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THE FUTURE OF THE GLOBAL ECONOMY IN THE LIGHT OF INFLATIONARY AND DEFLATIONARY TRENDS AND LONG CYCLES THEORY

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Recent years and months have evidenced an increase in deflationary phenomena. The present article defines the reasons for the problem, explains the irregularity of the inflation–deflation processes in the world and forecasts on this basis that the crisis–depressive phase of development in the global economy will continue for a relatively long time. Based on an analysis of available resources and the theory of long cycles, we believe that in the next 5–10 years, the global economy will continue being in the crisis–depression phase with rather sluggish and weak rises. The article also offers some forecasts for the forthcoming sixth Kondratieff wave (2020–the 2060/70s), identifies its possible technological basis, and discusses possible consequences of the forthcoming technological transformations.

KEYWORDS: Center, deflation, demand, economic future, economic laws, forecasts, inflation, investments, periphery, prices, quantitative easing, the Japanese economy.

The present-day world economy lacks a powerful and developed global mechanism of monetary and nonmonetary measures similar to the regulation at the national level and this has become one of the main causes of the current global financial crisis (see Grinin & Korotayev, 2010b). Thus, at the supranational level objective economic laws are operating; they manifest themselves, as before, in the successive short and long cycles of economic activity within national market economies. The cyclic regularity is manifested in the booms and recessions of the medium-term Juglar cycles (see, e.g., Juglar, 1862; Tugan-Baranovski, 1894; Grinin & Korotayev, 2010a, 2012; Grinin, Korotayev, & Malkov, 2010; Grinin, Korotayev, & Tsirel, 2011; Grinin, Malkov, & Korotayev, 2010; Schumpeter, 1939), and also in the inflation and deflation phases of long Kondratieff cycles. Let us note that Nikolai D. Kondratieff was the first to make an attempt to present a systematic theory of such fluctuations of conjuncture (Kondratieff, 1926, 1935,

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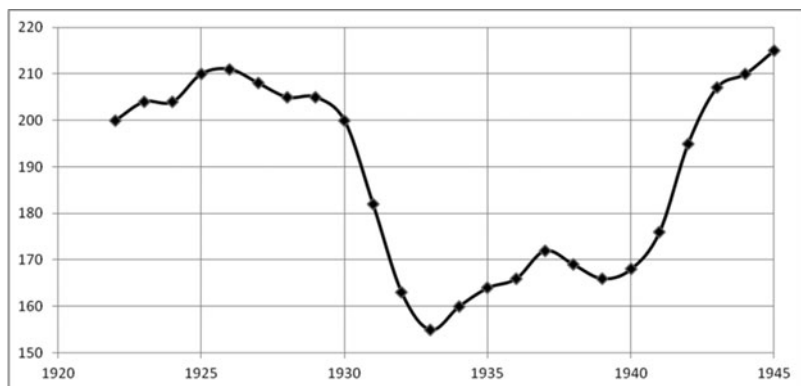


Figure 1. The dynamics of U.S. Consumer Price Index, 1922–1945. (100 = 1,860 level). *Source*. David & Solar, 1977, pp. 16–17 (Table 1).

1984), but these fluctuations had been noticed much earlier (see, e.g., Jevons, 1884 or Tooke & Newmarch, 1859).

The present-day world economy possesses some other features that allow attributing to it some phenomena that have already gone to the past as a result of government regulation. Some of them were mentioned in our works (see, e.g., Grinin, 2012a, 2012b; Grinin & Korotayev, 2010a; 2012; Grinin et al., 2010a, ch. 2, Grinin et al., 2010b). One can also note that since there is no common worldwide social legislation on labor, the laws of severe competition act with respect to most basic commodities when the low standard of living and high exploitation contribute to low commodity prices. As we shall see below, the cheap exports coming from an increasing number of countries with a low standard of living contribute to a partial restraining of inflation rates in wealthy countries. But it often has no impact on raw materials. On the whole, there is a disproportion between the raw material production countries and countries that produce commodities.

The aforementioned (and some other) analogies between world economy and national economies lacking government regulation can help to explain the cycles of world conjuncture and its inflation–deflation trends.

Recently, alongside numerous problems in European (and partly American) economies, one quite often mentions the danger of deflation that would seem long-forgotten. In the 19th and the first half of the 20th century, from time to time the deflation would put pressure on economies, nibbling away at entrepreneurs' profit. The deflation meant the decline in rate of return, bankruptcy, and other critical events. The Great Depression was also connected with the Great Deflation and a significant drop in prices (Figure 1).

However, after the Second World War and especially starting from the 1960s, inflation became the main problem, which persisted even in the 1970s when one observed a serious decline in Western economy due to the growth of oil prices. During economic downturns, prices usually fall or at least do not rise; meanwhile, at that period prices grew at the background of economic decline, thus giving rise

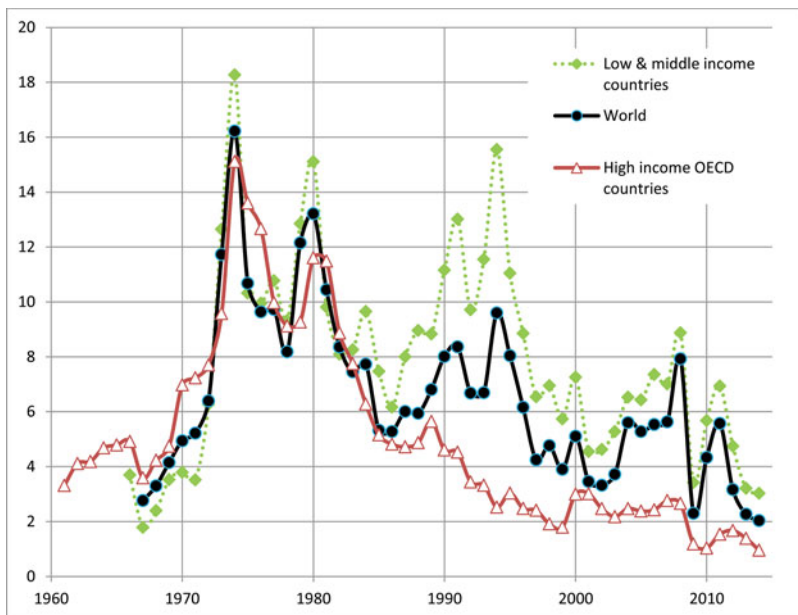


Figure 2. The inflation rates in the world in developed, medium-developed, and underdeveloped countries, deflator of Gross Domestic Product (% a year). *Source.* World Bank (2017): NY.GDP.DEFL.KD.ZG.

to a new dangerous phenomenon called “stagflation.” In short, deflation was forgotten as something remote and as a historical archaism. There appeared theories of secular inflation, organically inherent in the current economy based on paper money (not dependent on gold) and on central banks that make credits of their own will. In the 1980s, the fight against inflation required great effort. Then the 1990s brought a hyperinflation in the former socialist countries and in a number of developing countries (Figure 2). But later hyperinflation would occur from time to time, for example, as happened in Zimbabwe.

Against this background, Japan was a strange and difficult to explain exception (see Figure 3) as after the crisis of the 1990s (caused by the burst of the housing bubble) it began to suffer from deflation. The year 1994 turned critical in this regard.

After the Second World War, this was the first case when a developed economy suffered from consumer deflation. It was considered an achievement when in some years they succeeded to raise inflation by means of massive credit expansion. The economists generally fail to identify the causes of this prolonged “Japanese disease” (see, e.g., Hilsenrath, 2010).

On the whole, the situation seems rather mysterious. There are many factors that should promote inflation, namely: credit rates decrease to the limit (zero), the Central Bank performs all kinds of open market operations (accumulates debt securities with the purpose of creating additional money liquidity), high costs for the

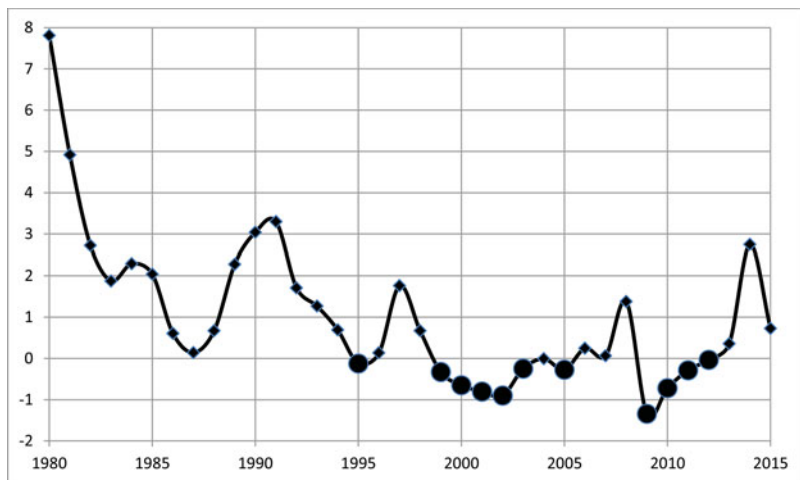


Figure 3. The dynamics of the inflation rates (% a year) in Japan, 1980–2013. *Note.* The black circles denote the years with negative values (i.e., the deflation years). *Data source.* IMF (2017). Calculated using consumer prices index.

state and low profit from taxes, and so on. There are other stimulating actions (in particular, reduction in taxes and tax increases, direct money distribution, changes in banking rules, etc.). But the long-expected inflation does not start. At the same time, however, other indicators in Japan are quite good (e.g., the high standard of living and life expectancy). And there is also significant scientific and technological progress.

One could attribute such a paradoxical situation (when there is a large amount of money in the economy but inflation is still absent) to the “mysterious Japanese soul.” However, the symptoms of the “Japanese disease” have become apparent in Europe (see Figure 4) and to some extent in the United States. Therefore, the reasons lie in the common features of developed economies and in the global economy as a whole.

In fact, in recent years a huge amount of money has been invested in the Western economy. The interest rates have declined to the Japanese (zero) level. But that has not produced the desired effect: the growth is actually weak and a number of European countries even have a negative growth rate. At the same time, people are not willing to increase their consumption and number of credits, while businessmen do not invest actively despite cheaper loans. The United States, in addition to reducing rates until recently, also implemented quantitative easing by buying every year government bonds and spending many hundreds of billions of dollars (and overall trillions, about 3 trillion over the past years) on “bad” financial assets. However, even in the United States the efficiency of emissions and easings is not high. Europe also intends to use quantitative easing (which is strongly recommended). And in fact, the reduction of quantitative easing immediately caused problems with developing markets and currencies and later with American stock

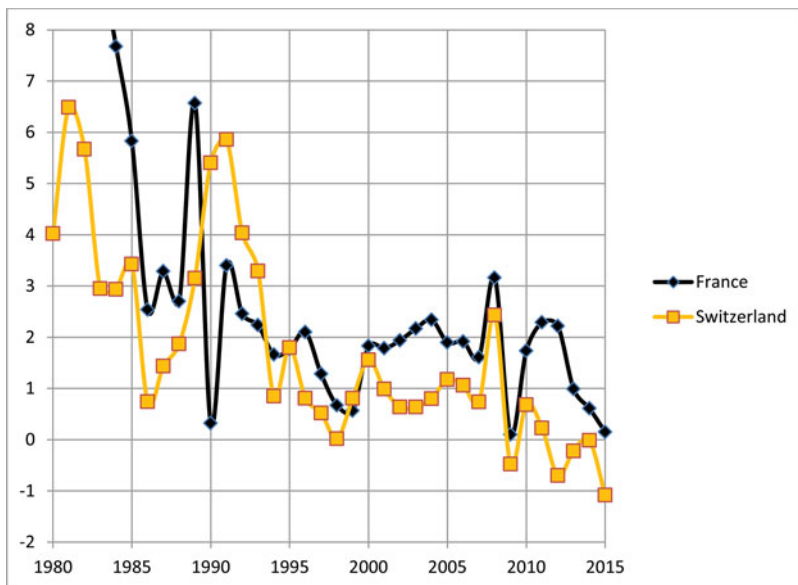


Figure 4. The dynamics of inflation rates (% a year) in France and Switzerland, 1980–2013. Data source. IMF (2017). Calculated using consumer prices index.

market (especially NASDAQ). The world economy is distorted as it has huge disproportions. But the elimination of these disproportions is very painful so the quantitative easing turns rather helpful in this situation; it is like an injection for a drug addict.

But the strangest thing is that despite trillions of dollars, euros, pounds, and yen injected into the economy in recent years, the inflation in Western economies remains low. And here one should keep in mind that the invested money was mostly created out of thin air through the policy conducted by the Central Bank. The United States failed to reach the inflation target of 2% (which was assumed to be the indicator to stop the quantitative easing). In Europe the inflation is even lower and threatens to turn into deflation.

All this seems even stranger than at first sight. It is obvious that something has fundamentally changed both in the Western and the global economy. But the economists fail to define the essence of this change. Where does money go? Why does the currency emission fail to accelerate inflation? It is very difficult to comprehend the situation. Nevertheless, we would like to present our assumptions about the causes of this situation of “disappearance of inflation.”

First of all, economic laws still are in force but with certain modifications. These modifications are related to the development of economic and financial globalization and also with the so-called financial revolution, which made international capital circulation much faster and with more freedom (see, e.g., Grinin & Korotayev, 2010a, 2010b; Rubtsov, 2000). In any case, in the conditions of currency emission “the disappearance of regular inflation” means that without this

emission either the deflationary bias is increasing or inflation gets transformed. Below we will consider both situations.

INFLATION AT DIFFERENT LEVELS AND IN DIFFERENT RESPECTS

We should take into consideration the fact that inflation is an economic variable that is measured using particular methods. However, we observe the price increase not only within the market basket (especially in the U.S. market basket, which does not include food and energy). In this respect one can assume that statistics can be manipulated for political benefits. It is rather probable as regards the United States, especially in the period before crisis (see, e.g., Akaev, Korotayev, & Fomin, 2012).

Let us suppose that the U.S. statistics are misleading. But why should Japan make figures confirm the deflation? On the contrary, they could easily show that inflation is rising once it is so desirable. The same refers to Europe. Thus, the calculations methodology is of minor importance in this case.

Taking into account that inflation remains the major threat in developing countries, one can assume that today due to the peculiar methods of calculating, the Consumer Price Index can strongly depend on the consumption patterns. The more food products and essential commodities are included, the more evident becomes the consumer inflation.

Now let us consider several types or levels of inflation as the consumer prices constitute the lower level of inflation while the asset price inflation forms the second level. (Let us note that this tendency is not new. Before the Great Depression of 1929, the level of consumer prices remained the same while the level of asset prices was increasing very fast.) In 2013, the U.S. Gross Domestic Product (GDP) rose by 1.9%, inflation was 1.1%, and stock market increased by 35%.

Thus, if the amount of circulating money increases more than the economic growth requires it to and there is no inflation, it means that money goes to the sectors where inflation is not measured (as an inflation). However, in these sectors either the asset value grows or the prices maintain at a stable level or increase, or the bubbles are blown, and so on. These can be stock markets (shares and securities), raw material markets, real estate markets, and so on. Meanwhile, the value of assets becomes an independent component that is not closely related to the actual situation at the enterprises.

GLOBAL AND NATIONAL INFLATION

The expanding financial and economic globalization together with growing financial sector in general and financial services as a part of GDP (and with the absence of obstacles for a rapid capital transfer) has led to the situation when the emission of money in some places (centers) can cause inflation in other countries. However, the emission of money affects national economies, and this impact is in a way similar to the increase in gold production during the gold-standard period. Indeed, the rapid increase in gold production between the 1850s and 1860s in California and Australia pushed the prices up in many countries. However, contrary

to the 19th-century situation when prices grew fastest in the places of gold mines, today (taking into account that money flows can be immediately transferred for many thousand kilometers) the consumer inflation may not be perceived in the centers of emission (as the movement of air is hardly perceived at the epicenter of a typhoon).

Besides, one should take into account the international division of labor. On the one hand, Western countries produce and supply capital and world currency to all economies of the world (but if a certain part of it is created “out of thin air,” then there may occur a peculiar effect of the simultaneous export of inflation and deflation); on the other hand, developing countries produce cheap consumer goods that are supplied in growing numbers to the developed countries. Increasing amounts of money from the core countries go to other countries and affect inflation there in different ways. This can be called an *exported inflation*. At the same time, the Western countries get cheap import from the developing countries and this also contributes to low inflation. But we should note that export of inflation is not always bad. On the contrary, in the current situation it can significantly stimulate economic growth (since Keynesian times moderate inflation is considered as a catalyst for economic growth). However, the dependence on the fluctuations of economic flows makes the developing markets extremely vulnerable when any external change can cause deterioration.

As we have already noted, the major part of emission goes not to consumers' expenses but flows to assets and contributes to raw materials increasing price (although this often does not correlate with the economic situation). However, in the second half of 2014 oil prices started to plunge, which can probably strengthen the deflationary trend. It is very important to realize that on the global scale it is just these capitals that support high oil and commodity prices, which would drop otherwise. Thus, the emission spreads all over the world without visible manifestations, but this imposes inflation tax on all countries and stimulates the growth of resource economies (including Russia's) sustained via high prices. Thus, due to the pointed factors, the characteristics and manifestations of inflation change and gain a more global character. *Inflation becomes a part of the international division of labor but under the conditions of labor division the benefits and problems are not equally distributed between the actors and countries and depend on the characteristics of a system.* Consequently, with a certain level of average world inflation there may be deflation in some countries while the others will suffer from high inflation (thus, in addition to the internal factors the global ones can also produce a certain effect).

Global capital flows have a great influence on the value of currency causing its devaluation and revaluation irrespective of internal factors and trade balance and these fluctuations also affect inflationary processes. The peculiarities of the international monetary system make the countries with soft currencies transmit inflation to their own territory. Forced to accumulate foreign exchange reserves, they emit national currencies in connection with them and thus accelerate domestic inflation (in particular, Rothbard pointed this out in his works; Rothbard, 2005).

Table 1.
Long waves and their phases, identified by Kondratieff.

Long wave number	Long wave phase	Dates of the beginning	Dates of the end
I	A: upswing	The end of the 1780s– beginning of the 1790s	1810–1817
	B: downswing	1810–1817	1844–1851
II	A: upswing	1844–1851	1870–1875
	B: downswing	1870–1875	1890–1896
III	A: upswing	1890–1896	1914–1920
	B: downswing	1914–1920	

Note. The subsequent students of Kondratieff cycles identified additionally the following long-waves in the post-World War I period (see Table 2).

THE WORLD DEFLATIONARY BIAS AND MECHANISMS

One can also explain the weak inflation in Western countries by the strong global deflationary processes and mechanisms that reduce inflation caused by huge emissions. If not for the emissions, deflation would be more clearly manifested in Western economies. The experts of the international financial organizations realize this quite well and press to continue emission. What are the reasons to maintain that at present we observe the deflationary trend?

First, we should note that at present we *observe the downswing phase of the fifth Kondratieff wave* (see Tables 1–2 and Figures 5–6). Kondratieff himself identified the following long waves and their phases (see Table 1).

The deflationary and depressive tendencies increase on the downswing phases (see Grinin, 2012a, 2013; Grinin & Korotayev, 2012, 2014; Korotayev & Grinin, 2012, 2014 for details about K-waves, their phases, and periodization). The deflationary factors persist even during the periods of recession and depression (they can only be mitigated). In the previous period between the 1990s and 2000s the

Table 2.
“Post-Kondratieff” long waves and their phases.

Long wave number	Long wave phase	Dates of the beginning	Dates of the end
Three	A: upswing	1890–1896	1914–1928/29
	B: downswing	1914–1928/29	1939–1950
Four	A: upswing	1939–1950	1968–1974
	B: downswing	1968–1974	1984–1991
Five	A: upswing	1984–1991	2005–2008?
	B: downswing	2005–2008?	?

Sources. Mandel (1980); van Duijn (1983, p. 155); Goldstein (1988, p. 67); Ayres (2006); Jourdon (2008); Linstone (2006: Figure 1, pp. 1040–1043). The last dating (2008) is suggested by the authors of the present article (Grinin et al. (2011); Grinin and Korotayev (2012); Korotayev, Khaltourina, and Bojevolnov (2010); Korotayev and Tsirel (2010a; 2010b, 2010c, pp. 188–227). A similar dating was also suggested by some other scholars (see, e.g., Lynch, 2004, p. 230).

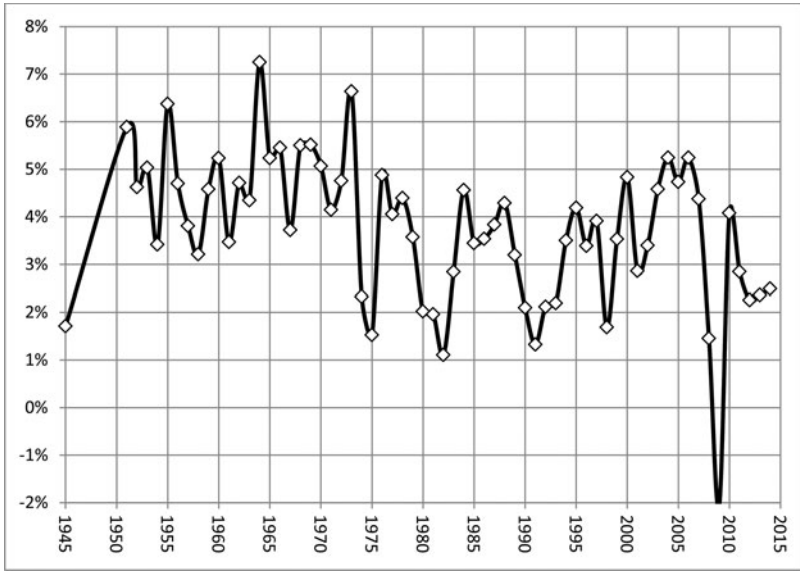


Figure 5. The fourth and fifth K-waves in world Gross Domestic Product annual growth rate dynamics. *Source.* Maddison (2010) (1940–2008); World Bank (2017) (2009–2014).

additional emission of dollar and the deficit of balance of payment played the role of California’s gold (in the period from 1850 to the 1860s) and increased the inflation in some places and sectors while blowing “bubbles.”

Second, inflation is multifaceted. In particular, one should distinguish cost inflation and demand inflation. The cost inflation can have severe consequences

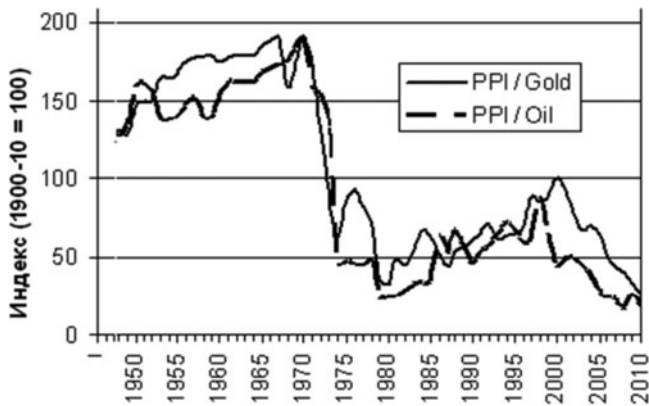


Figure 6. The U.S. producer price index in gold and oil equivalent during the fourth and fifth K-waves. *Sources.* BP (2010); Grinin et al. (2011); Scheglov (2009, p. 77).

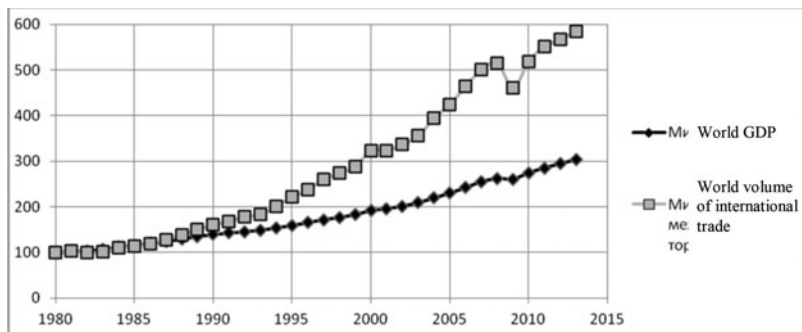


Figure 7. The relative growth dynamics of the world Gross Domestic Product and the world trade (100 = the level of 1980). *Source.* IMF (2017).

especially under non-competitive conditions. The stagflation of the 1970s was connected with cost inflation but not with demand inflation. There was no alternative to oil then. However, globalization has undermined some opportunities for the cost inflation even in the services sector since the rapid means of communication made it possible to outsource the most expensive services. *The demand inflation mainly depends on the growing demand. However, there is no such growth in the developed countries.* Thus the absence of deflation during the B-phase of the fourth K-wave looks now as an exceptional phenomenon.

Third, one should consider not only the emission of money but also the factors that level it, namely:

1. the fact that in the period of crisis many capitals were burned or frozen (“garbage assets”).
2. The necessity to support global trade. While in the 19th century gold played the role of world money, at present dollars and partly other currencies perform this function. Therefore, some amount of money should be additionally invested into the world economy annually. Let us recall that in recent decades the world trade growth rates surpassed the growth rates of the world economy (see Figure 7); and thus, a larger amount of world money has been needed. Against this background, the United States, Japan, and some other countries get benefits and this is a situation similar to the 19th century when the United States and Australia got extra bonuses from growth in gold mining. The world economy growth even by 2% per year means an increasing demand for dollars, hundreds billions of dollars that are invested through the emission.
3. Hoarding means accumulation and removal from circulation. On the global scale it took the form of accumulation of foreign exchange reserves that reached tremendous volumes and this contributes to the absorption of spare money. Over the last decade a number of countries have accrued their international reserves. That is the reason why the inflation is so low in the countries-issuers, but it is high in other countries (as we have already noted, the accumulation of foreign currency reserves is used by such countries to support the issue of their own currency). Besides, these countries accumulate a certain

part of the reserves and different national funds in U.S. and other countries' government bonds. Hoarding is expressed in private savings (up to hundred billions of dollars in cash are annually spent on these purposes).

DEFLATIONARY AND DEPRESSIVE FACTORS SPECIFIC TO THE WESTERN WORLD

All other things being equal, weak economic growth is mainly explained by the fact that the main reserves of growth were exhausted in respective societies. The evident reserve, which appeared to be mostly depleted in Japan in the 1990s, was demography. In the 1990s, the process of decline of economically active population began (see, e.g., Vimont, 2000), which continues until now (see Figure 8), but at present we also observe a natural decline in the population.

Thus, one of the main problems is the population aging, its slow growth, or even depopulation in developed economies and this contributes to the weakening of the natural foundation for the economic growth.

The next cause of “the Japanese disease” is a *very high standard of living that can hardly be adapted to decreasing growth rates.* In Europe, for example, the number of working hours per worker is much smaller than in the United States and Japan.

The third reason is that these countries are transforming into rentiers due to their specialization within the World System on the export of capital and receiving dividends and also due to their strong financial centers and financial sector.

The fourth reason is that the main reserve of the economic growth in Europe, the United States, and Japan is the technological growth. However, in the situation of active export of capital and continued industry export (although there is evidence of the homeward stream) this factor is limited in its action at least until the development of new breakthrough technologies. Low interest rates on deposits

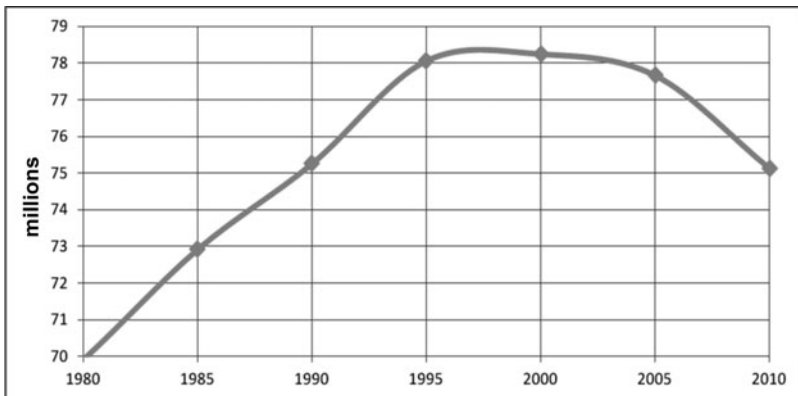


Figure 8. The dynamics of working age population (20–65 years) in Japan, 1980–2010. *Source.* UN Population Division (2017).

also cause low inflation (and the outflow of capital). The most important sign (not only in the United States but also in Europe) is *low credit rates*, which reduce cost inflation (on the contrary, in Russia and China the high credit rates increase cost inflation).

The fifth reason is the deindustrialization in developed economies in which the financial services and flows account for a larger share. And the service economy significantly differs from the previously existed type, similarly, as the industrial economy differed from the industrializing one. For example, while the crisis in 1970–1980 was associated with oil prices growth, the current crisis arises from the sharp decline in oil prices and it can make many businesses bankrupt. At present housing bubbles and other bubbles pose major threats because the emissions flow primarily into these financial structures. To some extent this is similar to pre-industrial and early industrial economy where basic capitals were separated from the economy (finance would concentrate mainly in serving public debt and large-scale trade). Bursting bubbles is unprofitable because it leads to bankruptcy and requires new niches for saving and growth of capital.

The sixth reason is the erosion of the middle class and growing inequality. Especially it is typical of the United States with its weak development of its social system, because extra revenues from monetary emission mean increasing or sustaining incomes of a narrow class of people, which leads to growing social stratification in developed countries. This can increase the risk of social unrest. But we also observe a growing social stratification in other developed countries. This tendency is typical of the largest Western states. Thus, the erosion of the middle class provokes deflationary processes as the household incomes decrease (or stop growing), while in developing countries, on the contrary, the growing middle class affects the inflation rates.

IMPLICATIONS FOR FUTURE GLOBAL ECONOMIC DEVELOPMENT

On the whole, there are reasons to maintain that European countries suffer from “the Japanese disease,” and this disease can progress or become chronic. The United States, although to a lesser extent, also has the signs of the disease. As a result, financial injections can become constant, as this has already happened in Japan.

The main problem is that the driving force of the growth weakens and the economies cannot grow without emissions and financial injections. The worst is that they cannot grow even with financial injections; at best they can demonstrate a sluggish development. As a result the real business forces move to the spheres of financial and other technologies and this leads to decreasing investments into real technologies. *In the situation of economic difficulties everyone requires emission on a growing scale. So there starts a certain emission race among states. However, in the situation of relatively low demand the emission will hardly bring a rapid increase of inflation, dollar devaluation, or other results.* But, of course, it will leave its mark. However, we will most likely see the consequences in a few years and as usual they will come unexpectedly. The continuous accumulation of money and financial instruments (especially combined with their accelerated circulation

or weakening of deflationary processes) can become a detonator. This situation will lead to the bursting of another financial bubble that can cause another large-scale crisis because the debt and emission overhang will significantly increase by that time. Besides, the central banks' manipulations cause remittance of money flows to the speculative channel (due to the actual repayment of debts by means of emission and repurchase of "bad" assets), which significantly distorts the proportions and creates a large overhang *in the form of overvalued exchange assets that are most likely to burst*. Of course, it is very difficult to forecast the time, place, and the trigger of that burst.

One should take into account that many social funds and capital owners invest in stocks and this fact will make the collapse hard for everyone.

Thus, probably, the cycle of monetary over-accumulation within the World System has not finished yet and it will take several years before the abscess breaks somewhere. The situation can be exacerbated if more countries and their central banks (including the European Central Bank [ECB]) are involved in the process of quantitative easing and the United States and Japan fail to cope with this process in the way they intend.

In the next few years the deflationary factors will prevail or even increase. According to Paul Krugman (in Hilsenrath, 2010), it is time to focus on the stable trend of decrease and on its consequences. After all, everything indicates that we will have to deal *with repressed economy for a long time*. Remarkable efforts and reforms will be needed to overcome the economic depression. The time will show if Western countries are ready for such sacrifices (Akaev, Sarygulov, & Sokolov, 2015; Minkov, 2015; Derluguian, 2016).

Thus on the basis of our analysis of available resources and the theory of long cycles, we arrive at the conclusion that in the next 5–10 years, the global economy will continue being in the crisis-depression phase with rather sluggish and weak rises. This conclusion is implied by the long cycle theory.

We suggest that the A-phase of the fifth K-wave ended with the start of the global crisis in 2008, when the B-phase started. In this case—taking into account the active search throughout the World System for effective anti-crisis measures—the duration of the B-phase should not be more than two "Juglars," and it is very likely that the duration of J-cycles within the cluster should not be very long. We should also take into account the tendency for the duration of B-phases to decrease. But at the same time B-phase shall not be less than two "Juglars," whereas, as we have seen, short J-cycles are less typical for B-phases than for A-phases. Therefore, we can suggest a tentative forecast that the present B-phase of the fifth K-wave will have a duration of 14 to 18 years. Thus, the fifth K-wave downswing will continue till the mid-2020s, and the problem of deflation, apparently, will be quite serious till that time.

FORECASTS

Recent developments in the global economy, commodity, and stock markets, as well as in the policies of central banks indicate the intensification of depressive and deflationary effects. We assume that in 2017 and 2018, these events will become

more intense. The world economy is moving toward a new financial or financial-economic crisis. But unlike 2008, this will be probably not a sudden collapse, but rather a slow retraction into the recession and financial contraction for some segments of the economy, which will have a cumulative impact on the financial sector and other areas of the economy.

We assume that more obvious signs of crisis (when it will be possible to speak about the crisis, not its precursors) may manifest themselves in 2018. At the same time, it is likely that we will have a “sticky” recession without major failures, but without the possibility to change the situation for 2–3 years or even more.

On the one hand, various negative developments in the economy in 2016 and 2017 are in certain moments reminiscent of the situation in 2006–2007 (when one could observe the beginning of the mortgage crisis, increased volatility in the stock markets and other harbingers of the crisis, which, however, seemed surmountable and transient). On the other hand, the situation now is significantly different. As we have mentioned above, the period up to 2006–2008 can be considered as the upward phase of the (fifth) Kondratieff wave. Then we can talk about a downward phase of this wave. For the upward phase is characterized by the growth of inflation and price bubbles (this is what we observed in the early 2000s). As noted by researchers of Kondratieff waves (see, e.g., Grinin & Korotayev, 2010a, 2012, 2014), the crisis at the turn of a Kondratieff wave (between its upward and downward phases) is particularly profound. This also explains the large scale of the crisis of recent years (as well as the crisis of 1974–1975).

Crises of the downward phases of Kondratieff waves are of a different character; they are less pronounced (collapses and busts might be absent or may not be as strong), as the preceding booms are relatively weak. But these crises are more stubborn and protracted. We assume that the next crisis (which will begin in 2018) will be of this kind.

Deflation is characteristic of the downswing phases of Kondratieff waves. At the downswing phase of the fourth Kondratieff wave (in the 1970s and early 1980s) deflation was not visible because it was prevented by the rise in oil prices, as well as by the departure from the gold standard. However, during the downswing phase of the fifth K-wave (i.e., just at present) deflationary phenomena began to appear as companions of the Kondratieff wave downswing. Unprecedented actions of central banks resorting to the emission in a variety of forms to saturate the economy with cheap money do not let the deflationary trend to develop fully, although in general it is becoming increasingly evident. Deflation begins to be also observed in some developing economies, including China—although a few years ago inflation was one of the main concerns of the Chinese administration. We expect further strengthening of deflationary phenomena (of course with fluctuations and variations in different countries). The strengthening of deflationary processes can be accelerated by the exhaustion of national funds of oil-producing countries, by the reduction of investment in companies producing oil and other raw materials, as well as by a number of other circumstances. Strengthening of these trends can be expressed in the future collapse of price bubbles.

In recent years we could observe the collapse of a few price bubbles that remained after 2008 due to the quantitative easing programs of the Federal Reserve

System (FRS). In this context, we assume that oil prices and prices of other raw materials is unlikely to grow significantly in the next three to four years, although some may rise (due to withdrawal of the less efficient players from the market). That is, they will not nearly reach the maximum levels that were two or three years ago.

Currently a very few bubbles can be observed in the world markets. These are some stock assets' bubbles, the dollar bubble (that increases the cost of the already existing great difficulties for the development of all economies, including the United States), as well as national debts' bubbles, since government bonds have become a haven for investors.

In this context, we assume that the stocks indices will be rather volatile in the forthcoming years, but the overall trend will be generally bearish (although with rather significant fluctuations). Thus, the "stock bubble" will gradually (but not abruptly) deflate, possibly reaching as a result the level of 2009. Such a trend will contribute to the reduction in corporate profitability, which we are already seeing in 2017.

As regards the U.S. dollar, we can say that even though objectively its cost is too high, the next year and a half we do not expect its significant decline, as long as the Fed continues to insist on raising rates and the U.S. economy continues to grow (although at a relatively small pace). Therefore, the dollar will remain a safer asset for investors.

But during the crisis forecast above, we can expect the fall of the dollar relative to other currencies due to the deteriorating economic situation in the United States and the corresponding actions by the Fed to ease the monetary policy. This, incidentally, may somehow counteract deflationary trends (but not in a radical way).

As for the government bond bubble, the situation will be ambiguous. Currently, due to the sharp decline in areas of favorable capital investment, which we assume will continue further, the primary aim of investors is to preserve their capitals. This is especially true with respect to conservative investors such as pension and other social and national funds. The number of those investors who prefer riskier operations, is unlikely to grow, it will rather decline, as is already evidenced by the problems of many hedge funds.

Nevertheless, one would expect that the absence of embedding spheres beneficial to investors, first to support the gold market and possibly other precious metals, and in the future these markets will grow. And second, it can enhance the mobility of the capital, which would seek to come to any market where higher profits are expected, but also it will contribute to the loss of capital as a result of falls or drops in these markets. Nevertheless, one would expect that the absence of spheres of profitable investments may first support the market of gold and possibly other precious metals, and in the future these markets will grow. And second, it can enhance the mobility of the capital, which would seek to come to any market where higher profits may be expected, but also it will contribute to the loss of capital as a result of falls or drops in these markets.

In connection with the above, the bubble of government bonds is likely to continue growing (even against the background of negative interest rates). However,

these will not be government bonds of all the states. Obviously, the debt market of government obligations can be divided into the market with reliable bonds and less reliable ones.

Accordingly, the market of reliable (American, German, Japanese) government bonds will be inflated (although central banks will become more and more important holders of them in connection with the policy of quantitative easing). As for the bond market of less reliable states (that has recovered from the crisis of 2009–2011), it is not likely to grow for a long time, whereas later it may turn out to be a source of a new general crisis.

In general, we note that today the Western economies are between the Scylla of weak economic growth with low interest rates and the Charybdis of over-indebtedness, which can threaten the state default. It is kind of a trap from which exit is difficult. In general, by trying through the increase in the national debt and all kinds of financial technologies (quantitative easing, zero and negative rates) to support the economy, Western countries have begun to “eat away” their financial superiority. We called the crisis of 2008 the crisis of overproduction of money (Grinin & Korotayev, 2010b). This is confirmed to a significant extent. As we just said, today the main problem is the lack of profitable and/or safe investments for monetary mass and financial derivatives that have increased dramatically since 1990. Therefore, the financial systems of a number of countries have been transformed into delayed-action mines. These are countries whose financial systems are parts of the Western monetary system, but whose economic systems are not as highly developed as the one of, say, Germany, which create greater risks of the crisis (Greece and the countries of Southern Europe are rather indicative in this respect).

As we have found, as a result of almost any Juglar crisis one can observe emergence, significant modification (or diffusion) of new financial technologies, which are then used to prevent or mitigate crises (Grinin & Korotayev, 2010b). Today the role of such technologies is played by quantitative easing with purchase of government obligations and negative interest rates. It can be assumed that as a result of a new crisis (that we have forecasted) their use may increase. However, they are unlikely to produce a radical effect.

Today there is a unique situation in many countries, when their debt is increasing, and the debt service costs decline; this looks beneficial in the short term, but in reality drives respective countries into a trap. First, their own pension and social funds suffer, as they cannot (as a result of lower bonuses) ensure the growth of pension and social savings for tens of millions of future pensioners.

Second, this situation worsens the possibility of a new round of economic growth since the emergence of new areas of profitable investment will inevitably raise the cost of credit, and with this the service of colossal public debt will be very difficult, and sometimes even impossible. This situation gives us further reason to believe that the forecasted crisis and depression (in 2018 and subsequent years) will be rather prolonged. As in the period between 2010 and 2015, there will be some rises in these years, but they are likely to be sluggish.

Overall, an end of the depression is likely to be associated with the completion of the downswing phase of the fifth Kondratieff wave and the beginning of the upward phase of the sixth Kondratieff wave (around the 2020s, most likely,

in the mid-2020s, but probably earlier). Thus, in the 2020s and 2030s we will expect the upswing of the forthcoming sixth Kondratieff wave, which will introduce the sixth technological paradigm (system). As is known, for this forecasted sixth technological paradigm the widely used abbreviation is NBIC-technology (or NBIC-convergence), where NBIC = nano-bio-information and cognitive (see Lynch, 2004; Pride & Korotayev, 2008). There are also those scientists (e.g., Jotterand, 2008) who consider another system of technologies to be leading in the future— Genomics, Robotics, Artificial Intelligence, Nano-technology (GRAIN). However, we believe that this complex will be larger. Moreover, we assume that this sixth technological paradigm will organically grow into a new technological revolution, which we call Cybernetic (Grinin & Grinin, 2015a; Grinin & Grinin, 2015b). The drivers of the final phase of the Cybernetic Revolution will be medical, additive (e.g., 3D printers), nano- and bio-technologies, robotics, information technology, and cognitive sciences, which will together form a sophisticated system of self-regulating production. We can denote this complex as MANBRIC-technologies.¹ However, all those revolutionary technological changes will be connected, first of all, with breakthroughs in medicine and related technologies (for more detail see Grinin & Grinin, 2015a; Grinin & Grinin, 2015b; Grinin & Korotayev, 2015).

Then, given the favorable conditions as they had been mentioned above, during this wave the final phase of the Cybernetic Revolution will begin. In such a situation it is possible to assume that the sixth K-wave's A-phase (the 2020s–2050s) will have much stronger manifestation and last longer than that of the fifth one due to more dense combinations of technological generations. And since the Cybernetic Revolution will evolve, the sixth K-wave's downward B-phase (2050–2060/70s), is expected to be not so depressive, as those during the third or fifth waves. In general, during this K-wave (2020–2060/70s) the Scientific and Information Revolution will come to an end, and the scientific and cybernetic production principle will acquire its mature shape.

Thus, the management of the economy should reach a new level. *K-waves appeared at a certain phase of global evolution and they are likely to disappear at its certain phase.*

NOTE

1. The order of the letters in the acronym does not reflect our understanding of the relative importance of areas of the complex. For example, biotechnologies will be more important than nanotechnologies, let alone additive technologies. The order is determined simply by the convenience of pronunciation.

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REFERENCES

- Akaev, A., Korotayev, A. V., & Fomin, A. (2012). Global inflation dynamics: Regularities & forecasts. *Structure and Dynamics: eJournal of Anthropological and Related Sciences*, 5(3), 1–15.
- Akaev, A., Sarygulov, A., & Sokolov, V. (2015). Macroeconomic Evolution: The Multipolarity of the Process and Quantitative Estimation Models. *Social Evolution & History*, 14(2), 191–207.
- Ayres, R. U. (2006). Did the fifth K-wave begin in 1990–92? Has it been aborted by globalization? In T. C. Devezas (Ed.), *Kondratieff waves, warfare and world security* (pp. 57–71). Amsterdam, the Netherlands: IOS Press.
- BP. (2010). *BP statistical review of world energy 2010*. Retrieved from <http://bp.com/statisticalreview>
- David, P. A., & Solar, P. (1977). A bicentenary contribution to the history of the cost of living in America. *Research in Economic History*, 2, 1–80.
- Derluguian, G. (2016). Does Capitalism Have a Future? That Is the Research Question. *Clodynamics*, 7, 109–118.
- Duijn, J. J., van (1983). *The long wave in economic life*. Boston, MA: Allen and Unwin.
- Goldstein, J. (1988). *Long cycles: Prosperity and war in the modern age*. New Haven: CT: Yale University Press.
- Grinin, A., & Grinin, L. (2015a). Cybernetic revolution and forthcoming technological transformations (the development of the leading technologies in the light of the theory of production revolutions). In L. Grinin & A. Korotayev (Eds.), *Evolution: From Big Bang to nanorobots* (pp. 251–330). Volgograd, Russia: Uchitel.
- Grinin, L., & Grinin, A. (2015b). Global technological perspectives in the light of cybernetic revolution and theory of long cycles. *Journal of Globalization Studies*, 6(2), 119–142.
- Grinin, L. (2012a). Kondratieff waves, technological principles, and the theory of production revolutions. In A. Akaev, R. Grinberg, L. Grinin, & A. Korotayev (Eds.), *Kondratieff waves: Aspects and prospects* (pp. 222–262). Volgograd, Russia: Uchitel. (In Russian).
- Grinin, L. (2012b). *Macrohistory and globalization*. Volgograd, Russia: Uchitel Publishing House.
- Grinin, L. (2013). The dynamics of Kondratieff waves in the light of the theory of production revolutions. In L. Grinin, A. Korotayev, & S. Malkov (Eds.), *Kondratieff waves: The range of approaches* (pp. 31–83). Volgograd, Russia: Uchitel. (In Russian).
- Grinin, L., & Korotayev, A. (2010a). *Global crisis in retrospective. Short history of rises and crises from Lycurgus to Alan Greenspan*. Moscow, Russia: KD LIBROKOM. (In Russian).
- Grinin, L., & Korotayev, A. (2010b). Will the global crisis lead to global transformations. 1. The global financial system: *Pros and cons*. *Journal of Globalization Studies*, 1(1), 70–89.
- Grinin, L., & Korotayev, A. (2012). *Cycles, crises and traps of the modern world-system*. Moscow, Russia: LKI. (In Russian).
- Grinin, L., & Korotayev, A. (2014). The interaction between Kondratieff waves and Juglar cycles. In L. Grinin & A. Korotayev (Eds.), *Kondratieff waves*. (pp. 25–95) Volgograd, Russia: Uchitel.
- Grinin, L., & Korotayev, A. (2015). Population ageing in the west and the global financial system. In J. Goldstone, L. Grinin, & A. Korotayev (Eds.), *History & mathematics: Political demography & global ageing*. (pp. 52–80) Volgograd, Russia: Uchitel.

- Grinin, L., & Korotayev, A. (2016). Global Population Ageing, the Sixth Kondratieff Wave, and the Global Financial System. *Journal of Globalization Studies*, 7(2), 11–31.
- Grinin, L., Malkov, S., & Korotayev, A. (2010a). Mathematical model of a medium-term economic cycle. In A. Akaev, A. Korotayev, & G. Malinetsky (Eds.), *Forecast and modeling of crises and world dynamics* (pp. 287–299). Moscow, Russia: LKI. (In Russian).
- Grinin, L., Korotayev, A., & Malkov, S. (2010b). A mathematical model of Juglar cycles and the current global crisis. In L. Grinin, P. Herrmann, A. Korotayev, & A. Tausch (Eds.), *History & mathematics. Processes and models of global dynamics* (pp. 138–187). Volgograd, Russia: Uchitel.
- Grinin, L., Korotayev, A., & Tsirel, S. (2011). *Developmental cycles of modern world-system*. Moscow, Russia: LIBROCOM. (In Russian).
- Hilsenrath, J. (2010). Deflation defies expectations—And solutions. *The Wall Street Journal*. Retrieved from <http://online.wsj.com/news/articles/SB10001424052748704249004575384944103200032?mg=reno64-wsj&url=http://%3A%2F%2Fonline.wsj.com%2Farticle%2FSB10001424052748704249004575384944103200032.html>
- IMF—International Monetary Fund. (2017). *World Economic Outlook (WEO)*. Washington, DC: International Monetary Fund. Statistical Supplement.
- Jevons, W. S. (1884). *Investigations in the currency and finances*. London, UK: Macmillan.
- Jourdon, P. H. (2008). *La monnaie unique europeenne et son lien au developpement economique et social coordonne: Une analyse cliometrique*. Thèse. Montpellier, France: Universite Montpellier I.
- Jotterand, F. (2008). *Emerging conceptual, ethical and policy issues in bionanotechnology*. Berlin, Germany: Springer.
- Juglar, C. (1862). *Des crises commerciales et de leur retour périodique en France, en Angleterre et aux États-Unis*. Paris, France: Guillaumin.
- Kondratieff, N. (1926). Die langen wellen der konjunktur. *Archiv für Sozialwissenschaft und Sozialpolitik*, 56(3), 573–609.
- Kondratieff, N. (1935). The long waves in economic life. *The Review of Economic Statistics*, 17(6), 105–115.
- Kondratieff, N. (1984). *The long wave cycle*. New York, NY: Richardson & Snyder.
- Korotayev, A., & Grinin, L. (2012). Kondratieff waves in the world system perspective. In L. Grinin, T. Devezas, & A. Korotayev (Eds.), *Kondratieff waves. Dimensions and prospects at the dawn of the 21st century* (pp. 23–64). Volgograd, Russia: Uchitel.
- Korotayev, A., & Grinin, L. (2014). Kondratieff waves in the global studies perspective. In L. Grinin, I. Ilyin, & A. Korotayev (Eds.), *Globalistics and globalization studies: Aspects & dimensions of global views* (pp. 65–98). Volgograd, Russia: Uchitel.
- Korotayev, A., Khaltourina, D., & Bojevolnov, Yu. (2010). *The laws of history. Secular cycles and millennial trends. Demography, economy, and wars*. Moscow, Russia: LKI/URSS. (In Russian).
- Korotayev, A., & Tsirel, S. (2010a). Kondratieff waves in the world economic dynamics. In D. Khaltourina & A. Korotayev (Eds.), *System monitoring of global and regional development* (pp. 189–229). Moscow, Russia: LIBROKOM/URSS. (In Russian).
- Korotayev, A., & Tsirel, S. (2010b). Kondratieff waves in the world-system economic dynamics. In A. Akaev, A. Korotayev, & G. Malinetsky (Eds.), *Forecast and modeling of crises and world dynamics* (pp. 5–69). Moscow, Russia: LKI. (In Russian).
- Korotayev, A., & Tsirel, S. (2010c). A spectral analysis of world GDP dynamics: Kondratieff waves, Kuznets Swings, Juglar and Kitchin cycles in global economic development, and the 2008–2009 economic crisis. *Structure and Dynamics*, 4(1), 3–57. Retrieved from <http://www.escholarship.org/uc/item/9jv108xp>

- Linstone, H. A. (2006). The information and molecular ages: Will K-waves persist? In T. C. Devezas (Ed.), *Kondratieff waves, warfare and world security* (pp. 260–269). Amsterdam, the Netherlands: IOS Press.
- Lynch, Z. (2004). Neurotechnology and society 2010–2060. *Annals of the New York Academy of Sciences*, 1031, 229–233.
- Maddison, A. (2010). *World population, GDP and Per Capita GDP*, A.D. 1–2008. Retrieved from www.ggdc.net/maddison
- Mandel, E. (1980). *Long waves of capitalist development*. Cambridge, UK: Cambridge University Press.
- Minkov, M. (2016). Predictors of societal accident proneness across 92 countries. *Cross-Cultural Research*, 50(2), 103–122.
- Pride, V., & Korotayev, A. (2008). (Eds.). *New technologies and the continuation of the human evolution?* Moscow, UK: LKI/URSS. (In Russian)
- Rothbard, M. (2005). *What has government done to our money?* Auburn, AL: Mises Institute.
- Rubtsov, B. B. (2000). *The world stock markets: Current state and patterns of development*. Moscow, Russia: Finansovaya Akademiya. (In Russian)
- Scheglov, S. I. (2009). *The Kondratieff cycles in the twenty-first century, or how the economic forecasts come true*. Retrieved from <http://schegloff.livejournal.com/242360.html#cutid1> (In Russian).
- Schumpeter, J. A. (1939). *Business cycles*. New York, NY: McGraw-Hill.
- Tooke, T., & Newmarch, W. (1858–1859). *Die Geschichte und Bestimmung der Preise während der Jahre 1793–1857* (pp. 1–2). Dresden, Germany: R. Kuntze.
- UN Population Division. (2017). *UN population division database*. New York, NY: United Nations.
- Vimont, C. (2000). Evolution démographique, marché du travail et croissance de la productivité. *Problemes Economiques*, 2656(2657), 37–41.
- World Bank. (2017). *World development indicators online*. Washington, DC: World Bank. Retrieved from <http://data.worldbank.org/indicator>