policy of the countries. Force majeure situations caused by financial crises, political and economic alliances or sanctions, climatic anomalies, etc. can arise.

**Figure 1.** Cycles of fluctuations in the economic development of Russia.

The National Bureau of Economic Research (NBER) which is engaged in tracking economic cycles, identifying their turning points, distinguishes a number of indicators whose dynamics coincides with cyclical fluctuations in the economy: a) GDP growth rate; b) unemployment rate; c) consumer price index; d) investment growth rate; e) industrial production growth rate; e) gross saving growth rate; g) refinancing rate.

**Figure 2.** The dynamics of the key indicators of the cyclical economy of Russia for 1992-2017.

Despite the obvious dominant trend towards an increase in the volume of production, there are periods of production growth and decline. This phenomenon is justified by the cyclical nature of economic development.
During the crisis and recession, countercyclical indicators (unemployment and refinancing rates, consumer prices) increase. Procyclical indicators of the GDP growth rate, industrial production growth, final consumption expenditures and investments in fixed assets have synchronous fluctuations of different depths. The greatest decrease is observed in final consumption expenditures; the growth rates for industrial production, investment in fixed capital and gross domestic product behave simultaneously. The dynamics of the main indicators of the cyclical economy of Russia for 1992-2017 showed the phases of recession and crises - 1992, 1998, 2009. Figure 2 shows the recession phase from 1992 to 1996, and a period of profound changes in the Russian economy. The 1991 reform affected prices, unemployment rates, loan interest rates, value indicators, inflation rates (1000%).

**Conclusion**

Thus, to revive and boost the economy within the Kondratiev cycle, the renewal of the economic structure, its technological base, new technologies and innovation technologies (advanced information technologies, new materials, bio, nanotechnologies, cleaner energy sources, etc.), redistribution of productive forces, stability of the financial system for forming savings are needed. Encouragement of innovation activities will make it possible to implement innovation technologies during the upward wave of the sixth Kondratiev cycle (2018–2060). The country has sufficient financial resources, scientific potential and human resources to put the innovative mechanism into action.

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