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Kondratieff Waves. Juglar – Kuznets – Kondratieff. Yearbook

Leonid Grinin, Tessaleno C Devezas, Andrey Korotayev

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KONDRATIEFF WAVES

Juglar – Kuznets – Kondratieff

**Edited by
Leonid E. Grinin,
Tessaleno C. Devezas,
Andrey V. Korotayev**



**'Uchitel'
Publishing House
Volgograd**



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In the period from the 1920s to 1930s the theory of economic cycles underwent dramatic changes. Due to the research of such famous economists as Nikolay Kondratieff, Joseph Kitchin, Wesley Mitchell, Simon Kuznets, and Joseph Schumpeter the idea of a whole system of economic cycles (with characteristic periods between two and sixty years) was developed. The idea of a system of intertwined economic cycles is nowadays paramount to the school of evolutionary economics and its development promises rather interesting future outcomes. That is why this issue of our 'Kondratieff Waves' Yearbook is devoted to the interconnections between various economic cycles.

As to the subtitle of this volume, one should note that many of the contributors refer to the system of cycles and the fact that real economic cycles make up a system, whereas among different types of cycles, the Juglar, Kuznets, and Kondratieff cycles are the most important ones for the present-day economic dynamics.

Although Kondratieff himself considered long waves as above all an economic phenomenon, the theory of the long waves became, however, very actively developed in connection with their political and geopolitical aspects. In this Yearbook, the political aspect of Kondratieff waves is the subject of several articles in the second section.

The last section of this Yearbook is devoted to the heritage of Kondratieff and other prominent economists. The year 2015 marks the 150th anniversary of the outstanding Russian economist, one of the most prominent researchers of medium-term economic cycles, Mikhail Tugan-Baranovsky, and the volume is concluded with Kondratieff's article about him. Concerning 2015, we should mention another anniversary, namely, 30 years since the death of Simon Kuznets (1901–1985).

This edition will be useful for economists, social scientists, as well as for a wide range of those interested in the problems of the past, present, and future of global economy and globalization.

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Contents

Introduction. Cyclical Dynamics in Economics and Politics in the Past and in the Future	5
----------------------------------------------------------------------------------------------------------	----------

I. The System of Cycles

<i>Leonid E. Grinin,</i> <i>Andrey V. Korotayev</i>	Interaction between Kondratieff Waves and Juglar Cycles	25
<i>Philippe Jourdon</i>	From Kuznets Theory to a New Global Governance, using a Mathematical Concept of Relations between wealth-Creating Kuznets Cycles and a Kondratieff-Inspired System of Management	96
<i>Lucas Bernard,</i> <i>Aleksandr V. Gevorkyan,</i> <i>Tom Palley,</i> <i>Willi Semmler</i>	Long-Wave Economic Cycles: The Contributions of Kondratieff, Kuznets, Schumpeter, Kalecki, Goodwin, Kaldor, and Minsky	120

II. Long Cycles: Economic and Political Aspects

<i>William R. Thompson</i>	K-Waves, Technological Clustering, and Some of Its Implications	164
<i>Arno Tausch</i>	The Hallmarks of Crisis. A New Center-Periphery Perspective on Long Economic Cycles	181
<i>Brian J. L. Berry,</i> <i>Denis J. Dean</i>	Long Waves in American Politics. Part One: Takeoff Presidencies	251
<i>Euel Elliott,</i> <i>Brian J. L. Berry</i>	Long Waves in American Politics. Part Two: The Obama Question	265
<i>Jonas Van Vossolle</i>	Long Waves of Political Contestation	276
<i>Peter Herrmann</i>	Indicators – More than Evidence and Maths	297
<i>Stephen I. TERNYIK</i>	World System Energetics	321

III. The Sixth Wave and Future of Technologies

<i>Leo Nefiodow,</i> <i>Simone Nefiodow</i>	The Sixth Kondratieff. The Growth Engine of the 21 st Century	326
<i>Leonid E. Grinin,</i> <i>Anton L. Grinin</i>	The Sixth Kondratieff Wave and the Cybernetic Revolution	354

IV. Nikolai D. Kondratieff's Heritage and the Economic Science

<i>Valentina M. Bondarenko</i>	The Feat of Life and Creativity	378
<i>Nikolai D. Kondratieff</i>	M. I. Tugan-Baranovsky (The Main Features of His Scientific Worldview)	396

In Memoriam

<i>William R. Thompson,</i> <i>Barry K. Gills,</i> <i>Robert A. Denemark,</i> <i>Christopher K. Chase-</i> <i>Dunn</i>	George Modelski (1926–2014)	408
Contributors	414
Guidelines	416

Introduction

Cyclical Dynamics in Economics and Politics in the Past and in the Future^{*}

*Leonid E. Grinin, Tessaleno C. Devezas,
and Andrey V. Korotayev*

Nikolay Kondratieff is known primarily for his theory of long cycles. However, it is worth recalling that he was among the first who started to investigate the nature of different economic cycles and their systematic interaction. Actually the primary classification of cycles into short, medium and long belongs to Kondratieff.

In 1922, in his book *The World Economy and its Conjunctures during and after the War* Nikolay Kondratieff formulated for the first time the basic tenets of the theory of long cycles (Kondratieff 1922 [2002]). As until that time the economic literature hardly knew any other cycles than the ones with a characteristic period between 7 and 11 years (which were called industrial, commercial, and so on), Kondratieff quite logically called them ‘short cycles’ (*Ibid.*: 323). However, already in 1925, in the *Long Cycles of Conjuncture* (Kondratieff 1925 [1993]: 25–26), he began to call the same cycles as ‘medium cycles’.¹ Why? The fact is that in those years Kitchin (1923) discovered some cycles (with a characteristic period between 3 and 4 years) manifested in fluctuations in inventories that could be denoted as truly ‘short cycles’. Later, they became known as ‘Kitchin cycles’. Due to the fact that the medium-term cycles often have internal ups and downs, a group of scientists in the Harvard School headed by Wesley Mitchell started to consider cycles statistically (not by their logic, but by the presence of recessions, from a recession to another recession, regardless of the point that different recessions may be significantly different as regards their strength and nature). As a result, they also detected some cycles with a period between 3 and 4 years (which to a certain extent coincided with Kitchin cycles).

^{*} This research has been implemented as part of the Basic Research Program at the National Research University Higher School of Economics (HSE) in 2015 and supported by the Russian Foundation for the Humanities (Project No 14-02-00330).

¹ By the way, Kondratieff seems to be the first economist to call those cycles ‘medium-term’.

Some years later, Simon Kuznets discovered construction cycles lasting from 17 to 30 years (Kuznets 1930). Thus, in the 1920s and 1930s one could observe within Economics the formation of the idea of a whole system of economic cycles.

At that time it was logical to consider different cycles as having a single and common nature. Such an attempt was made by Joseph Schumpeter in his monograph *Business Cycles* (Schumpeter 1939). However, due to the fact that he tried to consider the structure of long waves to be identical with the structure of the medium-term cycles, his attempt to create a general theory of cycles failed. Note, on the other hand, that it is due to Schumpeter that the medium-term cycles are known now as 'Juglar cycles', whereas the long-term cycles are denoted now as 'Kondratieff waves'.

The Great Depression intensified the economists' interest in cyclical dynamics. As Gottfried Haberler (1964 [1937]) noted, never before in the history of economics the issue of economic cycles had been studied so hard. Haberler himself, before the World War II and on the instructions of the League of Nations, compiled an exhaustive analysis of all the theories of business cycles, but he was skeptical about the idea of long cycles.

However, the emergence of the Keynesian theoretical framework moved economists' attention to other aspects. On the one hand, Keynesian ideas contributed to the understanding of the internal predisposition of the capitalist economy to recession and booms (*i.e.*, cycles), but on the other hand, the attractiveness of the opportunity to influence the course of cycles through public policies has led to the fact that economic thought became focused mainly on these kinds of instruments, and the problems of the nature and the root causation of cyclical changes gradually went to the periphery of economic science.

This was facilitated by the fact that in the second half of the 20th century (especially at the upswing phase of the fourth Kondratieff wave in the 1950s and 1960s) the flow of cycles significantly changed (primarily under the impact of active influence on the economic situation).²

The recessions ceased to be as deep as before. Not surprisingly, the researchers began to pay more attention to such issues as monetary regulation rather than to Juglar cycles.

Such disregard of the study of Juglar cycles is, of course, counterproductive. In our opinion, the current crisis is in many respects rather similar in type to the classic crisis as an integral part/phase of Juglar cycles.³

² For a more detailed analysis of post-World War II cycles see Grinin and Korotayev 2010, 2014a.

³ Fast, sometimes explosive booms (that produced a huge strain on the economy), and then even more precipitous busts were typical of the industrial cycles of the 19th and the beginning of 20th centuries (for more detail see Grinin and Korotayev 2014a; Grinin 2012; Grinin, Korotayev and Malkov 2010; Korotayev and Grinin 2012).

Yet, the investigations of long cycles continued, especially in the period of K-wave downswing in the 1970s and 1980s, when substantial research based on Schumpeter's ideas was performed (*e.g.*, Mandel 1975, 1980; Gordon 1978; Mensch 1979; van Duijn 1979, 1981; Barr 1979; van der Zwan 1980; Marchetti 1980, 1986; Eklund 1980; Kleinknecht 1981; Senge 1982; van Ewijk 1982; Glismann *et al.* 1983; Cleary and Hobbs 1983; Dickson 1983; Bieshaar and Kleinknecht 1984; Freeman 1987). But although very prominent scientists such as Forrester, Rostow, or Wallerstein sometimes concerned the topic (Forrester 1978, 1981; Rostow 1975, 1978; Wallerstein 1984), on the whole this area has never been among the top issues on economic thought. Nevertheless, the interest in this process continues, a new surge of interest has been associated with the work of Devezas and his colleagues (Devezas and Corredine 2001, 2002; Devezas, Linstone and Santos 2005; Devezas 2010).

We believe that the poor use of the theory of long waves limits the ability of forecasting the future of technological change. It is worth noting here that most of the studies that forecast the future development of nano- and biotechnologies, robotics, and so on, unfortunately, do not rely on major theoretical concepts. A significant part of the exceptions is constituted by the studies based on the relation between long waves and technological paradigms. This approach is based on the fact that each new wave (of 50–60 years long) corresponds to a significant shift to a new technological paradigm.⁴ The third section of this Yearbook, which is devoted to the sixth Kondratieff wave and related technological breakthroughs, demonstrates it quite well.

The article by **Leo and Simone Nefiodow** ('The Sixth Kondratieff. The Growth Engine of the 21st Century') introduces a method that is able to predict Kondratieff cycles in their early phase and describe them in ever-greater detail during their further development. This method was first published in 1996 (Nefiodow 1996). The authors believe that the fifth Kondratieff shaped economic events during the 1990s, and the new, sixth Kondratieff, is still in its early stage. This wave became possible because of the start of the formation of a new technological paradigm (new medical technologies and biotechnologies) whose development we have been observing during the last two decades. The Nefiodows believe that these are the technologies that will become the core of the new paradigm. At the same time they argue that psychosocial health (which, according to the authors, cover not only psychotherapeutic and psychiatric services, but also numerous measures of people's health improvement), will be the second leading way of the sixth K-wave.

⁴ See Mensch 1979; Kleinknecht 1981, 1987; Dickson 1983; Dosi 1984; Freeman 1987; Tylecote 1992; Glazyev 1993; Maevski 1997; Modelski and Thompson 1996; Modelski 2001, 2006; Yakovets 2001; Freeman and Louçã 2001; Ayres 2006; Kleinknecht and van der Panne 2006; Dator 2006; Hirooka 2006; Papenhausen 2008; see also: Lazurenko 1992; Glazyev 2009; Polterovich 2009; Perez 2011).

Leonid and Anton Grinin ('The Sixth Kondratieff Wave and the Cybernetic Revolution') differ from the Nefiodows, as they maintain that the sixth Kondratieff wave has not yet started – it will rather begin in the 2020s. The authors, based on their theory of production principles and production revolutions, reveal the interrelation between K-waves and major technological breakthroughs in history (for more detail about the latter see Grinin 2007a, 2012; Grinin and Grinin 2013). They make forecasts about the features of the sixth Kondratieff wave and its forthcoming technological paradigm in the light of the Cybernetic Revolution which, from their point of view, started in the 1950s. They assume that the sixth K-wave in the 2030s and 2040s will merge with the final phase of the Cybernetic Revolution (which they call the phase of self-regulating systems). According to them, this period will be characterized by a breakthrough in medical technologies, which will be capable to combine many other technologies into a single complex of MBNRC-technologies (medico-bio-nano-roboto-info-cognitive technologies).

* * *

No matter how attractive the idea of linear progress (that was actively developed after the second half of the 18th century [Nisbet 1980]) could be, it has become apparent that the world evolves in a non-linear pattern. And among these nonlinear phenomena the cyclical movements of various forms constitute one of the most common patterns.

It is obvious that the qualitative innovative motion toward new and unknown forms, levels, and volumes, *etc.* cannot continue endlessly, linearly and smoothly. It always proceeds with limitations, accompanied by the emerging imbalances, increasing resistance to environmental constraints, and competition for resources, *etc.* These endless attempts to overcome the resistance of environment created conditions for a more or less noticeable advance in particular societies. However, the relatively short periods of rapid growth (which could be expressed as a linear, exponential or hyperbolic trend) tended to be followed by stagnation, different types of crises and setbacks, which created complex patterns of historical dynamics, within which the trend and cyclical components were usually interwoven in rather intricate ways (see, *e.g.*, Grinin and Korotayev 2012a; Grinin, Korotayev, and Malkov 2010; Korotayev and Grinin 2012, 2014).

Thus, we have observed in history a constant interaction of cyclical and trend dynamics, including some very long-term trends (*e.g.*, Korotayev 2006; Korotayev and Khaltourina 2006; Korotayev, Malkov, and Khaltourina 2006; Korotayev, Komarova, and Khaltourina 2007).

The cyclical dynamics were noticed very long ago. Already the ancient historians (see, *e.g.*, the second Chapter of Book VI of Polybius' *Histories*) described rather well the cyclical component of historical dynamics, whereas new interesting analyses of such dynamics also appeared in the Medieval and Early

Modern periods (see, *e.g.*, Ibn Khaldūn 1958 [1377], or Machiavelli 1996 [1531]).

Although Kondratieff himself considered long waves as primarily an economic phenomenon,⁵ however, the theory of long waves became very actively developed in connection with their political and geopolitical aspects (*e.g.*, Goldstein 1988; Modelski 1987, 2006, 2012; Modelski and Thompson 1996; Devezas 2006). The ideas of long and super-long political cycles are also widely used in the world-system theory (*e.g.*, Chase-Dunn and Grimes 1995).

In the present Yearbook, the political aspect of Kondratieff waves (often in a very close connection with their technological and economic dimensions, as for example, in William Thompson's contribution) is the subject of several articles in the second section.

As **William Thompson** notes in his article ‘K-Waves, Technological Clustering, and Some of Its Implications’, the Kondratieff waves mean many things to different people. Thompson proposes that we would all benefit from adopting a view that considers these long-term fluctuations as instances of technological clustering. Thompson borrows the term ‘technologically clustering’ from Gruebler (1998: 117) who refers to a technological cluster as a ‘set of interrelated technological and organizational innovations whose pervasive adoption drives a particular period of economic growth, productivity increases, industrialization, trade, and associated structural changes’. If we were to converge on this technological clustering as the central focus of K-wave analysis, as a number of analysts do, the significance and centrality of these processes would become more salient, the need to elaborate our theoretical infrastructures would become more imperative, and the unification of many findings pointing in different directions might become more feasible. In other words, the potential payoffs could be efficient. Thompson attempts to advance the case for this approach by empirically elaborating some of the implications for technological clustering and world inequality reinforcement and systemic leadership decline. Earlier cases have been made for explaining the North-South income gap in terms of uneven technological diffusion (Thompson and Reuveny 2010) without being able to demonstrate fully the contours of the uneven diffusion. A relatively new dataset developed by Comin and Hobijn (2009) facilitates a more direct examination of this phenomenon. At the same time, uneven technological

⁵ On the other hand, Kondratieff noted that ‘it is during the period of the rise of the long waves, that is during the period of high tension in the expansion of economic forces, that, as a rule, the most disastrous and extensive wars and revolutions occur’ (Kondratieff 1935: 111). He also emphasized that ‘wars originate in the acceleration of the pace and the increased tension of economic life, in the heightened economic struggle for markets and raw materials, ...social shocks happen most easily under the pressure of new economic forces. Wars and revolutions, therefore, can also be fitted into the rhythm of the long waves and do not prove to be the forces from which these movements originate, but rather to be one of their symptoms. But once they have occurred, they naturally exercise a potent influence on the pace and direction of economic dynamics’ (*Ibid*).

clustering within the principal source of innovation, the leading economy, also helps explain the puzzles of the relative decline of the incumbent system leader.

Brian J. L. Berry and Denis J. Dean ('Long Waves in American Politics. Part One: Takeoff Presidencies') explore the relationships between long waves and cyclicalities in American politics. Particular attention is paid to 'takeoff presidencies', as modeled by Edward Jayne. These presidencies occurred in the decade following a long-wave trough and brought with them visions of liberty that have negated the preceding vision. The question is raised as to whether the Obama presidency, occurring in the same long wave phase as previous takeoff presidencies, will bring yet another redefinition of liberty to America.

Euel Elliott and Brian J. L. Berry ('Long Waves in American Politics. Part Two: The Obama Question') contend that Barack Obama, committed to ideas of social justice, has attempted to transform the United States into a European-style welfare state via taxation, regulation and legislation, in particular the Affordable Care Act ('Obamacare'), a medical insurance system that 'de facto' is nationalizing one-sixth of the nation's economy. But a slowing economy, mounting unemployment, and increasingly powerful central bureaucracy caught up in spying and other scandals and a disastrous launch of Obamacare, are producing a rising tide of resistance and a reaffirmation of individual rights guaranteed by the Constitution. If Obama prevails he will be hailed as another take-off president. If his initiatives could be overwhelmed by opposition forces, the effect will restore and strengthen constitutional guarantees that are currently under attack.

Jonas Van Vossle ('Long Waves of Political Contestation') develops a wave theory of political contestation, and places the current economic and political turmoil within a historical perspective. Based on legitimacy, it serves as an alternative to Samuel Huntington's (1991) waves of democratization. The theoretical framework is based on two main theories: the theory of long waves in political economics and the theory about state-legitimacy and fiscal crisis. In the first section, this paper gives a short overview of different economic dynamics which over time have been incorporated in long wave theories, predominantly based on the works of Kondratieff (1979) and Schumpeter (1939), and puts the current economic situation in this perspective. The second part analyzes the general interdependency between long waves and politics, and the original criticisms of the endogenous model by Trotsky (1923). The third section analyzes the long-waves theories in politics, in particular Samuel Huntington's theory, and discusses the main criticisms to his theory. The fourth section analyzes the influence of the long wave upswing and downturn on state-legitimacy, and is based on the works of O'Connor (2001) and Habermas (1975). The fifth section combines the long wave's concept with legitimacy and protest against a long wave theory of political contestation and gives the first

elements of some empirical evidence, comparing the political contestation in the thirties and today.

Peter Herrmann ('Indicators – More than Evidence and Maths') considers the important sociopolitical aspect of K-waves related to poverty dynamics. Work on conceptualizing and measuring poverty is widespread. Looking at the literature we can make out some form of cycles from different perspectives on the topic, oscillating between issuing poverty as a very general matter, on the one hand, and concentrating on very specific problems on the other hand, as for example, poverty of certain groups or the consequences of living in poverty. While, of course, attention is frequently paid to the connection between poverty and economic development, little consideration is given to the link between poverty and large cycles of capitalism represented by Kondratieff waves. Herrmann's contribution is devoted to theoretical investigation of this matter. This means as well that certain aspects of empirical approaches are critically investigated. The aim is to problematize some philosophical and methodological aspects of quantification/mathematization, equivalence principle and claim of exchangeability, individualization and, finally, evidence.

Stephen I. Ternyik ('World System Energetics') notes that human societies are evolving as energy transduction systems and the biophysical flow of energy in a socio-economic system 'quantizes' the flow of time and drives temporal acceleration. The decisive role of money in a monetary production economy is highlighted as temporal access to energy. The greater the natural energy input for productive output, the higher the economic wave frequency and the shorter the wave length. A singularization of human history, which is a replacement of long wave patterns, depends in the nearest future on the technical achievement of a relatively constant energy input. According to the basic formulae of the Snooks – Panov curve, a significant quantum change of the temporal flow will take place in the next decade; it is an open mathematical guess and an ongoing human intelligence test, if this temporal turning point is of discrete or continuous nature.

* * *

As to the subtitle of this volume, it should be noted that many of the contributors anyway speak about the system of cycles and the fact that real economic cycles make up a system, whereas among different types of cycles, the Juglar, Kuznets, and Kondratieff cycles are of utmost importance for the current economic dynamics. In this connection, it might be useful to make a small historical digression.

For a long time, the cyclical nature of economic development was not traced or was indiscernibly weak and irregular.⁶ This is not surprising. We be-

⁶ However, in complex agrarian systems one could detect rather regular socio-demographic cycles (see, e.g., Grinin 2007; Grinin and Korotayev 2012b; Korotayev 2006, 2007a, 2007b; Nefedov

lieve that the cyclical effect in economy appears only with the emergence of regular extended reproduction (first, in the financial and trade sector, and then in manufacturing). It would be useful to give a brief summary of the origin of cyclical dynamics in the modern economy.

It is no coincidence that the first manifestation of long-wave economic dynamics coincided with the industrial revolution of the 1780s. We can assume that the transition to the machine industry actually created the phenomenon of K-wave in economy (or at least allowed defining them clearly enough).⁷

The point is that in that period the productive forces began to acquire a new fundamental property consisting in striving for a steady and continuous expansion. The emergence of this property brought about various forms of cyclical dynamics connected with various limitations that hinder such an expansion and attempts to overcome them. This forward movement, of course, could not be uniform, and had to obey different rhythms; their common property was the alteration of acceleration and deceleration phases caused by the exhaustion of available resources for growth, market saturation, reduced profit margins and so on.

Those rhythms were already present in the development of trade in the 18th century. The emergence of the first K-wave at the final phase of the Industrial Revolution meant the origin of the first form of cyclical dynamics that was specific for the industrial production principle. The completion of the Industrial Revolution in Britain and consolidation of the extended production pattern were marked by the emergence of a new and more explicit form of cycling – the medium-term cycles (ending with cyclical crises). The first such cycle can be dated to 1818–1825. It is rather symptomatic that the first medium-term economic cycle in history happened after the completion of the upswing phase of the first K-wave. There is every reason to believe that K-waves may be fully realized only through the medium-term cycles, as summarized depressions of medium-term cycles determine the overall downward trend at B-phases of a K-wave, whereas aggregated booms of medium-term cycles determine the upswing dynamics of K-wave A-phases (see Grinin 2010, 2013; Grinin and Korotayev 2012b, 2014b; Korotayev and Grinin 2012 for more detail).

Thus, both the Kondratieff long waves and the medium-term Juglar cycles are associated with the same fundamental change – with a transition to a new

2004; Turchin 2003, 2005a, 2005b; Turchin and Korotayev 2006; Turchin and Nefedov 2009; Korotayev and Khaltourina 2006; Korotayev and Komarova 2004; Korotayev, Komarova, and Khaltourina 2007; Korotayev, Malkov, and Khaltourina 2006; Korotayev *et al.* 2011; Korotayev, Malkov, and Grinin 2014).

⁷ In any case, most researchers agree with this dating, though there are ones who find long waves in prices (and not only in prices) starting from the 12th (or even 10th) century (see, *e.g.*, Goldstein 1988; Modelski and Thompson 1996; Modelski 2006, 2008, 2012; Mogeey 1992; Pantin 1996; Pantin and Lapkin 2006).

pattern of production development, that is an extended reproduction based not only on the involvement of new resources (this also had happened within complex pre-modern agrarian systems), but on the economic growth through regular investments, innovations and improvements. In other words, the relationship between the long and medium-term cycles, on the one hand, and the tendency of the contemporary productive forces toward the continued expansion, on the other, has a common denominator, which includes innovations as an important component. Hence, it is evident that both types of economic cycles are associated with a longer (and deeper) cyclic change in the productive forces – the production revolution that leads to the movement from one production principle to another (Grinin 2007b).

The year 1825 was the year when a typical cyclic crisis of the Juglar type engulfed for the first time the whole British economy and part of the other countries' economy. It was preceded by the rise of enterprise, investment, and speculation, which in 1824 and early 1825 grew into a real boom (see Grinin and Korotayev 2012a for more details). The crises that took place in industry before 1825 were not universal, they were connected with certain problems in trade caused by various factors (inflation, wars and so on). As mentioned above, Schumpeter named such classical cyclical industrial crises that emerged in the early 19th century after the French economist Klement Juglar.

The researchers of medium-term cycles and crises of the 19th century often paid much attention to the crises of the 18th century finding them very instructive, and most importantly, largely similar to those observed in the 19th century. Indeed, the similarities (excitement, excessive lending, unexpected bankruptcies, credit crunch, panic and bust) are clearly visible. And it is no coincidence since a number of necessary elements for economic cycling (of course, except for a system of industrial machine production that dramatically increased the supply of goods to the market) had been already formed at that time.

As has been mentioned above, the imperative of continuous expansion of economic turnover was forming. Therefore, cyclicity (inherent in the industrial production principle) was substantial. The role of credit also increased. And since the mid-term cycles and crises are associated with fluctuations in credit, a certain prototype of medium-term cycles (with a characteristic period of about 10 years) can be observed in the 18th century, especially in its second half (see Hansen 1951; Braudel 1973).

In 1763, a crisis started in Hamburg against the background of the depreciation of currency during the Seven Years' War, but then as a result of the huge bankruptcy of de Neufville brothers in Amsterdam, this crisis acquired a pan-European character (Wirth 1877, 1883; Braudel 1973). Then there happened the crisis of 1772–1773, which took place against the background of severe crop failures of 1771–1772 and, like the previous one, included a large bankruptcy (the Cliffords bankruptcy of December 1772, which became the detona-

tor of collapse). Finally, the crisis of 1780–1783 also acquired a large scale as a result of another major bankruptcy in 1780 (see Braudel 1973).⁸

Crises could then obtain the all-European scale largely because trade and economic relations in the Western (or rather, Atlantic) part of the World System had significantly increased and became more intense. Against this background it is hardly surprising that any market fluctuations in some region influence the others (see *e.g.*, Wirth 1883). It is no coincidence that the crises in the 19th century were called commercial/industrial, as they particularly quickly seized the whole commerce (which tends to depend heavily on credit). They became predominantly industrial not immediately; still there was a significant difference between the 18th and 19th centuries. In the 18th century, the crises were mainly trade-related ‘disorder of the credit’, that is a violation of trust in the credit sector, a result of failures in the functioning of the financial system. Before 1825, the industrial crises (of overproduction) were observed in the cotton-textile industry (Mendelson 1959, vol. 1), but they should be more likely considered local, and the normal cycle period had not yet emerged. Thus, there was a certain preparatory period, when the mechanism of K-waves had been formed.

The articles of the first section of the Yearbook are devoted to the study of this system of cycles in modern economic dynamics.

Leonid E. Grinin and Andrey V. Korotayev (‘The Interaction between Kondratieff Waves and Juglar Cycles’) analyze some important correlations between the medium-term economic cycles (7–11 years) and the long (40–60 years) Kondratieff cycles. The research into the history of this issue shows that this aspect is insufficiently studied. Meanwhile, it can significantly clarify both the reasons of alternation of upswing and downswing phases in K-waves and the reasons of a relatively stable length of these waves. It can also provide certain means for forecasting. The authors show that adjacent two-four medium cycles form a system whose important characteristic is the dynamics of economic trend. The latter can be upswing (active) or downswing (depressive). The mechanisms of formation of such medium-term trends and changing tendencies are explained in the article. The presence of such clusters of medium cycles (general duration of which is 20–30 years) determines to a large degree the long-wave dynamics and its timing characteristics. Thus, not medium-term J-cycles depend on the character of K-wave phase as Kondratieff supposed, but instead it is the character of the J-cycles cluster that significantly determines the character of the K-wave phase.

Philippe Jourdon (‘From Kuznets Theory to a New Global Governance, Using a Mathematical Concept of Relations between Wealth-Creating Kuznets

⁸ Then, however, crises became more frequent occurring every three to four years. For example, one can mention the crises of 1787–1788, 1793, 1797, 1803. But they were of a transitional type.

Cycles and a Kondratieff-Inspired System of Management’) notes that debates on the significance of economic cycles proposed by Kuznets, Kondratieff, and Tugan-Baranovsky help to shape a unifying economic theory, the one that also borrows concepts, ideas, and models from neo-Marxist, monetarist, and other neo-classical schools of thought. These theories of economic cycles reveal a structure of economy which gives perspective to both economic statics and dynamics. In particular, the Kuznets cycles can contribute to forecasting a permanent new leadership in the global economy, while the Kondratieff cycles, by pointing to the existence of long periods of crisis, will make explicit the understanding of how they emerge from these long periods of crises. In combination, these insights will provide a top-down model of governance, which will include both global and institutional objectives. Jourdon further suggests that in order to allow for an empirical and theoretical convergence in using such a method we also have to learn from the European economic thought before the separation of economics and econometrics in the 1930s.

Finally, **Lucas Bernard, Aleksandr V. Gevorkyan, Tom Palley, and Willi Semmler** (‘Long-Wave Economic Cycles: The Contributions of Kondratieff, Kuznets, Schumpeter, Kalecki, Goodwin, Kaldor, and Minsky’) highlight the empirical and epistemological contributions made by the economists with respect to the cyclical nature of economic and social development. They examine the major mechanisms of economic cycles involving different time scales, with a particular focus on long-wave theory. The long-wave theories include Kondratieff’s theory of cycles in production and relative prices; Kuznets’ theory of cycles arising from infrastructure investments; Schumpeter’s theory of cycles due to the waves of technological innovation; Keynes – Kaldor – Kalecki demand and investment oriented theories of cycles; Goodwin’s theory of cyclical growth based on employment and wage share dynamics; and Minsky’s financial instability hypothesis whereby capitalist economies show a genetic propensity to boom-bust cycles. The paper also discusses the methodological and empirical challenges involved in detecting long-duration cycles.

With respect to the interaction between different kinds of cycles as well as world-system perspective the article by **Arno Tausch** (‘The Hallmarks of Crisis. A New Center-Periphery Perspective on Long Economic Cycles’) is of special interest. The author provides the analysis, based on a variety of standard econometric techniques, aiming at a fairly comprehensive test of the hypotheses about long cycles, associated with the names of Kondratieff and Kuznets. Tausch’s work, which takes up a recent approach by Barro (Barro and Ursua 2008; Barro, Nakamura, and Ursua 2011) tries to link the issue of long cycles with the issue of economic convergence and divergence in the World System, because there are very strong cyclical ups and downs of relative convergence in the world system in comparison to world averages or leading economies, and not just in terms of ‘national’ growth rates and ‘national’ economic cycles. Al-

ready the Japanese economist Kaname Akamatsu (1896–1974), who was a great admirer of Kondratieff, hinted at this connection. His most well-known tribute to Kondratieff (Akamatsu 1961) specifically linked the rise and decline of the global peripheries to the large Kondratieff cycle. In his contribution, Tausch attempts at establishing the empirical relationship between the Kondratieff cycles and the Akamatsu cycles, using advanced quantitative techniques with the Maddison data base, covering 31 countries. The Akamatsu cycles, analyzed in this work, are even stronger and seem to be more devastating than the ‘national waves’ and the global world systemic waves. There is a double-Tsunami wave structure of crises in the world economy. In addition, Tausch shows that the purchasing power shortfalls during the 2007 crisis were the largest in Japan, Italy, Denmark, France and Germany. His re-analysis of global cycles and national cycles as well as cycles of global convergence and divergence, has also revealed the existence of the 36-year Barro cycles and the 140-year Wallerstein cycles. For the first time in the literature, he also tries to analyze in a more systematic manner the cycles of convergence and divergence on a global level. Let us say a few words about the title of Tausch's article: the monolithic spirit of the day in Europe may maintain very uniformly that there is no alternative for the European periphery but to continue to be members of the Eurozone and to be subjected to the *phlebotomy* (bloodletting) of austerity packages under the auspices of the European Commission, while in reality the discovery of the organizing principles for rationalizing the complexities of the disease of stagnation and recession are being called for (in accordance with the path-breaking advances in cancer research, see Hanahan and Weinberg 2000, 2011). It is from cancer research, then, that we have taken the title: not the ‘hallmarks of cancer’, but the ‘hallmarks of economic crisis’ are on our agenda. These insights could one day include, like in medicine, sustaining future crisis signalling, getting to terms with economic growth suppressors, resisting the death of economic and social networks and agendas, especially in the most peripheral regions of Europe. The recognition of the widespread applicability of these concepts will, like in medicine, increasingly affect the development of new means to treat the ‘economic cancer’ of peripheral stagnation.

The last section of this Yearbook is devoted to the heritage of Nikolay Kondratieff and other prominent economists (we plan to make this section regular). Here we will publish articles both by Kondratieff himself and by other outstanding economists who explore the cycles, as well as the articles about Kondratieff and his successors. On the other hand, the year 2015 marks the 150th anniversary of an outstanding Russian economist, one of the most promi-

ment researchers of medium-term economic cycles, Mikhail Tugan-Baranovsky⁹, and the Yearbook is concluded with Kondratieff's article about him.

Another article in this section is by **Valentina Bondarenko** ('The Feat of Life and Creativity') and is devoted to Leonid Abalkin.¹⁰ Leonid Abalkin, who was the first President of the International Kondratieff Foundation (1992–2007), did incredibly much to bring the name and works of Nikolay Kondratieff back to the academic discourse in Russia as well as to collect and publish Kondratieff's scientific heritage.

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⁹ Incidentally, concerning 2015, we should also mention another anniversary, namely 30 years since the death of Simon Kuznets (1901–1985).

¹⁰ Leonid I. Abalkin (1930–2011) became a director of the Institute of Economics of the USSR Academy of Sciences in 1986. He also worked as an advisor to Presidents Mikhail Gorbachev and Boris Yeltsin, and was the second-in-command of Premier Nikolai Ryzhkov's government. Under Gorbachev he was one of the major advocates of rapid economic reforms.

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I. THE SYSTEM OF CYCLES

1

Interaction between Kondratieff Waves and Juglar Cycles*

Leonid E. Grinin and Andrey V. Korotayev

Abstract

Some important correlations between medium-term economic cycles (7–11 years) known as Juglar cycles and long (40–60 years) Kondratieff cycles are presented in this paper. The research into the history of this issue shows that this aspect is insufficiently studied. Meanwhile, in our opinion, it can significantly clarify both the reasons of alternation of upswing and downswing phases in K-waves and the reasons of relative stability of the length of these waves. It also can provide the certain means for forecasting. The authors show that adjacent 2–4 medium cycles form the system the important characteristic of which is the dynamics of economic trend. The latter can be upswing (active) or downswing (depressive). The mechanisms of formation of such medium-term trends and changing tendencies are explained. The presence of such clusters of medium cycles (general duration of which is 20–30 years) determines to a large degree the long-wave dynamics and the characteristics of its timing. Thus, not medium-term J-cycles depend on the character of K-wave phase as Kondratieff supposed, but the character of the cluster of J-cycles determines significantly the character of K-wave phases.

Keywords: *medium-term cycles, Juglar cycles, long cycles of Kondratieff, long waves, downswing phase, upswing phase, crisis, resources, business strategies, generations of businessmen.*

Introductory Notes

‘It appears that crises, like diseases, are one of the conditions of the existence of those societies where trade and industry are prevalent. One can predict them, alleviate them, delay them up to a certain moment, one can facilitate the recovery

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of economic activities; but it has turned to be impossible to eliminate them notwithstanding all the possible methods that have been applied¹. Unfortunately, those well-forgotten words of Clement Juglar (1862: VII), who was one of the first to demonstrate that economic crises follow the periodical/cyclical pattern, became very relevant again in 2008, that is about 150 years after they had been written.

We will start this article with our analysis of the main features of medium-term cycles of business activity, or business cycles (7–11 years)¹ that are also known as Juglar cycles after the prominent 19th-century French economist Clement Juglar (1819–1905), who investigated these cycles in detail (*Idem* 1862, 1889).²

Juglar investigated fluctuations of prices, discount rates and gold reserves of banks in France, England, and the USA and showed their correlation with cycles of increasing business activity, investments (and speculations), and employment (*Ibid.*). The first edition of his book was published in 1862. Juglar's most important achievement lay in presenting substantial evidence that crises were periodical, that is in support of 'the law of crises' periodicity'. According to this law, crisis is preceded by epochs of recovery, well-being, and price increases, which are followed by years of price decrease and trade slowing down that bring economy into a depressed state (*Idem* 1889: xv). The transition of economics as a whole from crisis theory to business-cycle theory is frequently connected (Bosomi 2005: 1) with Juglar's contribution to analysis of periodical crises. Thus, crisis does not occur randomly (it is erroneous to ascribe its occurrence to random factors).³ It is preceded by an intensive increase in business activities and prices, which sometimes allows one to predict a crisis in advance.⁴ According to Tugan-Baranovsky (2008 [1913]: 294), Juglar successfully coped with this task on a number of occasions.

¹ Many economists maintain that business cycles are quite regular with the characteristic period of 7–11 years. However, some suggest that economic cycles are irregular (see, *e.g.*, Fischer *et al.* 1988). As we suppose, comparative regularity of business cycles is observed rather at the World System scale than in every country taken separately. This corroborates the important role of exogenous factors for the rise and progress of business cycles (for more details see below).

² Medium-term cycles (7–11 years) were first named after Juglar in works by Joseph Schumpeter, who developed the typology of different-length business-cycles (Schumpeter 1939, 1954; see also Kwasnicki 2008).

³ Notwithstanding the belief of some influential modern economists in the contrary (see, *e.g.*, Zarnowitz 1985: 544–568; Mankiw 2008: 740).

⁴ It is worth mentioning here that, before Juglar, prevailing views were based on Adam Smith's ideas of 'invisible hand' and on Say's law of markets. According to such views, equilibrium state is considered to be the main one for the market, various shifts from it being caused by some external factors. Consequently, crises are also caused by random factors. However, currently these ideas (those of external shocks) are rather popular again. We will consider this issue in more detail further on.

A few notes on Juglar cycles (which will be also denoted as **J-cycles** below). Let us turn to a brief description by Tugan-Baranovsky of the economic cycle scheme proposed by Juglar:

‘Industrial crisis never comes unexpectedly: it is always preceded by a special heated state of industry and trade whose symptoms are so specific that an industrial crisis may be forecasted in advance... What causes these regular changes of booms and busts? Juglar indicates one main cause: periodic fluctuations of commodity prices. The prosperous epoch that precedes the crisis is always characterized by the growth of prices: “Annual savings of civilized nations (that enlarge their wealth) also lead and sustain the constant growth of prices: this is a natural state of the market, a prosperous period. The crisis approaches when the upward movement slows down; the crisis starts when it stops... The main cause (one may even say – the only cause) of the crises is the interruption of the growth of prices” (Juglar 1889: 33). The overall mechanism of the crisis development is specified by Juglar in the following way. The increase in commodity prices naturally tends to impede the sales of respective commodities. That is why with the growth of prices the foreign trade balance becomes less and less favorable for the respective country. The gold starts to move abroad to pay for the imports whose amounts start to exceed those of exports. At the beginning the amounts of gold moving abroad are negligible and nobody pays attention to this. However, the higher the prices, the greater the amount of gold that moves abroad. Finally, the commodity prices reach such a high level that selling the respective goods abroad becomes highly problematic. As the traders cannot cover the import expenses with the export revenues, they have to renew their promissory notes in banks after the payment deadline, and this accounts for the intensification of the discounting operations of the banks in the period that directly precedes the crisis. Yet, the payments cannot be delayed forever; sooner or later they should be made. The commodity prices fall immediately, this is followed by bankruptcies of banks and traders, and the industrial crisis begins’ (Tugan-Baranovsky 2008 [1913]: 294–295).

It can be seen that the central mechanism of cyclical fluctuations, in Juglar's opinion, is the fluctuation of prices, their increase leading to recovery and upswing, their decrease being followed by crisis and depression. The exceptionally important role of price fluctuations is indisputable; it has been noticed by economists belonging to various schools (see, *e.g.*, Haberler 1964 [1937]). Among them one can mention such contemporaries of Juglar as Karl Marx and Friedrich Engels. In Tugan-Baranovsky's opinion (Tugan-Baranovsky 2008 [1913]), with which we are ready to agree, Juglar's theory, however, does not explain adequately enough the main point, namely the increase in commodity prices in the period that precedes the crisis. Subsequent researchers described numerous mechanisms of such an increase, ranging from interest rate fluctuation, credit expansion and reinvestment to the behavior of aggregate demand and aggregate supply curves, as well as psychological factors such as ungrounded optimism. Nevertheless,

the issue is still subject to vigorous academic discussions. Tugan-Baranovsky himself suggests that crises are caused by a lack of capital, as in the upswing period capital is spent faster than it is accumulated. As a result, both credit and impulse to development are exhausted, while structural disproportions lead to crisis phenomena (not necessarily in the form of an acute crisis; he was right in stating that the crisis intensity depends on the intensity of upswing). Tugan-Baranovsky emphasizes (and we would agree with him on this point to a certain degree) that the school of Marx and Engels suggested the deepest understanding of crisis for their time. According to them, crises are caused by over-production (which is a consequence of the main contradiction of capitalism). Overproduction itself is stipulated, first of all, by the anarchic character of capitalist production; secondly, by poverty of the masses, their exploitation, and the tendency of salaries to decrease. As a consequence of constant growth of capital's organic structure (*i.e.* the decline of the proportion of salaries in total production expenses), according to Marx, the profit rate falls.⁵ Capitalists try to overcome the profit rate reduction by introducing new machines, which leads to labor productivity growth. This leads to the expansion of the commodities' supply and, consequently, to their overproduction (because of the 'anarchy' of capitalistic production). Then crisis is the explosion of contradictions of capitalistic production, and, consequently, the restoration of equilibrium. Some Marxist economists provided fundamental descriptions of the history of crises (see, *e.g.*, Mendelson 1959–1964; Varga 1937; Trakhtenberg 1963 [1939]). However, Marx and Engels, in our view, did not manage to show the true connection between processes of production and circulation (the latter were ignored as an allegedly less fundamental part). Thus, they were not capable of revealing the causes of the explosiveness of crises and dramatic changes at so-called turning points (*i.e.*, from boom to acute crisis and from bust to recovery and boom).

In the first half of the 20th century, numerous theories explaining economic cycles were already present. In fact, the under-consumption theory was one of the oldest, emerging a long time ago (actually, together with the science of political economy itself). Among its earliest followers, Lord James Lauderdale, Thomas Malthus and Jean Sismondi were the most prominent. In the first half of the 20th century, a significant contribution to scientific re-consideration and diffusion of the under-consumption theory was made by John Atkinson Hobson, William Foster, Waddill Catchings, Emil Lederer. Essentially concordant with its ideas were some of the abovementioned approaches of the Marxist orthodox school, which assumed that the conditions of the working class, according to the law of absolute impoverishment put forward by Marx, must worsen.⁶

⁵ Phenomenon marked by economists of various schools but explained differently.

⁶ However, such explanation has become an anachronism long ago. The given theory correlates very badly indeed with a long-term trend to an unprecedentedly fast (against the general historical background) increase in life standards (and real incomes) of 'direct producers' in general, and the 'working class' in particular. This trend is rather typical for 'capitalist' countries and is observed in reality.

Monetary theories saw causes of cyclicity mainly in the cumulative character of the expansion and contraction of business activities depending on the available amounts of money in the economy.⁷ The most vivid example is Hawtrey's theory (see, *e.g.*, Hawtrey 1926, 1928). For him, trade-industrial crises appeared to be purely monetary phenomena, as, in his opinion, the changes of monetary flow suffice to explain the transitions from upswings to depressions (and *vice versa*). On the whole, undoubtedly, the monetary component of cyclicity and crises is very important. However, representatives of monetary theories attributed a too dominant role to monetary factors, thus ignoring non-monetary causes.

One of the versions of the theory of over-accumulation is based on the ideas of Tugan-Baranovsky. Haberler (1964 [1937]) divides representatives of the theory into followers of its monetary and non-monetary versions. The first group includes those economists who suggest that monetary factors, acquiring great importance with credit expansion, cause strong disproportions between those economic sectors producing consumer goods and those producing capital goods (or, more exactly, between the sectors of the manufacturing chain). The followers of this version of the theory have made a particularly valuable contribution to the analysis of disproportions in production structure caused by the credit expansion during the phase of boom and prosperity, as well as to the interpretation of crisis as a result of those disproportions. Representatives of this direction include Friedrich von Hayek, Fritz Machlup, Lionel Robbins, Wilhelm Roepke, and Richard von Strigl. Numerous representatives of this direction belong to the so-called Austrian School, which started from the works by Ludwig von Mises (1981 [1912], 2005). The representatives of the Austrian School see the most important cause of crises in state interference into economic processes, particularly the artificial credit expansion. Special attention is given to the role of central banks as mechanisms generating crises (see, *e.g.*, Huerta de Soto 2006; Skousen 1993; Rothbard 1969; Shostak 2002; Kuryaev 2005).⁸

The other, non-monetary direction of over-accumulation theory is represented by the authors whose theories are based on taking non-monetary factors into account: inventions, discoveries, creation of new markets, *etc.*, that is the factors securing favorable conditions for new investments. This direction is represented by Gustav Cassel, Peter Hansen, Arthur Spiethoff, and Knut Wicksell. Works

⁷ It should be noted that, from the point of view of General Systems Theory, this point is essentially related to the issue of positive feedback loops, which will be considered in more detail further on. The action of these feedbacks can lead to phenomena perceived as 'booms', 'collapses', and 'breakdowns' (see, *e.g.*, Sornette 2003).

⁸ As a separate direction, a group of economists may be specified who developed the so-called 'acceleration principle'. According to this principle, the changes in consumer goods production cause, due to technological reasons, much sharper fluctuations in production goods sector, as investments into main capital require much more time and expenses. This causes a general demand increase, which eventually turns out to be greater than required for optimal development, which creates prerequisites for crisis origin (see, *e.g.*, Haberler 1964 [1937]).

by Arthur Pigou and Joseph Schumpeter are also essentially close to this direction.

Psychological theories are also worth mentioning. Even though every economic phenomenon has its psychological aspect, some theories (not without reason) when interpreting different cycle phases assign a special importance to 'psychological reaction' that can considerably increase disproportions, make a new phase occur faster or slower, contribute to business activity increase or hinder it, *etc.* Among the representatives of psychological theory, one may mention such prominent economists as, for example, John Keynes, Frederick Lavington, Arthur Pigou, and Frank Taussig. In some aspects they ascribe to psychological factors (such as optimism, pessimism, euphoria, panic) a relatively independent impact (for more details see Grinin 2009c).

Theories of economic crises can be classified in a variety of ways. For example, they can be segregated into exogenous and endogenous ones (see, *e.g.*, Morgan 1991), which is closely connected with approaches to the explanation of the nature of an equilibrium in economy. We take it as a basis that, though cyclicity has an endogenous structure being connected to occurrence of structural disproportions, yet crises cannot occur without some exogenous impacts. Essentially, the economy of a given country cannot be regarded in an isolated way, as the economic field is always much broader than the one of an isolated economy. It serves as part of the World System economic field, so in reality external impacts must necessarily be observed (see for more details Grinin and Korotayev 2012). The following important aspect must also be taken into consideration: while crisis in a given country may have first of all an endogenous character, its process and characteristics may possess substantial peculiarities in comparison to crisis in countries where it is caused by exogenous factors. In particular, under modern conditions many countries – as for example, China, India, or Russia – have not exhausted their resources for development. Crisis in these countries occurred just under the influence of a sharp change of external conditions. And, as external conditions of every country form a unique combination, crisis would have important peculiarities in each particular case. At the same time, in the USA the crisis was more of endogenous character, as the country's economic resources had been worn out to a greater extent than that in many developing countries. Such a situation is generally (though, of course, not always) typical for the development of crises in the core of the World System, on the one hand, and in its periphery, on the other. In the center, crises have a more endogenous character, while in the periphery their origins are usually more exogenous, as they tend to be caused by economic fluctuations in the center (Grinin and Korotayev 2010a, 2010b). Thus, every crisis has always both endogenous and exogenous causes, but their combination is specific for each particular society in every particular period, which makes the situation unique for any society and any crisis.

Kondratieff (2002: 11–14) divided all approaches firstly into ones regarding economic phenomena as static, considering static equilibrium state in economy as basic, and all deviations from such equilibrium as disturbances. Among the followers of this approach Kondratieff named William Jevons, Leon Walras, Vilfredo Pareto, Gregory Clark, Alfred Marshall, Knut Wicksell, *etc.* Secondly, in Kondratieff's view, the researches of some other economists were oriented mostly at the study of economic dynamics. These economists state that the equilibrium is not a basic condition; they may even consider it as random, whereas, according to them, the economic dynamics go through a whole range of regular development phases. Among those economists Kondratieff mentions Karl Marx, Clement Juglar, Mikhail Tugan-Baranovsky, Arthur Spiethoff, Jean Lescuré, Albert Aftalion, and George Mitchell. He indicates, however, that these researchers elaborated on particular problems of economic dynamics, their works stand somewhat apart from the general development of economic theory. Nevertheless, it should be added that these researchers made an especially important contribution to the development of the economic cycle theory.

As regards the above-mentioned division, it should be noted that, in the view of some economists, the essence of Keynesian Revolution is in Keynes' ideas (1978 [1936]) destroying the belief in perfect inner regulatory forces of market mechanisms (Adam Smith's 'invisible hand' [see Smith 1935]), which meant the true end of the *laissez-faire* doctrine (see, *e.g.*, Blaug 1985). The discussions between the Keynesians and Neoclassicists are mainly centered on the question whether economy possesses self-regulating forces.⁹ Classical theory pays particular attention to long-term economic growth, dwarfing the meaning of economic cycles. Keynesians insist that crisis-less economy growth is only possible in the presence of adequate monetary and fiscal policies playing the role of countercyclical stabilizers. In other words, Keynesians maintain that economic growth directly depends on *the state's* economic policy, without which such growth may not occur altogether. As Samuelson and Nordhaus note (Samuelson and Nordhaus 2009a: 486–487), in Keynesians' opinion, the economy is prone to lengthy periods of recurring unemployment followed by speculation and increasing inflation. While for a classical economist the economy is similar to a person leading a healthy way of life, for a Keynesian, economy is a manic-depressive personality, periodically inclined either to boundless rage and groundless gaiety, or to hopeless sullenness.

Since the 1950s, but especially from the 1970s to the 1990s, discussions concerning problems of cyclicality were connected with choosing the parameters through which economists proposed to influence it in order to diminish the negative consequences of uneven economic development. Expansion and de-

⁹ In classical economic theory, self-regulating forces are stated to be ones connected with the behavior of economic agents: entrepreneurs, workers, buyers, sellers, *etc.*, stipulated by elasticity of salaries and prices, which are capable of supporting the economy in a state of full employment.

velopment of the Keynesian theory contributed to the advancement of the idea about the economy's immanent proneness to falls and booms (*i.e.*, to cycles). However, on the other hand, the popularity of the idea about the possibility of influencing cycles through state policy led to the economic thought focusing mainly on the ways of producing such an influence. The problems of the cycles' nature and their deep causes gradually shifted to the periphery of the economic science.

Best-known in modern economic thought are the Keynesian (more exactly, neo-Keynesian) and monetary schools. The first post-war decades showed that the state policy of influencing economic parameters (such as aggregate demand, aggregate supply, discount rates, *etc.*) is not entirely successful. First of all, it is not always effective; secondly, it is not always based on long-term economic interests; thirdly, it has a certain lag, as necessary laws and decisions must be subject to a long procedure of coordination, approval, and enforcement. This led to growing popularity of the monetarist theory, which suggests that the state should exercise less direct influence on economy, while its interference must be more subtle and concentrate mainly on regulating money supply, money circulation velocity, state debt volume, and interest rates.¹⁰ An important contribution of this school to the macroeconomic theory can be seen in developing the idea about the necessity of following the rules of money circulation and not relying on voluntary fiscal and monetary policy.

Thus, the main difference between the views of Keynesians and monetarists lies in their approaches to defining aggregate demand. Keynesians suggest that aggregate demand changes are influenced by numerous factors, while monetarists believe the main factor having impact on output and prices is the change of money supply. Monetarists believe that the private sector is stable, and state interference often simply extracts resources; macroeconomic fluctuations appear mainly because of fluctuations of money supply. In general, one can observe different views as regards the questions of which instruments should be used to influence the cyclicity, and what should be the role and economic policy of a state in short-term and long-term perspectives.

However, some more radical views on direct state interference into the economy are also present within the neoclassical theory. One of its tenets is based on the so-called theory of rational expectations (Robert Emerson Lukas and others), which essentially suggests that, as people use all available information, they can figure out in advance the predictable state policy and use it for their own benefit, as a result of which state policy turns out ineffective. Rough-

¹⁰ It is no coincidence that dominating positions in global economic science (and practice) went from Keynesians to monetarists in the early 1970s at a transition period from upswing to a downswing phase of the 4th Kondratieff cycle. On the other hand, such position transition was stipulated by refusal from attachment to the gold standard in dollar, which led to great changes in behaviour of finances devoid of such an anchor.

ly speaking, ‘no government can outwit the taxpayers’. Neoclassicists also assume price and salary flexibility (that is why the theory is called neoclassical, as, similar to the classical pre-Keynesian one, it is based on the idea of economy self-regulation). Like monetarists, they suppose that state influence should concentrate mainly on indirect economy regulation via various monetary instruments.

However, it is important to understand that in the last 10–15 years the process of definite and substantial synthesis of old and new economic theories has been going on (for more details see Samuelson and Nordhaus 2009a: 505–507).¹¹ In particular, economists started paying more attention to expectations, as neoclassical theory suggests.

Phases of Medium-Term Cycles of Juglar (J-cycles)

Some modern economists single out only two main phases of the business cycle: upswing and downswing (there are some other names for those phases – *e.g.*, ‘expansion’ and ‘contraction’, whereas moments corresponding to the crisis (emerging at the peak of the overheating) and the trough of the downswing/recession are interpreted as inflection points (see, *e.g.*, Samuelson and Nordhaus 2009b).¹²

However, it is not rare that the cycle is subdivided into four phases¹³ (and we prefer to do this within our model). For more details on our model of the Juglar cycle see Grinin, Korotayev, and Malkov 2010.¹⁴

Thus, in our model J-cycle consists of four phases:

- recovery phase (which we could subdivide into the start sub-phase and the acceleration sub-phase);
- upswing/prosperity/expansion phase (which we subdivide into the growth sub-phase and the boom/overheating sub-phase);

¹¹ Actual synthesis of Keynesian and monetary theories started much earlier.

¹² Yet, generally speaking, the number of phases may depend on how detailed the respective analysis is (as well as a number of other factors). Thus (see below), we subdivide each cycle into four big phases (basing ourselves on Schumpeter's approach to the distribution of cycle phases), and then single out eight subphases (two subphases per every phase), whereas Burns and Mitchell (1946) only identify two big phases (expansion and contraction) subdividing each phase into three subphases, and consider turning points (peak and trough) as separate short phases. Thus, they get eight stages too (as the ninth stage belongs actually to the next cycle).

¹³ On the other hand, it appears possible to single out two sub-phases in each phase.

¹⁴ This model takes into account a number of approaches to the analysis of such cycles that are specified in the publications by Juglar (1862, 1889); Lescure (1907); Marx (1961 [1893, 1894]); Tugan-Baranovsky (1954, 2008 [1913]); Hilferding (1981 [1910]); Mitchell (1927), Keynes (1978 [1936]); Varga (1937); Haberler (1964 [1937]); Mendelson (1959–1964); Minsky (1983, 1985, 1986, 2005); Hicks (1946 [1939], 1993: 432–442); Samuelson and Nordhaus (2005: 403–552); Schumpeter (1939); von Hayek (1931, 1933); von Mises (1981 [1912], 2005); Cassel (1925); Pigou (1929); Friedman (2002); Abel and Bernanke (2008a), as well as a number of other economists.

- recession phase (within which we single out the crash/bust/acute crisis sub-phase and the downswing sub-phase);
- depression/stagnation phase (which we could subdivide into the stabilization sub-phase and the breakthrough sub-phase).

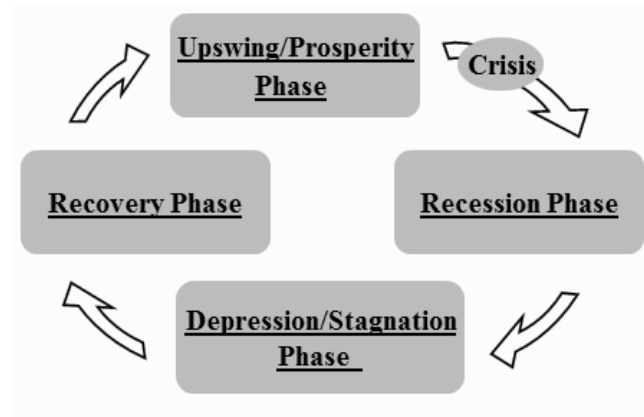


Fig. 1. The Model of a Juglar Cycle

Recovery phase starts after (and as a result of) the liquidation of disproportions (and the establishment of new proportions) that almost inevitably take place during preceding phases of recession and stagnation (which often lead to a significant restructuring). That is why a new cycle starts at a new level of equilibrium (Schumpeter 1939). The recovery and certain growth can start because, as a result of the preceding downswing, excessive commodity inventories have been dissolved and have come into correspondence with extant demand, some unsatisfied demand for commodities has been formed, problematic firms have disappeared, bad debts and fictive capitals have been ‘burnt out’, businessmen have become much more cautious (see, *e.g.*, Minsky 1983, 1985, 1986, 2005), *etc.*

During the expansion phase the growth accelerates, whereas the recovery becomes general. The active expansion often needs some external factor (*e.g.*, the emergence of some major new market). The demand for resources and commodities grows, investments increase in a really substantial way. This tends to lead to the growth of prices. The demand for credit also grows, new enterprises emerge, active speculations at stock and commodity exchanges take place. If the growth continues and becomes very fast, the economy moves to the boom (overheating) sub-phase, which leads to overstraining of the financial markets, as free liquidity is absent. As a result, prices grow very fast, ‘bubbles’ emerge, speculation increases.

Recession phase. Finally, some factors interfere (*e.g.*, a sudden drop of demand or prices, a bankruptcy of a large firm, a default of some foreign state,

additional demand for funds in the context of worsening political situations, a new law that changes 'rules of the game'); as a result one observes bust and acute crisis. This is accompanied by the decline of industrial production, waves of bankruptcies, decline of orders for various products, shut-down of many enterprises, explosive growth of unemployment, and so on.

Depression phases are the periods of stagnation and very slow economic growth, when the economy moves from the overheating and bust, the over-accumulated inventories are dissolved, prices decrease (though in modern times prices may behave in a somehow different way during this phase). The depression is the process through which the market economy gets adapted, it gets rid of extremes and distortions of the previous inflationary boom and restores a stable economic state. Within this perspective, depression turns out to be an unpleasant but necessary reaction to distortions and extremes of the preceding boom (*e.g.*, Rothbard 1969).

The causes of cyclical crises. Economic crisis (bust, recession, and depression) is the most dramatic part of the medium-term J-cycle. The crisis is always a result of the preceding active growth, because this growth inevitably produces structural strains not only in the economy, but in the society as a whole (as the current social institutions are 'designed' for a certain scale of phenomena and processes). However, notwithstanding all the similarities, every crisis, naturally, has certain unique features.

The characteristic features of classical J-cycles can be presented as follows: at the expansion phase they were characterized by very fast (sometimes even explosive) growth (boom) that involved a tremendous strain within the economic system, which was followed by an even more impressive bust.

The phase of expansion (that included the sub-phase of boom and overheating) was accompanied by the following phenomena:

- a) a very strong (even inadequate) growth of prices of raw materials and real estate;
- b) excessive demand for credit and the expansion of the investment over any reasonable limits;
- c) outbreak of speculations with commodities and bonds;
- d) enormous growth of risky operations.

All these are salient features of the Juglar cycle that have been described on many occasions by representatives of various schools of the economic thought. On the other hand, they can be easily found in the recent global economic crisis.

Our analysis has also demonstrated that during the expansion phase a special role is usually played by some new financial technology or some new type of financial assets.

Sharp transitions from booms to busts were connected with a spontaneous economic development that was regulated by almost nothing except the market forces, as the state interference in the economic development was not sufficient.

Within such a context (and taking into consideration the presence of the gold standard) acute crises became inevitable.¹⁵

On the Importance of Further Research on the Theory of J-Cycles

After the Great Depression the interest in Juglar cycles grew sharply, and, according to Haberler (2008: 431), there was no other period in the history of economic thought when the problems of economic cycles were studied so intensively. However, later, in the second half of the 20th century (especially, during Phase A of the 4th Kondratieff Cycle), the dynamics of business cycles experienced a significant change (first of all as a result of the active interference of the state into the economic life)¹⁶, recessions became less deep than before (whereas the crisis became less dramatic), the recovery came relatively fast, *etc.* As a result, economists began paying more attention to long waves of business activities (Kondratieff cycles) than to Juglar cycles, though, mostly by tradition, macroeconomics textbooks still tend to include a chapter on those cycles (yet, they are mostly denoted just as ‘business cycles’).¹⁷ We believe that such neglect with respect to the study of J-cycles is unproductive. In our opinion, modern crisis is quite similar in type to classical Juglar's cycle crisis.

The cyclical dynamics of Juglar type in their most pronounced form (that is, not smoothed by state intervention) was determined by the following factors: a) the presence of the gold standard in transactions within a country, as well as at the international level; b) uncontrolled dynamics of prices and interest rates; c) relatively weak interference of the state during upswings and even crises and recessions (though gradually such interference increased). These resulted in fast (sometimes even explosive) upswings (that demanded a great tension on the part of the economic system) and equally rapid downswings. The upswing, boom and overheating were accompanied by rapid and inadequate growth of prices of raw materials and real estate; an increase in intensity of speculations with commodities and stock assets; by a dramatic expansion of credit and risky operations; and the growth of investments beyond any reasonable limits. All

¹⁵ Thus, with the excessive growth of credit and swelling of financial assets, the amount of money substitutes (shares, bills, bonds, *etc.*) greatly increased. As a result, with a decrease in confidence in these securities a sudden demand for gold and cash increased so much that destroyed the entire banking system.

¹⁶ Even some Soviet economists had to acknowledge this, *e.g.*, Varga, a Hungarian by origin, who was influenced originally by the Austrian Economic School (*e.g.*, Varga 1974: 366–400). In particular, he noticed that the depression phase had contracted in a very significant way. The change in crisis patterns in England since the late 19th century was first noticed by Tugan-Baranovsky (2008 [1913]). Mitchell also showed that, though recession is a necessary part of the cycle, not every cycle should be necessarily connected with an acute crisis (Mitchell 1930: 391–392). For a more detailed analysis of post-war cycles see Grinin and Korotayev 2012.

¹⁷ See, *e.g.*, Mankiw 1994: ch. 14; Sacks and Larren 1996: ch. 17; Abel and Bernanke 2008a: ch. 8, even though such chapters are present not in all textbooks of the kind. For example, in the textbook by Dornbusch and Fischer (1997) such a chapter is absent.

these are salient features of the J-cycles that were described many times in the writings of representatives of various schools of economic thought (see, *e.g.*, Juglar 1862, 1889; Marx 1960 [1867]; Mills 1868; Lescure (1908); Tugan-Baranovsky 1954; Marx 1961 [1893, 1894]; Hilferding 1981 [1910]; Haberler 1964; Keynes 1978 [1936]; Hicks 1946 [1939]; Abel and Bernanke 2008; Samuelson and Nordhaus 2005, 2009b).

Such an expansion of assets tended to lift temporarily limitations produced by the metallic standard. This is the reason for the fact that we observe almost always during the upswing phase the effect of some new financial technology (naturally, in addition to the old ones), or some new type of assets (*e.g.*, in the 19th century this could be railway shares), that could drive the credit and speculations, amplifying the overheating of the economic system.¹⁸ The monetary component of the Juglar cycles was always exceptionally important (though this was the dynamics of real economy that was at the basis of cyclical **upswings**).

The above indicated factors were the main ones to engender very sharp and vividly expressed cyclic features. However, gradually under the impact of the Keynesian recipes (in the framework of national economic development) it became possible to minimize these dramatic distortions of rises and falls and to put speculation under a certain control (*e.g.*, after the Great Depression in the USA the Glass-Steagall Act was passed, forbidding banks, investment firms and insurance companies to speculate at stock exchanges [see Lan 1976; Samuelson and Nordhaus 2005, 2009b; Suetin 2009: 41]). This led to smoothing of cyclical fluctuations and to less explosive crises.¹⁹

However, currently, the crisis has evidently overgrown national borders, occurring namely as an international crisis, where national norms act in an obviously weakened form, while international regulations have not yet been worked out. That is why a number of old features recur at the new stage, because the methods of regulation applicable to separate countries would not work at World System scale, still more so that the rules of such regulation have not been worked out yet.

We suggest that the current recurrence of some features of Juglar's cycle is connected namely with the following features of anarchy and arrhythmia of the non-regulated market economy:

¹⁸ For example, by the Charter of the Bank of England (as renewed in 1833), it was permissible to establish deposit joint stock banks everywhere. As a result, their number started growing rapidly which greatly contributed to the growth of capital accumulation, speculation, and at the same time to the accumulation of conditions for the 1836 crisis (for more detail see Tugan-Baranovsky 2008 [1913]: 110–111). For more detail on the development of various new financial technologies from cycle to cycle see Grinin and Korotayev 2012.

¹⁹ In 1999 in the USA the law on financial services modernization was passed, which annulled the Glass-Steagall Act that was in force for more than 60 years (see Suetin 2009: 41). As a basis for introducing the law on financial services modernization, it has been claimed that American credit organizations are inferior to foreign rivals, especially European and Japanese 'universal banks' which were not subject to such limitations (Grinspen 2009: 200).

1. Subjects of international law (and their economic agents) largely behave the same way as subjects of national law and the market previously did. As they use foreign currency and foreign currency rates in their dealings, this invariably leads to sharp distortions in international trade, devaluations, *etc.*

2. In the last decades capital movement between countries became free, that is it is relatively weakly regulated by national law and almost not regulated at all by international law. This causes huge and exceedingly fast capital movements, which lead to a very rapid growth in some places and then to a sharp decline and corresponding crisis phenomena.

3. In the modern economy not only new financial technologies have been developed, but the modern economy itself largely started producing values namely in the financial sphere (financial services). Thus, the financial component of crisis has increased dramatically; this differs from previous decades, when the main growth went on in the sphere of manufacturing. These processes are analyzed in greater detail in the following publications: Grinin 2009a, 2009b; Grinin and Korotayev 2012; Grinin, Malkov, and Korotayev 2009.

We would like to conclude the present section with the following important note. Activities of modern financial corporations and funds lead to an uncontrollable growth of financial assets and anarchy in their movements; that is why it is criticized quite convincingly by various authors (*e.g.*, Schäfer 2009: 279–280), including ourselves (Grinin 2009a, 2009c, 2009d, 2012; Grinin and Korotayev 2010a, 2010b; Grinin, Malkov, and Korotayev 2010; Grinin, Korotayev, and Malkov 2010; Akaev, Fomin, Tsirel, and Korotayev 2010; Akaev, Sadvnichy, and Korotayev 2011, 2012). That is why we are absolutely convinced of the necessity to look for ways to minimize the respective risks at the global scale, to regulate activities of financial actors, and to restrict them in their most risky operations (*Ibid.*). However, it is highly erroneous to claim that the modern financial technologies are immanently destructive, that they only lead the world economy to various calamities, that they are only useful to parasitic financiers and speculators. Contrary to this, the modern financial sector performs a lot of generally useful important functions at the global scale. Our own analysis has demonstrated quite convincingly that the global financial system, notwithstanding all its negative points, still performs certain important positive functions including the ‘insurance’ of social guaranties on a global scale (Grinin 2009d, 2010b, 2012; Grinin and Korotayev 2010a).

Correlation between K-Waves and J-Cycles

1. Preliminary Discussion

Introductory Notes

The main goal of this section is to study the interaction between K-waves and J-cycles. We believe that the analysis of this interaction may help to clarify significantly both the causes of the alternation of upswing and downswing phases in the K-waves and the relative stability of their characteristic period.

We have already noticed above that there are numerous explanations as regards the origins of the medium-term Juglar cycles with their characteristic period between 7 and 11 years;²⁰ however, there is a substantial degree of unanimity as regards the main factors that are responsible for the emergence of the Juglar fluctuations (though this unanimity is absent as regards the contribution of each of those factors). There is much less clarity and unanimity as regards the causes of the emergence and recurrence of the K-waves (long cycles), as this field is still mostly dominated by various hypotheses (see, *e.g.*, Korotayev and Grinin 2012a).²¹

Notwithstanding substantial advances in the study of wave-like periodic fluctuations, there is no unanimity among researchers as regards many important points (see, *e.g.*, Goldstein 1988 for a review of earlier literature on this subject, or Korotayev and Grinin 2012a); those points include the total number of attested Kondratieff cycles; their periodization (this includes the issue of the presence/absence of the K-waves before the industrial revolution of the 18th century);²² which parameters should be used to trace periodic fluctuations; which spheres are subject to those fluctuations (whether they are observed in the economic subsystem only, or also in political and cultural spheres).²³ There is no unanimity either as regards the issue of the main factors affecting the formation of the waves and the change of their phases²⁴ (for more details see Grinin, Devezas, and Korotayev 2012).

Notwithstanding the abovementioned difficulties, we may base our further research on the fact that the K-wave dynamics was actually observed at least during the last two centuries; that we do observe some fairly periodic fluctuations of some important economic indicators (technological innovations, prices, GDP, trade turnover, *etc.* (see, *e.g.*, Korotayev and Tsirel 2010a, 2010b, 2010c;

²⁰ See, *e.g.*, Juglar 1862, 1889; Lescure 1908; Marx 1961 [1893, 1894]; Tugan-Baranovsky 1954, 2008 [1913]; Hilferding 1922; Mitchell 1930; Keynes 1978 [1936]; Varga 1937; Trakhtenberg 1963; Haberler 1964 [1937], 2008; Mendelson 1959–1964; Minsky 1983, 1985, 1986, 2005; Hicks 1993: 432–442; Samuelson and Nordhaus 2009a; Samuelson 1994; Schumpeter 1939, 1982; von Hayek 1931, 1933; von Mises 1981 [1912], 2005; Cassel 1925; Pigou 1929; Fridman 2002; Abel and Bernanke 2008a: 361–502.

²¹ Some of those hypotheses even suggest climatic change as the main factor generating the K-waves (see, *e.g.*, Mougy 1992).

²² For the evidence supporting the existence of the preindustrial K-waves see, *e.g.*, Goldstein 1988; Modelski 2006, 2008a, 2008b, 2012; Modelski and Thompson 1992, 1996; Modelski, Thompson, and Devezas 2008; Mougy 1992; Pantin 1996; Pantin and Lapkin 2006, *etc.* Some scholars, while not rejecting some long-term fluctuations in the pre-industrial period, consider the K-waves in this period as certain historical excesses produced by various exogenous factors (see, *e.g.*, Maevsky 1992: 60).

²³ See an incomplete list of such problems in the following publications: Maevsky 1992: 58–60; Avramov 1992: 64–66; Romyantseva 2003: 11–12.

²⁴ As regards the underlying causes, one can identify mono-causal and multi-causal approaches; the latter with more or less success can be combined into one or another paradigm synthesis. About the criticism of mono-causal approaches see, *e.g.*, Romyantseva 2003: 50.

Korotayev, Zinkina, and Bogevolnov 2011; Berry and Dean 2012; Devezas 2012; Helenius 2012; Husson and Louca 2012; Korotayev and Grinin 2012a; Modelski 2012; Ternyik 2012; Thompson 2012; Grinin, Korotayev, and Tsirel 2011).

We believe that one of the most promising directions of the K-wave research is constituted by the analysis of the connections between the K-wave and J-cycle dynamics. It appears a bit strange that the relations between K-waves and J-cycles have not been studied sufficiently yet, which indicates that the importance of this relationship is still underestimated.²⁵

The relationship between K-waves and J-cycles is visible rather saliently in the point that the most widely accepted dates of the Kondratieff waves and their phases are tightly connected with the most widely accepted dates of Juglar cycles. However, even this aspect of the relationship between Kondratieff and Juglar cycles has been studied rather superfluously and insufficiently (see Poletaev and Saveljeva 1993: 11–12; Avramov 1992: 66–68); note that Kondratieff himself did not pay much attention to this relationship (Kondratieff 2002: 379–380). Schumpeter (1939) paid significantly more attention to this relationship; however, we believe that his view of this relationship was too straightforward; he thought that the structure of long cycles (K-waves) was too similar to the structure of medium-term J-cycles (see also Rumyantseva 2003: 19). Note that Schumpeter, when developing his theory of cycles with different characteristic periods, based himself on the principle of the unity of the cause and the multiplicity of the effects (Avramov 1992: 67); this does not appear to be correct despite some heuristic value of the respective principle. Long-term processes are likely to be caused by factors that are different from the ones causing short-term processes (see, *e.g.*, Korotayev, Malkov, and Khaltourina 2006a: 105–111). Below we will demonstrate that the factors generating K-waves are inherent within the expanding reproduction of the economy; however, the shorter-term impulses generating J-cycles produce some ordering of the K-waves.

We believe we need a more profound study of the relationship between two types of cycles. We think that the study of the interaction between J-cycles and K-waves is capable of shedding light on the reasons of the relative stability of the characteristic period of the K-waves and their phases. It does not appear to be possible to explain completely this periodicity with exogenous factors – such as the alteration of technological or population generations. It appears necessary to look for such economic and social processes that are capable to support the abovementioned rhythm. From our point of view, the only real factor that is able to give to the Kondratieff waves the respective rhythm is represented by the Juglar cycles. In addition to the study of the organic links between K-waves and

²⁵ The concept of long waves and the ‘normal’ business cycle theory exist and develop relatively independently. Experts on the theory of the business cycle with minimal exceptions try to ignore the existence of long waves, and K-wave students make little use of the ‘conventional’ business cycle theory (Poletaev and Saveljeva 1993: 11–12).

J-cycles, it appears absolutely necessary to research the links between those two types of cycles and certain world-system processes.

Some Preliminary Conclusions

The analysis of the K-wave manifestation and alteration demonstrates quite convincingly that, notwithstanding a considerable variety of explanations of K-waves, proponents of all the respective theories are partly right. However, each of those theories has a rather limited field of application. Thus, in order to achieve a more adequate understanding of the nature of the K-waves and their driving forces we need a profound synthesis of various theories.²⁶ The situation here is somehow analogous to the one attested in the theory of medium-range cycles. Essentially, proponents of most approaches are right, but the general understanding may only be worked out through a synthetic theory (see, *e.g.*, Haberler 1964 [1937], 2008). Note, by the way, that more theories have been proposed to account for the J-cycles than for K-waves (in particular psychological factors are hardly taken into account in the latter case [for more details on those factors see, *e.g.*, Haberler 1964 [1937], 2008; Grinin 2009d; Grinin, Korotayev, and Malkov 2010], though such factors are very important for an adequate understanding of the alteration of phases of the K-waves).

We have based ourselves on the following approaches to the study of endogenous factors: innovation-based and investment-based, as well as on those approaches that pay most attention to such factors as capital depreciation, decline of profit rates, and the alteration of technological paradigms. We have also taken into account such approaches that pay special attention to exogenous factors: influence of the warfare and the expansion of the external resource base, as well as monetary theories. However, those theories are only used by us within certain limits, determined by our general approaches. It also appears necessary to take into account the point that we only consider K-waves in their economic dimension, ignoring civilization, cultural and other manifestations of the K-waves, but taking into account the full spectrum of factors of the K-wave dynamics (including political, legal, and social factors).

It appears necessary to emphasize again that a very important component of our theory that allows to integrate various approaches is the reliance on the organic link between K-waves and J-cycles.

Below we will present our answers to a few questions that are important with the analysis of K-waves.

1) Are there endogenous factors that generate the alteration of upswings and downswings?

The very alteration of downswings and upswings is connected with the need of the industrial economy to expand; this expansion, however, inevitably

²⁶ Such a task is mentioned from time to time by the K-wave students (see, *e.g.*, Menshikov and Klimentenko 1989; Lazurenko 1992).

meets serious obstacles. One may speak about the alteration of two developmental trends: 1) prevalence of qualitative innovations (creation of new technologies); 2) prevalence of quantitative development – implying a wide introduction/diffusion of innovations (see, *e.g.*, Korotayev, Zinkina, and Bogevolnov 2011). Both tendencies are simultaneously present in economic systems; however, in some periods one of these tendencies prevails, whereas in the other periods the other tendency does (see, *e.g.*, Perez 2002, 2010, 2011a, 2011b, 2012; Grinin 2003, 2006a, 2006b, 2006c, 2007a, 2007b, 2007c, 2007d, 2009b, 2012, 2013; Korotayev 2005, 2006, 2007; Korotayev and Grinin 2012a, 2012b; Korotayev, Malkov, and Khaltourina 2006a, 2006b; Grinin and Korotayev 2012). Processes of qualitative innovation are connected with periods of emergence and validation of new technologies of various types (production technologies, financial technologies, social technologies – including technologies of counter-crisis management). Quantitative processes are connected with such periods when such technologies diffuse widely – up to the exhaustion of their potential. For those countries that follow the leaders of the World System, processes of wide diffusion of technologies are virtually equivalent to the process of catch-up modernization (Grinin and Korotayev 2010a, 2010b; Grinin 2013a). At the level of the World System, the analysis of processes of such a modernization (as we will see) may play an important role in the explanation of the length of particular A-phases.

The periods of predominantly qualitative development determine a potential possibility of the B-phase realization, whereas periods of predominantly quantitative development determine a potential possibility of the A-phase realization. Qualitative changes (having shown their advantages) tend to expand/diffuse. After new technologies become habitual, after they come to the level of saturation, they lose their stimulating meaning (see, *e.g.*, Perez 2002, 2010, 2011a, 2011b, 2012; see also Akaev and Rummyantseva *et al.* 2011); for a new acceleration the global economic system needs a transition from extensive (quantitative) development to a new period of innovative qualitative development. As is well known, this leads not only to the changes of technological paradigms, but also to the changes of financial styles, relationships in the framework of the world trade and so on (see, *e.g.*, Kondratieff 2002; Schumpeter 1939; Menshikov and Klimenko 1989; Lazurenko 1992; Pantin and Lapkin 2006; Rummyantseva 2003; Grinin 2010a; Grinin and Korotayev 2010b; Korotayev, Zinkina, and Bogevolnov 2011).

Thus, prolonged processes of the generation and diffusion of innovation, change of technological paradigms, as well as the models of international relations and economic regulation give long-term impulses toward the acceleration or deceleration of the growth of production, sales, prices, and so on. However, the scheme described above implies only the possibility of alteration of up-swings and downswings, but it does not imply that such alteration should be

regular/periodic. The mechanism that generates a relatively regular periodic temporal rhythm of the phase alteration is established through the alteration J-cycle clusters (see below). Thus, the dynamics of Kondratieff waves is generated by a complex set of various factors and causes that acquire a certain directionality through a synthesis of long-term impulses, J-cycle rhythm, as well as various reactions of economic actors. That is why we cannot agree with Sergey Glaziev who believes that the basis of the K-wave dynamics is created by the life cycles of technological paradigms, whereas 'at the surface of economic phenomena these look as long cycles of economic conjuncture' (Glaziev 2009: 26). This looks as an approach in spirit of Hegel – Marx' set of 'essence and its epiphenomena' that not only strips K-waves of their specificity – it reduces them to one factor only while ignoring a number of such factors that are of no less importance.

As far as exogenous factors (*e.g.*, wars) are concerned, they amplify certain (*e.g.*, inflationary) impulses (that may trigger the process of change). However, it is important to understand that at the level of the World System it does not really make sense to distinguish between endogenous and exogenous factors (except, of course, certain natural [from seismic to cosmic²⁷] ones). In full extent both K-waves and J-cycles are traced at the World System level. We can hardly find any single society where those waves and cycles are perfectly traced throughout all the 200 years of the industrial development. And if we analyze K-waves at the World System level, then we have to interpret all the relevant social and economic processes as endogenous. In other words, at the World System level we should rather speak about endogenous factors of various orders (except, as has been already mentioned, some natural factors).

2) Which factors do determine a relative temporal stability of the length of K-waves and their A- and B-phases?

The K-waves' length and relative regularity of the alteration of their phases is determined by J-cycle clusters. A-cluster may consist of two to four upswing J-cycles (though most frequently their number is three); B-cluster may consist of two or three downswing J-cycles (though most frequently their number is two). During the K-wave A-phase the fast economic expansion leads inevitably to the necessity of societal change; as a result, B-phase starts. But the possibilities of societal transformation lag behind the demands of the economy, that is why the periods of such a restructuring correspond to periods of more difficult development, that is, to K-wave downswings. Below we will discuss this point in more detail. It makes sense to pay attention to the point that cyclical crises are attributes of medium term crises only.

²⁷*E.g.*, solar activity.

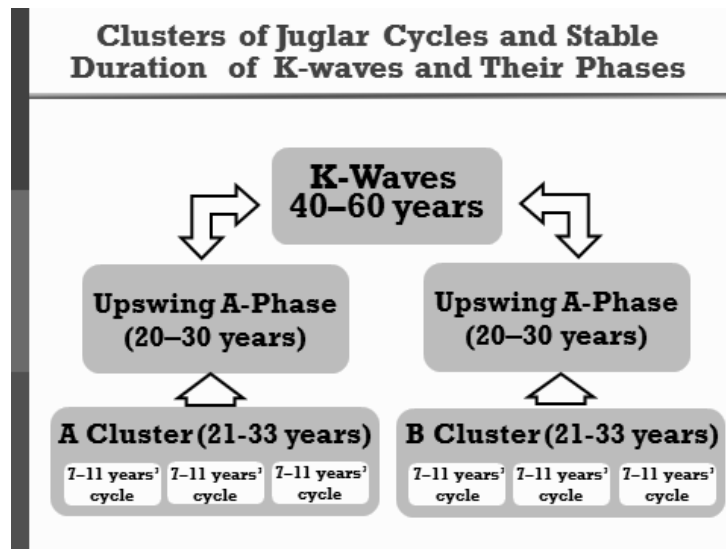


Fig. 2. Clusters of Juglar Cycles

3) Why and how do the main characteristics of the K-wave dynamics change?

This is a result of the development of the world economy, the transition to new conditions, resulting from the transformation of the World System. In the metallic standard epoch, prices were the best K-wave indicators (they are visible there till now when the prices of key commodities expressed in grams of gold [e.g., Grinin, Korotayev, and Tsirel 2011]); later they became more visible in some indicators of economic growth.

4) Which endogenous mechanisms account for the alteration of long-term trends of inflation/deflation?

Those trends are embedded in the nature of industrial economy itself (whereas wars, discoveries of new rich deposits of precious metals and other exogenous factors of this sort may amplify additionally inflationary trends). The trends toward expansion and growth tend to lead to increasing resource limitations and – hence – inflation. However, with metal money, the growth rates of the productivity of labor and potential to produce goods start to outstrip the growth rates of the money mass (effective demand). Money becomes more expensive and profits tend to decrease. This leads to the search for new ways to increase the production, and one of such ways is to reduce costs. The latter leads to the further growth of the volume of the produced goods against the background of the reduction of their prices. *Thus, the tendency toward economic expansion generates both the inflationary and deflationary trends.* Busi-

nessmen look actively for the opportunities to increase profit rates and to fight deflation. Such opportunities are usually found (though in no way automatically) through the market expansion (export) and/or the creation/diffusion of new financial technologies. To counteract the deflation effectively a rather wide diffusion of financial technologies is necessary. This increases the monetary mass and – consequently – the effective demand (at the level of both individual societies and the World System as a whole). However, with the exhaustion of the potential of new technologies and territories the deflationary trend strengthens again.

5) Is it possible to speak about the decrease of the characteristic period of the K-waves? And, if yes, what is the mechanism of this decrease?

As has been mentioned above, in the 19th and 20th centuries the characteristic period of the J-cycles decreased from 11 to 7–9 years. This was accompanied by the decrease of the characteristic period of the K-waves from 60 to 45–50 years. Thus, some shortening of the K-wave period appears to be observed. However, this change of the length of the K-waves is rather complex (some explanations for this phenomenon will be suggested below).

There are some quite grounded hypotheses regarding a significant shortening of the periods of the 4th and 5th K-waves in comparison with those K-waves that preceded the World War II, suggesting that *the lengths of phases and waves depend generally on the speed of reaction of social systems*. In the 1970s–1980s in the USA and Europe (especially in the UK) some new radical decisions were made that helped to move faster respective societies from the downswing trough. It appears important to note that in some respects those decisions contributed to the emergence and development of *new technologies (and – in particular – financial technologies)*.

It is important to note that states and other actors spend enormous efforts in order to prolong the prosperous period and to shorten the depressive period. Against this background it is hardly surprising that this is precisely the B-phase (and not the A-phase) of which the length is shortening. We believe that this is a much simpler and more adequate explanation for the shortening of the B-phase of the 4th K-wave in comparison with the explanation proposed by Pantin and Lapkin (2006: 289–303).²⁸

²⁸ The gist of their approach is that there are two different types of upward and downward phases of long waves and long waves themselves constitute half of a longer cycle, which consists of two Kondratieff waves and leads to a radical change in technological and institutional foundations of the economy and the international division of labor. According to Pantin and Lapkin, duration of the downswing phase of long waves with the transition from one complete evolutionary cycle to another is reduced by an average of 12 years, while the duration of the upswing phase of Kondratieff waves is kept roughly constant (about 24 years). The very same shortening of evolutionary cycles of world development is due, in their opinion, to the general acceleration of social development. Indeed, one would expect that the acceleration of the rate of development will reduce

6) Is there any relationship between K-waves and warfare?

Before the World War I a certain background of wars was observed during both K-wave phases. However, during A-phases warfare frequency somehow increased due to the intensification of World System modernization processes. The point is that the accelerating modernization generates strains within states and between them, which tends to lead to the increase in warfare frequency.

Explanation of the characteristic periodicity of the J-cycle. Thus, the temporal rhythm of change of K-wave phases is connected with the characteristic period of the J-cycle. But what determines the length of the J-cycle itself?

There are no clear explanations for the period of the Juglar cycle being between 7 and 11 years. We suggest that the minimum and maximum length of the J-cycle stems from rather natural circumstances. If we take a cycle consisting of four phases, even with an average length of each phase around a year, the period of the cycle will be about four years (however, it should be taken into account that each phase consists of at least two sub-phases). Of course, within K-wave A-phases the phases of recession, depression, and recovery may last one year each (whereas the recession may last even less than one year), though depression and recovery phases may last for two and even more years each. On the other hand, the upswing phase of the J-cycle can hardly last for just one year, as a one year long upswing can hardly generate the overheating of the economy.

In order for a downswing to transform into a boom a fast growth should continue for at least three years. The first two years of expansion tend to go on the basis of the engaging of existing capacities as well as the realization of the changes made during the recession and depression. Two years of expansion make businessmen confident that the situation is permanently improving. They begin to invest more actively, the credit expands, the prices of resources start growing. However, in order that the development could reach a limit, beyond which an easy economic growth becomes impossible, a rather significant increase in GDP should be observed,²⁹ which needs normally not less than four years even with rather fast growth rates. This time is necessary for the 'bubbles' to form, prices reach record levels and the credit expansion experiences the overloading. In any case, four to five years of expansion (+ three–four years for the other phases) yield together at least seven–nine years. However, in favorable conditions the expansion may continue even seven or eight years. The empirical data on the J-cycle length are discussed further in this article.

the duration of Kondratieff waves, but the logic of these authors is not clear – why does the length of some phases decline? And why do the others remain stable (whereas the shortening should rather be manifested proportionally)?

²⁹ No less than 30–50 %, whereas in emergent markets the growth may be twofold, or even threefold.

2. Juglar Cycles as Structural Elements of the K-Waves

How many J-Cycles do We Find during a K-Wave Phase? An Analysis of Empirical Data

‘Economists use widely modeling on the basis of so-called stylized facts. This is achieved through the simplification of the real situation by abstracting from concrete historical fluctuations, which allows to identify the most significant features in the economic dynamics. Such stylized facts include the statement that the large cycle consists of six medium-range Juglar cycles. Duration of the industrial cycle of this type almost always (this is also a stylized fact) falls within the range of 7 to 11 years. Accordingly, the total duration of the big cycle can range from 42 to 66 years, which is roughly consistent with observations from the beginning of the industrial revolution in the UK, as well as with the assertion that the average length of a long wave is half a century. It is also argued that a long cycle consists of approximately equal halves: the rising and falling waves of economic conditions. Thus, every half contains three Juglar cycles’ (Klinov 2008: 64).

In our verbal model of the relationship between K-waves and J-cycles (as in our spectral analysis [Korotayev and Tsirel 2010a; Grinin, Korotayev, and Tsirel 2011: Ch. 2] and our mathematical model of the J-cycle [Grinin, Malkov, and Korotayev 2010]) we were bound to use stylized facts mentioned by Vilenin Klinov. Now we will try to find out how much those stylized facts correspond to the empirical data. We will pay a special attention to the following ‘stylized facts’: a) each K-wave consists of six J-cycles; b) the length of the A-phase of each K-wave is equal to the length of its B-phase; c) each A-phase consists of three J-cycles, and each B-phase also consists of three J-cycles.

First, consider the general picture of the correlation between Juglar cycles and Kondratieff waves (see Table 1 and Fig. 3).

Table 1. Correlation between Juglar cycles and Kondratieff waves (the first version)

<i>Serial numbers of K-waves</i>	<i>Long waves' phases and their dates</i>	<i>Serial numbers and dates of J-cycles</i>	<i>Number of J-cycles per the respective K-wave phase</i>
<i>I</i>	B (downswing): 1817–1847	J1: 1817–1825	3
		J2: 1825–1836/7	
		J3: 1836/7–1847	
<i>II</i>	A (upswing): 1847–1873	J4: 1847–1857	3
		J5: 1857–1866	
		J6: 1866–1873	
	B (downswing): 1873–1890/3	J7: 1873–1882	2
		J8: 1882–1890/3	
<i>III</i>	A (upswing): 1890–1929/33	J9: 1890/3–1900/3	4
		J10: 1900/3–1907	
		J11: 1907–1920	
		J12: 1920–1929/33	
	B (downswing): 1929/33–1948/9	J13: 1929/33–1937/8	2
		J14: 1937/8–1948/9	
<i>IV</i>	A (upswing): 1948/9–1966/7	J15: 1948/9–1957/8	2 ³⁰
		J16: 1957/8–1966/7	
	B (downswing): 1966/7–1979/82	J17: 1966/7–1974/5	2
		J18: 1974/5–1979/82	
<i>V</i>	A (upswing): 1979/82–2008/10	J19: 1979/82–1990/3	3
		J20: 1990/3–2001/2	
		J21: 2001/2–2008/10	

³⁰ However, it is possible to single out in this phase three shorter (rather than two longer) J-cycles: 1947–1954; 1954–1961 (whose course was somehow interrupted by the 1957 crisis); 1962–1967. The general length of the phase – 20 years – allows to speak about three short J-cycles. Such a vague cyclical dynamics was produced by an active Keynesian interference in the cycles, as well as by the difference in the course of the cycles in Europe and the USA (for more details see Grinin and Korotayev 2010b).

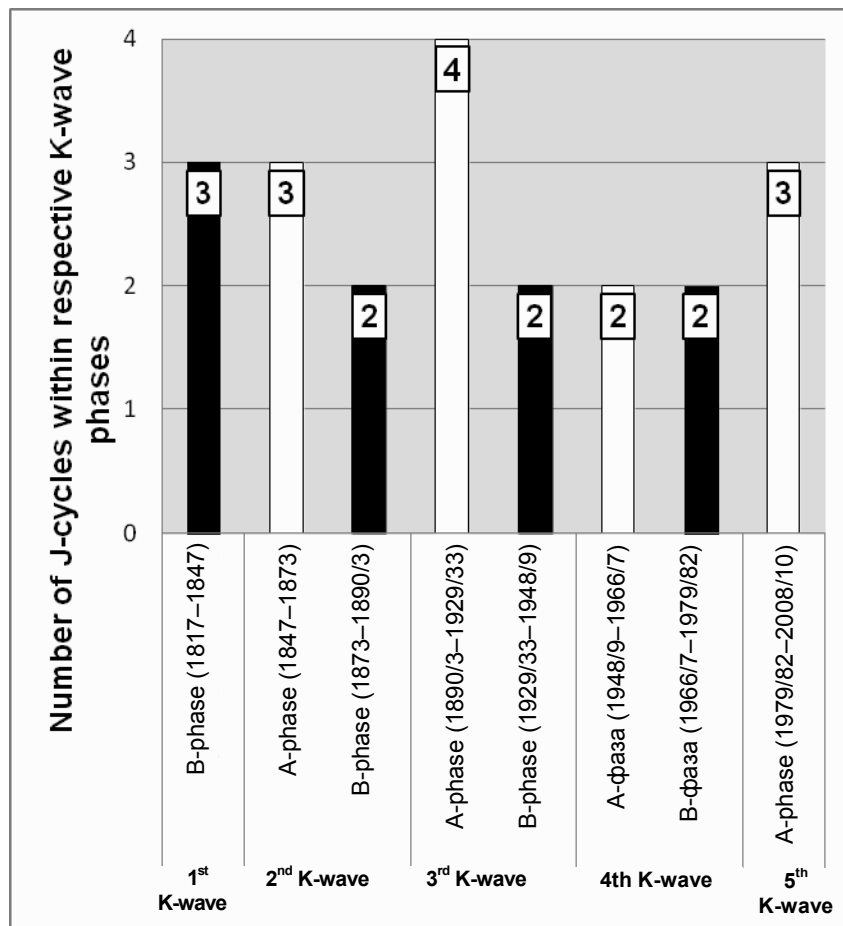


Fig. 3. Correlation between Juglar cycles and Kondratieff waves (the first version)

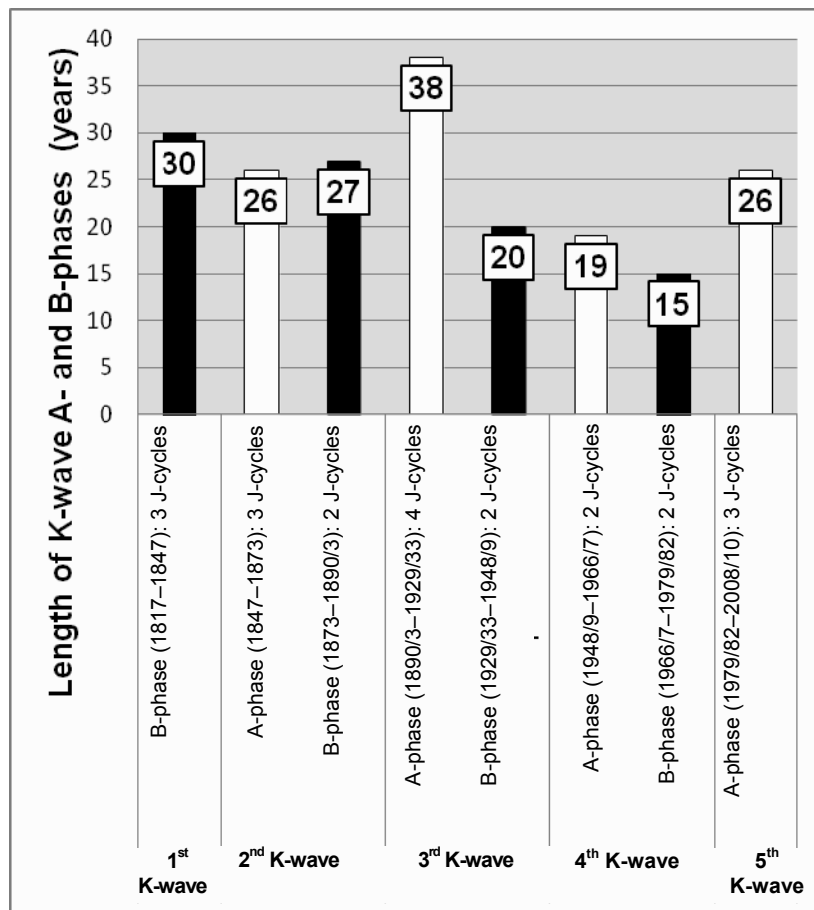


Fig. 4. Length of K-wave A- and B-phases (the first version)

At this point it appears reasonable to return to the consideration of the general dynamics of the annual world GDP growth rates in 1945–2007 (see Fig. 5):

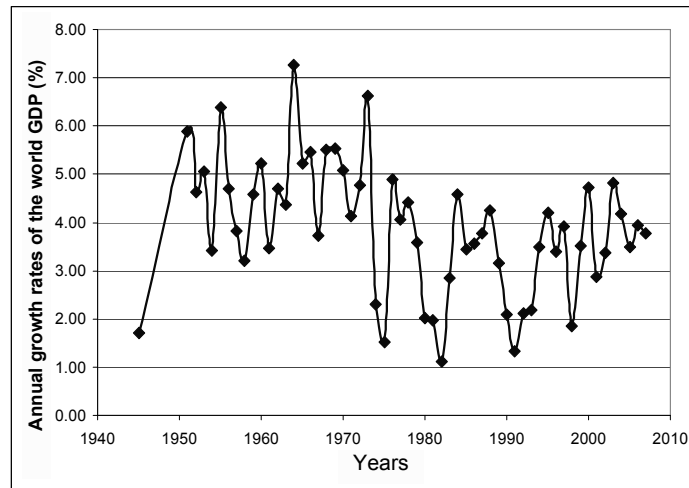


Fig. 5. Dynamics of the annual world GDP growth rates (%), 1945–2007

Sources: World Bank 2014; Maddison 2010.

This diagram indicates rather clearly an ambiguous position of the 19th J-cycle (1979/1982–1990/3). Following a number of K-wave scholars, we included the 19th J-cycle above into the 5th K-wave A-phase. However, due to the patently transitional character of this cycle, we do not see sufficient grounds to exclude the possibility of its inclusion into the K-wave B-phase. In addition, the diagram suggests that the 1967–1974 period (the 18th J-cycle) can be considered to be a part of both A-phase and B-phase of the 4th K-wave. In this case, we get a different picture of the correlation between K-waves and J-cycles (see Table 2 and Figs. 6–7).

Table 2. Correlation between Juglar cycles and Kondratieff waves (the second version)

<i>Serial numbers of K-waves</i>	<i>Long waves' phases and their dates</i>	<i>Serial numbers and dates of J-cycles</i>	<i>Number of J-cycles per the respective K-wave phase</i>
<i>I</i>	B (downswing): 1817–1847	J1: 1817–1825	3
		J2: 1825–1836/7	
		J3: 1836/7–1847	
<i>II</i>	A (upswing): 1847–1873	J4: 1847–1857	3
		J5: 1857–1866	
		J6: 1866–1873	
	B (downswing): 1873–1890/3	J7: 1873–1882	2
		J8: 1882–1890/3	
<i>III</i>	A (upswing): 1890–1929/33	J9: 1890/3–1900/3	4
		J10: 1900/3–1907	
		J11: 1907–1920	
		J12: 1920–1929/33	
	B (downswing): 1929/33–1948/9	J13: 1929/33–1937/8	2
J14: 1937/8–1948/9			
<i>IV</i>	A (upswing): 1948/9–1966/7	J15: 1948/9–1957/8	3 (or 4 ³¹)
		J16: 1957/8–1966/7	
		J17: 1966/7–1974/5	
	B (downswing): 1974/5–1990/3	J18: 1974/5–1979/82	2
		J19: 1979/82–1990/3	
<i>V</i>	A (upswing): 1990/3–2008/10	J20: 1990/3–2001/2	2
		J21: 2001/2–2008/10	

³¹ See the note to the first version of this table.

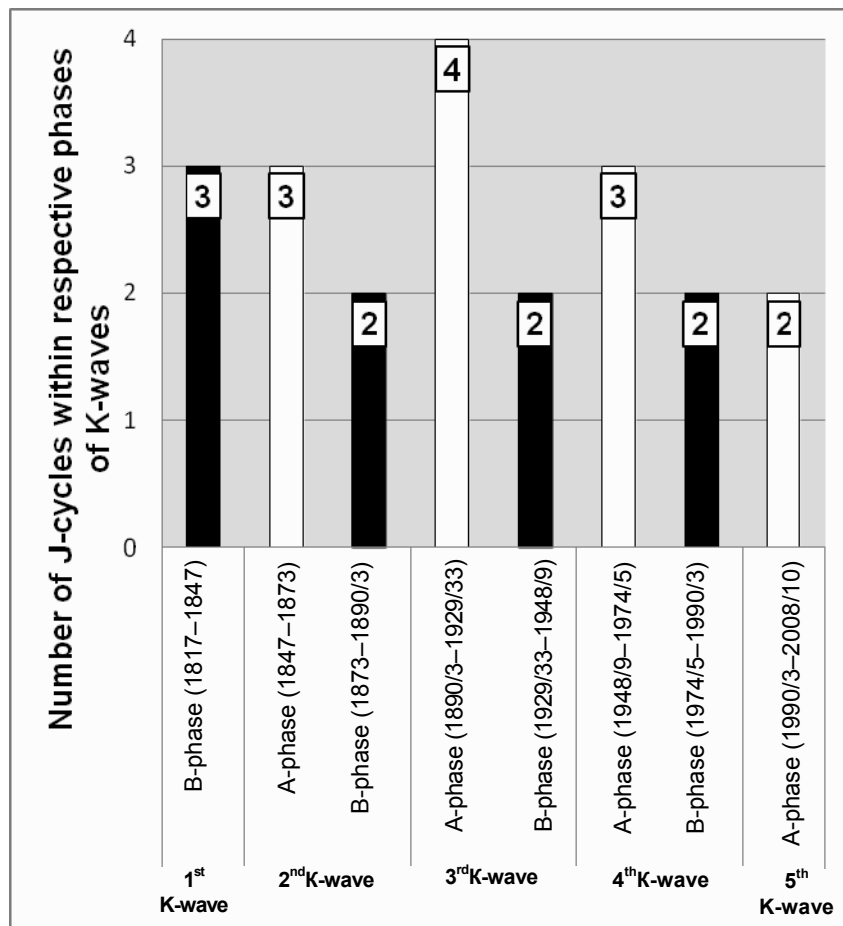


Fig. 6. Correlation between Juglar cycles and Kondratieff waves (the second version)

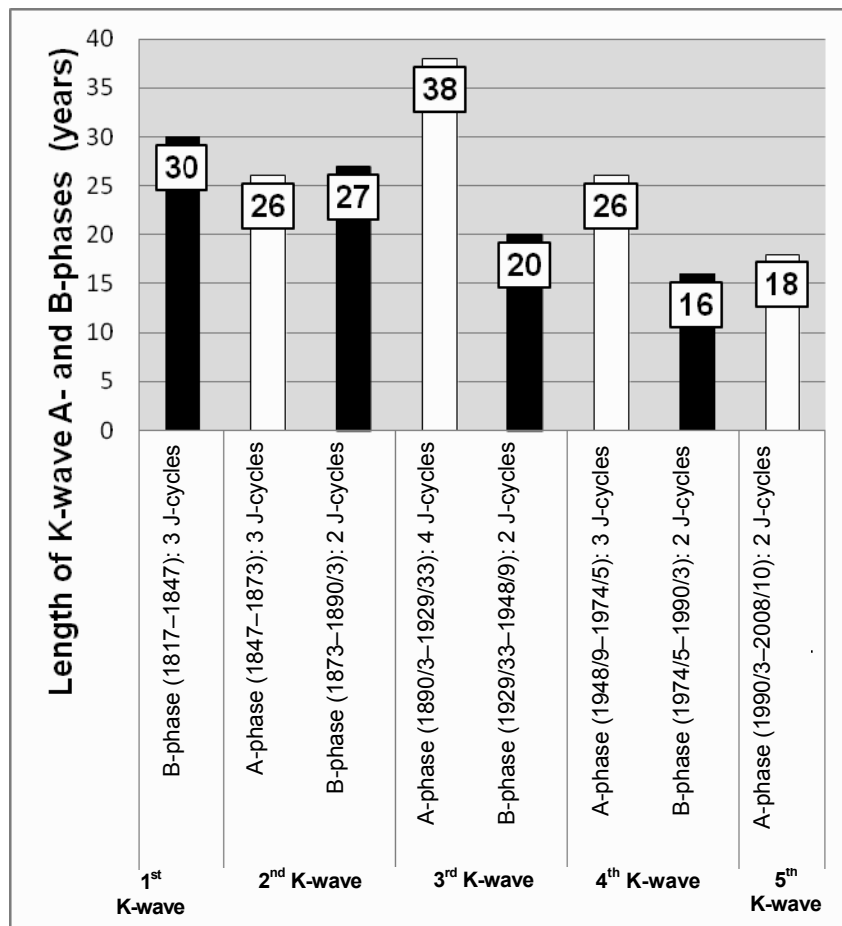


Fig. 7. Length of A- and B-phases of K-cycles (second version)

We believe that our analysis allows us to make the following preliminary conclusions.

1) First of all, we see that the actual lengths of K-waves, as well as their A- and B-phases do not correspond fully to the ‘stylized facts’; in addition, there are significant variations both in the absolute lengths, and the number of J-cycles that fit into them. In the framework of the first version the same number of J-cycles in the A-phase and B-phase within a K-wave is observed in only one case out of three, and in two cases the number of J-cycles in the A-phase exceeds the number of J-cycles in the B-phase. Within the second version the number of A-phase J-cycles exceeds the number of B-phase cycles in all

the three cases. At the same time, taking into account what has been said in the note to Table 1 the number of A-phase J-cycles may exceed the number of B-phase cycles in all three cases in the first version too. Based on these conclusions, we graphically represent two versions of the relationship between the J-cycles and K-waves in Figs. 10 and 11 at the end of this article: one with equal numbers of J-cycles in the A- and B-phases (Fig. 10), whereas in Fig. 11 this number is unequal (three A-phase J-cycles *versus* two B-phase J-cycles).

2) Note that we observe in both cases the tendency that we have already discussed above, namely the tendency toward the reduction of the absolute duration of B-phases. In this article we suggest a possible explanation for this phenomenon. With respect to the A-phase this reduction does not appear to be observed in a comparably clear way (and we will suggest our explanation for this phenomenon too). Thus, as we shall see below, due to deliberate action of economic actors upon the Juglar dynamics the duration of A-phase tends to be longer than the one of the B-cycles (irrespective of how we count this duration – in years, or in Juglars).

In general, for both versions of the four A-phases we find 12 J-cycles, whereas for four B-phases we find only 9 J-cycles.

3) Much has been written about the absolute duration of K-waves measured in years (see above), so we will not dwell on this issue here. But if we use ‘Juglar’ as a unit of measurement of the length of K-waves, we must note that this length fluctuates between 4 and 6 ‘Juglars’. On average, if 21 ‘Juglars’ are divided into four waves (three full waves and two ‘halves’), then one has on average 5.25 ‘Juglars’ per one K-wave (note that with the second version of the estimate of the duration of the 4th K-wave A-phase, we will get on average 5.5 ‘Juglars’ per one K-wave).

However – and this is crucial for the theory presented in this article – whatever the duration of the phases, we see in any case an integral number of J-cycles in any K-wave. This shows that the deep and tangible connection between J-cycles and K-waves is observed on the ‘essential’ rather than phenomenological level.

4) Thus, the idea of measuring the duration of the K-phase waves not only in years, but also in ‘Juglars’ has a very specific meaning, as the number of ‘Juglars’ in different waves and phases respectively ranges from 4 to 6 and from 2 to 4 (see, *e.g.*, Figs. 6 and 7 above). In this case, the ‘economic time begins to be measured not in years, but in cycles’ (Avramov 1992: 64).

Thus, depending on the chosen periodization, the number of ‘Juglars’ in the same K-wave and the same phase of the wave varies. For example, according to Version 1, the fourth K-wave includes 4 ‘Juglars’; according to Version 2 it consists of 5 ‘Juglars’. Accordingly, the A-phase of the 5th K-wave includes either three or two ‘Juglars’. And the latter is very essential for the development of economic forecasts, as we shall see below.

When you add an electron to an atom (or take an electron from it), this atom undergoes a substantial change (it becomes a positively or negatively charged ion instead of the neutral atom). In a similar way, the extension/contraction of A- or B-phases by one Juglar leads to the significant changes in the economy and economic moods, the tone of economic theories, as well as to the intensification in search of anti-crisis measures.

5) Kondratieff's conclusion that 'during the rise of the long waves, years of prosperity are more numerous, whereas years of depression predominate during the downswing' (1935: 111) may be augmented with the conclusion that, generally, at the K-wave B-phases J-cycles are longer than at the A-phases. In particular, the calculation shows that at the A-phase the average duration of one J-cycle is about 9–9,1 years (and if we add an additional cycle to the A-phase of the 4th K-wave, this duration will be equal to about 8.3 years), while the average duration of one J-cycle at the B-phase is about 10,2–10,3 years. We attribute this to the following circumstances: a) within B-cluster J-cycles we observe the lengthening of phases of recession and depression in comparison with A-clusters, and b) in the A-cluster J-cycles one observes so powerful phases of expansions, that sub-phases of overheating, acute crisis and recession phase occur very fast, within a rather short period of time.

6) The forecast may change substantially depending on what version of the periodization of the 5th K-wave will be chosen. For example, in Chapter 2 of our previous monograph (Grinin, Korotayev, and Tsirel 2011) we offered two versions of forecasting the dynamics for the forthcoming two decades. Note that in both cases we base ourselves on the assumption that the A-phase of the 5th K-wave must be longer than its B-phase. In any case, the A-phase of the 5th K-wave corresponds to three J-cycles, whereas its B-phase is most likely to consist of two 'Juglars'.

We find the first version to be more probable; it suggests that the A-phase of the 5th 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 5th K-wave will have a duration of 14 to 18 years.

7) The presence of more than one version of periodization and forecasts should not be of any surprise – taking into account the extreme narrowness of the empirical basis. Indeed, one can talk reliably about Juglar cycles only starting from the first clear Juglar cycle of 1817–1825. Therefore, to date, we can

only talk about three full K-waves and two ‘halves’, in which the interaction between Juglar and Kondratieff dynamics has been clearly observed, which does not meet the minimum requirements for regular analysis of cyclic processes (Avramov 1992: 72; Grinin and Korotayev 2013). In his paper published in 1992, Avramov maintained that within the relative chronology of the theories of his day, the stage of development of the long-wave theory could be compared with the situation in the medium-term cycles theory in the 1870s (*Ibid.*). With the passage of time, the theory of K-waves approached a level of development of the theory of medium-term cycles at the time of the first edition of Tugan-Baranovsky's classical volume in 1894; however, Tugan-Baranovsky himself then said about the theory of medium-term cycles that it was ‘the least studied subject in the economic literature’ (Tugan-Baranovsky 1894: 377).

3. Verbal Model of K-Waves

General Outline

The main ‘intrigue’ of the K-wave phenomenon is a relatively regular period of the change from K-wave upswings to K-wave downswings, and *vice versa*. Our general ideas that allow to understand better the mechanism of changing trends, can be presented as follows:

1) Both trends (upward and downward) are present in the modern economy at the same time and always (so periods when there is no qualitative or quantitative development at all, are extremely rare, just one hardly find cases of overall growth without any stagnant sectors at all); but at every phase one or those trends predominates.

2) The change of the trend is largely prepared by its exhaustion, *i.e.* the weakening of one trend paves the way for the strengthening of the other.

3) In other words, one can observe an evident negative feedback between the trends, which strengthens with each new medium-term cycle (until the trend does not change), since the nature and results of each J-cycle is a signal for a particular type of action of active participants in the process (from individual entrepreneurs to whole states and supranational organizations). Rising prices and profit margins, as well as high demand cumulatively lead to the expansion of production. The falling rate of profit, reduction of the growth rates, *etc.* lead to the reduction in investment and the search for new innovative solutions.

4) The nature of the trend depends largely on the type of action chosen by the majority of participants in the process.

5) The relatively regular characteristic period of the K-wave phase alteration is determined by the relative stable characteristic period of the J-cycles (7–11 years), whereas J-cycle clusters (that mostly include three J-cycles each) tend to last somewhere in the range between 20 and 30 years. We would also add that, in relation to the theory of generations, 10 years is not a period that is long enough to significantly alter the generation of businessmen (and especially

politicians) so that to more proactive and less cautious entrepreneurs could appear. Two or three J-cycles (7–11 years each) are just sufficient to renew the generation of businessmen.

6) The only exception is constituted by the upswing (A-) phase of the First K-wave (the late 1780s – the early 1790s – 1810–1817), as it was generated mostly by external [military] factors (see for more details below). However, the B-phase of the First K-wave started with the first J-cycle (approximately 1815/1818–1825) that ended the first large-scale cyclical crisis in 1825.

Thus, the alteration of upswings and downswings is inherent in the properties of the industrial and post-industrial economy that seeks to expand, but is impeded by all sorts of obstacles, and the rather regular duration of K-wave upswing and downswing phases is connected with the time frames of the J-cycle length.

Notes on Dynamics

As we have already mentioned above, in the modern economic systems the periods of predominantly qualitative (innovative) development are followed by periods of mainly quantitative development and *vice versa*. However, it is important to note that such a development occurs with sufficient frequency not within a single country, but only in the framework of the World System as a whole (but in some periods, it can also be observed in the core states of the World System). In addition, each of these pulsations is associated with the expansion of the World System and the change of its configuration. This leads to a change in the economic and political relations within the boundaries of the World System. The mechanism of a rather fast impulse propagation in the framework of the World System and relatively synchronous change of development vectors are associated with the increasingly close interaction of economies and societies through a variety of financial and other links.

Secondly, by itself the alteration of innovation and modernization trends may not have sufficiently clear time limits. Modernization trends within the World System cannot arise from the investments and implementation of major innovations in different countries because the timing and modalities of these processes are very different, and investments themselves cannot be synchronized. To repeat: **the timing and the relative accuracy of the K-wave phase alteration are determined by the nature of the J-cycle clusters**. During the K-wave upswing one can observe a rapid expansion, which inevitably requires significant changes from society.³² However, such changes are far behind in time from the objective need in them (due to the time required for the emergence of awareness of the problem, its discussion, the search and decision-making, implementation of solutions in practice, *etc.*). Such a delay is one of the important reasons why we can frequently observe a period of more difficult ('downswing')

³² This was noticed already by Simon Kuznets (1966).

development (B-cluster of J-cycles) after the upward phase.) During the struggle with the crisis-depressive phenomena economic actors are searching for ways to overcome difficulties. As a result, in some societies a social innovation emerges, which then begins to be applied not only in this society but also in many others. Then new upward momentum in some societies creates conditions for transition to a new A-phase upswing. But the wide (*i.e.* in many societies) awareness of the benefits of such a social innovation does not happen immediately, but around the second J-cycle of a new A-phase.

The emergence of a variety of technical and social innovations and their successful testing lead to a new round of extensive World System growth. **This is a very important fact, which attracts little attention, but it is the expansion of modernization that enhances the momentum of the A-phase.** Expansion of modernization (combined with technological and social innovations) leads to the expansion and reconfiguration of the World System, which creates the need for a change in relations within the World System. Results of the extended modernization become visible in 10–15 years. By this time, prices can reach very high scores; many large ‘bubbles’ emerge in the economy under the influence of excessive demand for resources. However, the momentum of modernization loses its original strength. In a situation of prolonged overheating of the economy, such a slowdown leads to various kinds of difficulties and increased global competition, the burst of bubbles, and Juglar crises. Finally, we see the transition to a B-cluster of J-cycles (and to a B-phase of the following K-wave).

We also note that one can observe as a result of the development of each J-cycle cluster the change of the businessmen generations, their approach to doing business, the attitude to the different parameters, *etc.* Thus, again, the idea of generational change influence on the alteration of K-wave phases may also find its place in the synthetic theory of the K-waves.

Main Principles for the Development of the K-Wave Model

So, to summarize. The alteration of the K-wave upswings and downswings is determined by the following points:

- a) Both trends (upward and downward) are always present, which, incidentally, can be clearly seen in the continuous alternation of J-cycle phases of rise and recession;
- b) periodically some trend is amplified at the expense of another at the level of both medium length cycles and long waves;
- c) the development of every trend is initially enhanced by some sort of positive feedback;
- g) but the strengthening of this trend eventually leads to its weakening and the strengthening of the countertrend;

d) in other words, the phase change mechanism is defined by the switching time of negative feedback, which leads to the increase in strength of the countertrend;

e) thus, there is a time lag that is essential for the generating of cyclical dynamics;

g) the nature of the medium-term cycles and their phases are the most important signals to business and society, defining the model of their strategy;

h) more active (in the B-phase) or less active (during the A-phase) innovative-reforming activities are the most important factor affecting the occurrence of negative feedback, and the latter ultimately leads to a change in the phase of K-waves.

Phase Alteration in the K-Wave Model

When the A-phase (upward trend) begins, this puts into action the positive feedback effect in the form of investment, growth in demand (reinforcing the rise in prices and GDP) and other activity that warms up the economy. This positive relationship operates at the level of individual companies and inter-societal contacts (trade, financial flows, *etc.*). Furthermore one observes a new level of positive feedback – the World System – due to the fact that in the World System the modernization process accelerates as a whole under the influence of growth and success thanks to the emergence at the B-phase of a system of technical, financial and social innovations. This leads to a temporary acceleration of positive feedback and delay the appearance of negative feedback. This lag (taking into account the point that the World System modernization is a fairly lengthy process) can be about 10–20 years. But when modernization is on the wane the negative feedback mechanisms start being felt as a reaction to excessive overheating of the preceding period: reducing demand, falling prices, falling profit margins, decrease of investment activity, *etc.* As a result, the downward trend begins to dominate, and a new B-phase starts.

With the start of a B-phase a certain positive feedback mechanism starts working, as over some time one can observe the strengthening of the process by which within the World System more and more economic agents and even whole countries begin to experience difficulties and to change their strategies (to reduce investments, to reduce costs, not to pay debts, *etc.*). In other words there is a natural chain reaction of negative momentum transfer through the World System. Further, this positive feedback is strengthened and stretched in time due to the fact that the necessary changes in the societies were not made in due time (in phase A), and most importantly – due to the fact that the emergence and launch of necessary social (and other) innovations require quite a long time.

This lag is also estimated to be about 10–20 years (taking into account the need to change policy, to enact laws, *etc.*). One should keep in mind periodically occurring temporary improvements (in expansion phases of J-cycles) that,

paradoxically, hinder the process of change in society. Finally, after the introduction of such social innovations (which generally add up to the overall system with other types of innovation: technical, financial, *etc.*), and after they begin to show its effectiveness, a negative feedback starts to be felt, which leads to a decrease in negative trends and strengthening of the upward trend. And as these phenomena emerge at least within one or a few societies of the World System, the upward momentum of them gets distributed throughout the whole world. A new A-phase begins, which accelerates the positive feedback due to the introduction of sets of innovations, which again leads to an extension of the World System or growth of its complexity.

This system of relationships is graphically represented at the end of this article in Figs. 10 and 11.

4. Relationships Between K-Waves and J-Cycles

K-Waves and J-Cycle clusters

J-cycle clusterization. As has already been mentioned, the most mysterious moment in K-waves is their relatively stable duration (as well as the relatively stable duration of their phases – respectively, 40–60 years and 20–30 years). None of the theories has been able to explain this phenomenon satisfactorily; none of them has been able to clearly separate economic or social factors that would clarify the reasons behind such rhythm. In our opinion, the only real factor that can set the pace of certain duration of Kondratieff waves and their phases are Juglar cycles. We would like to underline again that the J-cycles appear in the ontological sense more real than K-waves, hence these are J-cycles that should be considered as basic structural units, creating in the totality of their processes K-waves and their phases (and not *vice versa*).

In the analysis of such a relationship between J-cycles and K-waves it is necessary to take into account the point that in addition to general model properties of J-cycles one can identify more common properties for groups of nearby J-cycles. These properties are derived not only from their greatest historical proximity, but also from the fact that they have a general trend, as well as from the fact that the nature of their crisis-depressive phases and phases of growth and prosperity has certain properties in common.

Thus, J-cycles can be seen not just as structural units of the same type, but as a more complex system that represents a single chain/cluster of two, three or more J-cycles possessing within the cluster additional common features.

It appears necessary to emphasize that: a) such clusters of J-cycles tend to have a duration of roughly 20–30 years (assuming that the cycle is 7–11 years, then three cycles in duration constitute 21–33 years), which correspond to average lengths of K-wave phases; b) an organic link between the J-cycles and K-waves is particularly supported by the fact that the phase boundaries of Kondratieff waves (as well as boundaries of particular waves themselves) in many

theories practically coincide with the boundaries of certain medium-term cycles and crises.³³

The character of J-cycle clusters correlates with the character of K-wave phases. Of course, this cannot be accidental; actually, this is rather accounted for by certain mechanisms of reaction of particular societies and the World System to J-cycles.³⁴ Incidentally, it appears necessary to note that the ratio between the extreme values of duration periods of K-waves (40–60 years) and J-cycles (7–11) is very similar: $7 : 11 \sim 0.64 \sim 40 : 60 = 0.66$.

On the Correlation between J-Cycles and K-Wave Phases

As was already established by Kondratieff, within upswing phases of K-waves J-cycles are characterized by stronger expansions and weaker depressions, whereas within K-wave downswings a contrary pattern is observed.

Nikolay Kondratieff himself addressed the analysis by Arthur Spiethoff (Kondratieff 2002: 380). Below is Spiethoff's table (Table 3). The other researchers' analysis proves Kondratieff's assertions concerning the proportions between the number of contraction and growth years at different phases of K-waves. In particular, William Mitchell (1913)³⁵ concluded that within the long-term inflationary trends (*i.e.*, at the A-phase of the K-wave), the phases of growth and depressive phases in Juglar cycles with respect to the USA are in the ratio 2.7 : 1, and in the periods of prolonged deflation (*i.e.*, at the B-phase of the K-wave) the ratio is only 0.85 : 1. Alvin Hansen, who used to be rather sceptical of the K-waves theories, nevertheless, found that for the period from 1872 to 1920 (*i.e.*, second – third K-wave) during the upward rise in prices (at the A-phase), an average duration of depression was two years, and at the downtrend (the B-phase) it was 5.3 years. And conversely, the respective rises at the A-phase were by 1.8 times longer than at the B-phase (Hansen 1951). We interpreted these calculations in the Table 3.

³³ Initially long waves were considered as combinations of a few adjacent medium-term business cycles (Burns and Mitchell 1946; van der Zwan 1980; Delbeke 1987; van Duijn 1983). These were still regarded as a sort of rather mechanical combination, whereas the idea that adjacent J-cycles could form a real system was expressed very rarely and was not developed in any significant way.

³⁴ Some researchers speak about a tight connection between Kuznets cycles and K-waves (see, *e.g.*, Rummyantseva 2003; Akaev, Rummyantseva *et al.* 2011). We do not exclude the possibility that such a connection does exist. However, Kuznets swings have been detected mostly in the USA (see Kuznets 1958; Abramovitz 1961: 230; Hansen 1951; see also Akaev, Rummyantseva *et al.* 2011: 91), whereas the J-cycles may be traced in all the main countries of the World System. In addition, Kuznets cycles are much less pronounced and do not have so dramatic crisis phase; that is why there is some sense in the prevalent tendency to denote them as 'swings', rather than as 'cycles'.

³⁵ See also: Burns and Mitchell 1946: 438.

Table 3. The correlation between the years of upswing and depression at the A- and B-phases according to Spiethoff

Periods	Upswing years	Depressive years
The downswing of the long cycle from 1822 to 1843	9	12
The upswing of the long cycle from 1843 to 1874	21	10
The downswing of the long cycle from 1874 to 1895	6	15
The upswing of the long cycle from 1895 to 1912	15	4

Table 4. The correlation between the duration of upswing and depression phases according to some economists

Economist	A-phase	B-phase
A. Spiethoff	2.5 : 1	0.6 : 1
W. Mitchell	2.7 : 1	0.85 : 1
A. Hansen	3 : 1	0.75 : 1

Modern data on characteristics of upswings and recessions for 1919–1994 period confirm the presence of this regularity – the lengthening of expansion phases during K-wave upswings and the lengthening of recession phases during K-wave downswings (for details see Rumyantseva 2003: 25).

Thus, we can speak of two types of chain-clusters of J-cycles characterized by specific boom-depression patterns: 1) at upswing phases of K-waves J-cycle depressions are less pronounced, and J-cycle expansions are more durable; 2) at downswing phases of K-waves J-cycle depressions are more pronounced, and J-cycle expansions are less intense and prolonged. Accordingly, the first type of J-cycle chain-clusters can be called ‘A-clusters’, whereas the second type can be denoted as ‘B-clusters’.

As has already been mentioned, the relationship between K-waves and J-cycles has not been studied quite sufficiently. Recall that Kondratieff pointed out that J-cycles are a sort of interwoven within K-waves and depend on the latter. In particular, he wrote, ‘The long waves belong really to the same complex dynamic process in which the intermediate cycles [*i.e.*, J-cycles. *L. G., A. K.*] of the capitalistic economy with their principal phases of upswing and depression run their course. These intermediate cycles, however, secure a certain stamp from the very existence of the long waves. Our investigation demonstrates that during the rise of the long waves, years of prosperity are more nu-

merous, whereas years of depression predominate during the downswing' (Kondratieff 1935: 111).

However, it seems that the relationship between K-waves and J-cycles is not only significantly deeper and more complex, but – most importantly – the causal relationship between them in general looks different. **Hence, Kondratieff was not quite correct when he contended that the nature of J-cycles depended on the nature of the respective K-wave phases; the actual situation seems to be simply the opposite – this is the nature of the respective J-cycle clusters that largely determines the nature of the respective K-wave phases.**

This view on the causal relationship between the two types of cycles emerges from the fact that Juglar cycles are more observable empirically than K-waves, which, in the words of Maevsky (1992: 58), 'appear as a kind of surreal force that cannot be perceived directly'. The factors that produce J-cycles are also clearer and better described. Moreover, the presence of these factors has been confirmed 'experimentally', because more than half a century of economic regulation in many countries has proved that the course of Juglar cycles can be influenced by certain measures of economic policy that this course can be modified, and in some cases the critical phase of those cycles can be even avoided. In the meantime any successful attempts to influence consciously the course of Kondratieff waves do not appear to be known.³⁶

5. General Causes and Mechanisms of Economic Cycles

J-cycles and K-waves arise from the general properties of the industrial economy – the ability of expanded reproduction (on this feature see, *e.g.*, Kuznets 1966; Gellner 1983; Abramovitz 1961; Poletaev and Saveljeva 1993; Grinin 2003, 2006a, 2007a, 2007b, 2009b; Grinin and Korotayev 2012). Economic growth cannot go on constantly and continuously; therefore, slowdowns are inevitable; and those slowdowns can only be overcome through qualitative changes. Thus, the constant expansion and development imply that the structure within whose framework this development takes place, sometime should be substantially modified. Especially such changes should occur as a result of technological revolutions (see, *e.g.*, Perez 2002, 2010, 2011, 2012; Grinin 2003, 2009b). But, as a rule, such a change lags behind the more dynamic economic (technological) component underlying the expanded economic growth. Therefore, this change occurs in the form of more or less severe crises that, in fact, generate cyclical fluctuations.

³⁶ Note that reality of medium-term cycles is recognized by many (though still not all) economists that is expressed in the fact that in most textbooks on macroeconomics these cycles are discussed in special chapters or sections (see, *e.g.*, Mankiw 1994: Ch. 14; Sacks and Larren 1996: Ch. 17; Abel and Bernanke 2008a: Ch. 8), whereas reality of long Kondratieff cycles recognized minority of economists (and – consequently – references to them in Economics textbooks are either absent or very scarce).

There are certain important (and not random) similarities between J-cycles and K-waves in terms of their 'structure' as regards some cyclical factors and certain properties of cyclical processes. The understanding of those similarities must be able to further clarify the mechanisms of interaction between those different cycles. There are also important similarities both in terms of the nature and mechanisms of transmission of impulses (leading to the generation of J-cycles and K-waves) from one country to another within the framework of the World System. Both cycles never occur only within a particular society, they always extend beyond individual societies and are somehow connected with the world-system processes. This is all the more important that J-cycles (especially J-crises) always tend to become global, or at least taking place simultaneously in a number of societies. Thus, through J-cycle ups and downs within the World System momentum of growth and decline is transmitted very quickly and fairly synchronously. But, of course, for the K-wave dynamics Juglar cycles within the World System leaders are of special importance.

6. Mechanism of Influence of J-Cycles on the Temporal Rhythm of K-Wave Alteration

Emergence and Resolution of Societal Structural Crisis within A- and B-Clusters of J-Cycles

How can medium-term cycles affect the dynamics of upward and downward phases of long cycles?

Mechanism of change in phase K-wave, its A-phase with respect to its dependence on J-cycle looks like this (see also the end of this article, Figs 10 and 11). More severe in their manifestations, the crises/depressive phases of J-cycles at a downswing K-wave phase inevitably require from societies deeper and more radical changes, not only in technical and technological aspect, but also in social, legal, political, ideological, and cultural aspects, as well as in the field of international relations and world-system links. Otherwise, a society will not be able to overcome the negative effects of economic crisis and come out of depression.

Only a profound change in many different areas of society, as well as new approaches to the regulation of the economy allow eventually the transition to a significant expansion.³⁷ This has already been discussed earlier. The cluster structure of two J-cycles (see Fig. 11) can be schematically represented as follows: the first cycle – awareness of the difficulties and search for counter-depression and reformist measures, the second cycle – the introduction of anti-crisis measures and their first results. With three cycles the following pattern can be identified (see Fig. 10): the first cycle – awareness of the difficulties, the

³⁷ Recall that Americans and Europeans had to carry out very deep reforms during and especially after the Great Depression of the late 1920s and 1930s (see Lan 1976; Kindleberger 1973)

second – search for counter-depression and reformist measures and their application, and the third cycle – the time required to develop the result.

Ultimately the struggle with depressions, conducted changes, as well as introduced innovative technologies lead to the replacement of a J-cycle B-cluster with an A-cluster (and, thus, to the transition from a K-wave downswing to a K-wave upswing).

As a result, there is a transition to a new system of relations, which opens the possibility for economies to develop in the coming decades without so strong crisis manifestations.³⁸ However, since further development proceeds in a relatively soft way, the need for reforming and modernizing relations weakens. Accordingly, the society experiences insufficient changes compared with those that are necessary to re-start rapid growth, whereas any cycle is associated with an increase in structural economic, social, political and other problems. And if they are not resolved, this will lead to the amplification of negative trends, as a result of which rapid economic growth becomes impossible, or there are internal and international problems leading to various crises. Within about three J-cycles potential of free growth is exhausted, and the problems are accumulating. Next there is a powerful crisis, triggering a more or less protracted depression. As a result, an upswing A-cluster of J-cycles is replaced with a downswing B-cluster that corresponds to the K-wave B-phase.

Thus, it is through the medium-term economic cycles in the downward phase of the K-wave conditions are being prepared for the transition to the K-wave upswing. The stronger the crises, the weaker the expansions, and the more intense the structural changes. In turn, less painful crisis-depressive phases of J-cycles at K-wave upswings causes them to turn downswing phases (this is the turn after certain euphoria, and we had an ‘honor’ to observe such a development in the late 2000s and the early 2010s). That is why the most severe crises are crises at the turning points from the K-wave upswings to the K-wave downswings (in particular, the crisis of 1847, 1873, 1929, 1973, as well as the current global crisis that started in 2008).

So, in the upswing phase, when there is a more intensive growth, cyclical crises resemble a kind of ‘stumbling when scooting’, when excessive speed leads to inevitable stops and setbacks. However, within A-clusters J-cycles are lesser related to each other; they are rather more similar to isolated events. These are **crisis of growth**, during which structural problems within societies (and in general within the World System) get accumulated. At the downward phases of the K-wave crises are very different. They are much more closely related to each other, either directly, so that the next crisis is a sort of continuation of the first (*e.g.*, the crisis of 1937 was a sort of continuation of the previ-

³⁸ Menshikov and Klimenko (1989) use the following metaphor – they say that ‘society changes its skin’ while going through a Kondratieff wave.

ous crisis that started in 1929), or they go against a common negative background (*e.g.*, the cycles of 1875–1895 period went against the background of a protracted agrarian crisis, and the J-cycle crises of 1971–1982 period went against the background of currency, commodity and energy crises). This is explained by the fact that such crises are structural in nature, as they resolve complex structural problems that were accumulated in the previous upswing period. Moreover, military, political or revolutionary crises (as well as world wars) fit rather well in those downward phases, as those crises act as the components of a general world-system crisis that make people change the relationship structure within the World System. In short, **these are structural crises that lead to structural changes.**

Additional Notes

An Example of More Active Social Activities during K-Wave B-Phases in Comparison with K-Wave A-Phases

To illustrate the idea that in the economically prosperous periods of a K-wave A-phase societies tend to change less than in the period of crisis in depressive phases, we analyze the average annual number of days of meetings of the U.S. Congress since 1790 to the present. At the same time we have moved the origin period for meetings' calculations for each phase by five years as this can be estimated as average minimum time required for an adequate understanding of the situation (*i.e.*, schedule for Column 4 lag behind the respective schedule for column 3 by five years).

Table 5. Number of days of sessions of the US Congress corresponding to different K-waves and their phases

<i>K-wave serial-number</i>	<i>K-wave phase</i>	<i>K-wave phase datings</i> ³⁹	<i>Corresponding periods of Congress sessions</i> ⁴⁰	<i>Overall number of session days</i>	<i>Average number of session days per year</i>
1	2	3	4	5	6
<i>I</i>	A: upswing	1789–1817	1794–1822 (29 years)	4263	147
	B: downswing	1818–1847	1823–1852 (30 years)	4931	164,4
<i>II</i>	A: upswing	1848–1873	1853–1878 (26 years)	4820	185,4
	B: downswing	1874–1893	1879–1898 (20 years)	3904	195,2

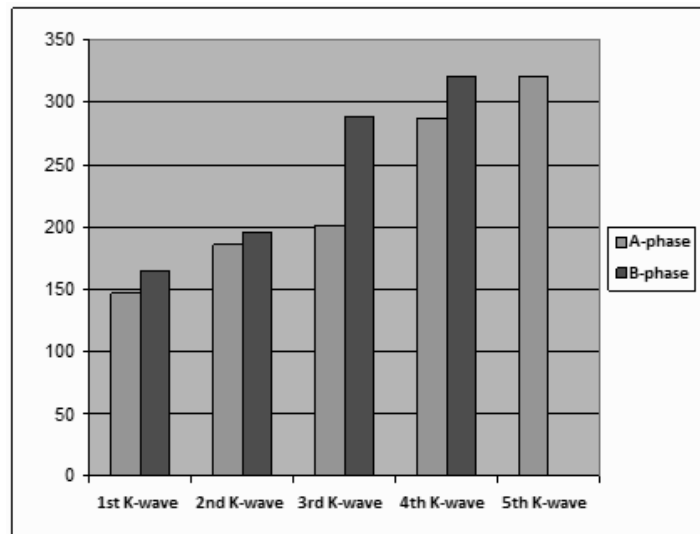
³⁹ The dates in this column do not take into account versions of the starts and ends of various phases mentioned in Table 5.

⁴⁰ Taking the five-year lag into account (see above).

1	2	3	4	5	6
III	A: upswing	1894–1929	1899–1934 (36 years)	7242	201,2
	B: downswing	1930–1948	1935–1953 (19 years)	5475	288
IV	A: upswing	1949–1968	1954–1973 (20 years)	5737	287
	B: downswing	1969–1982	1974–1987 (14 years)	4495	321
V	A: upswing	1983– 2006 ⁴¹	1988–2006 ⁴² (19 years)	6077	320 ⁴³
	B: downswing				?

Source: LLSDC. n. d. URL: <http://www.llsdc.org/assets/sourcebook/sess-congress.pdf>

Fig. 8. Correlation between K-wave phases and average number of the US Congress session days per year (taking the five-year lag into account, version 1)



Note. The point that the average number of session days per year at B-phases is higher than at A-phases is more visible as regards the 3rd and 4th K-waves (rather than the 1st and the 2nd). It appears necessary to note the following in this respect:

⁴¹ In this phase we took the period preceding the 2007–2010 crisis.

⁴² Within this phase we have taken the period preceding the start of the crisis.

⁴³ Which is less than in the B-phase of the 4th K-wave. We can forecast that during the B-phase of the 5th K-wave the average number of the US Congress sessions per year will be higher.

1. The situation reflects the fact that since the late 19th century governments started paying much more attention to economic problems than earlier.

2. As regards the 2nd wave, one should take into account that its B-phase was rather peaceful, whereas its A-phase includes the periods of the Civil War and Reconstruction of the South when the Congress had to work more intensively.

If we only consider the peaceful part of the K-wave A-phase, the distribution of the US Congress session time looks as follows:

1853–1861 – 1480 days of the US Congress sessions in nine years (on average 164.4 days per year);

1870–1878 – 1600 days of the US Congress sessions in nine years (on average 177.8 days per year).

Thus, altogether for all the peaceful years of the 2nd K-wave A-phase – on average 171.1 days per year, which is substantially less than 195.2 days per year attested for the 2nd K-wave B-phase;

1862–1869 (war-and-reconstruction period) – 1740 days of the US Congress sessions in eight years (on average 217.5 days per year). As we see a higher level of average annual US Congress sessions at the 2nd K-wave A-phase is connected with this difficult period of the US history.

As regards the 3rd K-wave, war periods are found at both A- and B-phases.

A graphic picture of this pattern is presented in Fig. 9.

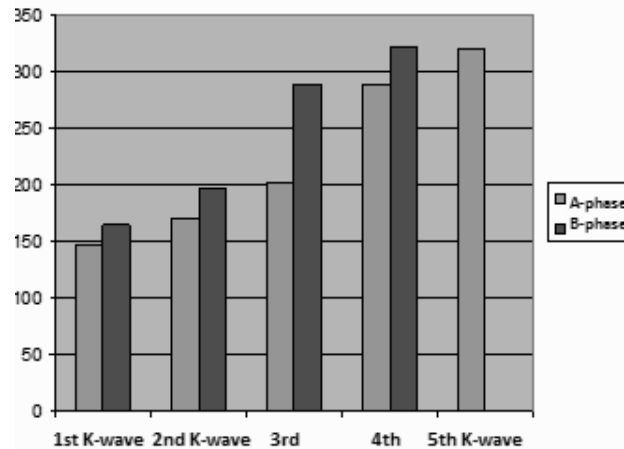


Fig. 9. Average annual number of days of the US Congress sessions in their relationship with K-waves and their phases (taking the five-year lag into account, version 2: taking into consideration the 2nd K-wave A-phase)

Note. Fig. 9 displays the relationship between the number of the US Congress sessions at the A-phases and B-phases of K-waves with the elimination of the war-and-reconstruction years (1862–1869). Here it is especially visible that within all the documented K-waves the respective society paid more attention to necessary changes during the downswing B-phases.

Social Innovations as a Factor of K-Wave Interphase Transitions at the Level of Individual Societies, the Level of Intersocietal Interactions, and the World-System Level

It appears rather important to emphasize that, though the change of K-wave phases is connected with the exhaustion of the potential of respective technological paradigms,⁴⁴ its immediate factors include first of all behavior of particular economic agents (including the state institutions), which is very tightly connected with psychological sets of businessmen and political elites. When development accelerates at the A-phase, this stimulates additional investment activities. In contrast, during phases of depression society is actively seeking opportunities to minimize losses, and to re-introduce the accelerating growth trend. During the past two centuries more and more forces joined the agents of economic development in their attempts to re-start the upswings; and these included government, state and interstate agencies, education institutions, ideology, science, *etc.* These are the activities of all those forces that lead to the eventual end of the downswing and the start of a new upswing.⁴⁵

Here it appears possible to expand Schumpeter's idea (Schumpeter 1939, 1949 [1911]) regarding innovators as well as the creative destruction; many economists like this idea, but they do not appear to apply it in a sufficient way. In fact, in the innovators of all kinds of social activities during downswing phases have more opportunities to implement their innovations: politicians who promise to solve economic problems, reformers, legislators, scientists, *etc.* The ideas that begin to be discussed and implemented, could be expressed for a long time, limited experiments could be carried out much earlier (or in other countries), but it is during the times of difficulties when clusters of reform and change appear. The solution for the difficulties can be found – *ceteris paribus* – in those societies where depressive manifestations of the crisis are stronger. Ultimately, innovative changes begin to work, to spread and to give effect, in particular they contribute to the diffusion of financial and technological innovations (in other words, a **new innovative synthesis** emerges). *Thus, we should talk about innovations and innovators of all kinds, including social innovators and innovations.* Thus, effective methods to counter crisis are beginning to spread, and, like technological innovations, they may be borrowed by modernizing societies with a significant delay, but in a completely ready form. The wider this process of reforms is conceptualized, the more opportunities can be found for economic growth and the longer can be the upswing. In particular,

⁴⁴ In the widest possible sense of this notion, *i.e.*, the one that includes financial, social, cultural, and political technologies.

⁴⁵ It appears necessary to note that social innovations are not always found, or they may turn out not to be quite effective, or blind-alley innovations emerge (*e.g.*, in Nazi Germany); in these cases crises could be especially destructive – and not only economically (as these was, *e.g.*, observed in the case of World War II).

this explains economic successes in several post-World War II European countries and Japan (economic ‘miracles’) in the 1950s and 1960s, as well as some modern achievements of China actively using the whole arsenal of counter-cyclical measures developed in Western countries. At the same time, taking into account the point that the Chinese leadership has more opportunities to effectively pursue such policies than the governments of the countries with full market economies status, the results of counter-cyclical policies in China are indeed very impressive.

Time lags. Intensification of modernization processes within the World System. But the emergence of a major social innovation (effective in combating new manifestations of depression) may not be a quick thing. Therefore, although a collision with difficulties initially causes frequently active, significant anti-crisis actions, yet they do not lead to profound changes. A considerable time must elapse before a new innovative system starts working. This may take up to ten years or even more. In the meantime, on the one hand, during the B-phase social innovations lag behind, because they are only beginning to be implemented sometime after its first third (or even later), and they can only be implemented during the second third (or later). And on the other hand, in fact, they give their real effect toward the end of the B-phase. However, early in the A-phase social innovations get implemented fully. As a result, when the upswing is already underway, the inertia of social change further accelerates the A-phase. Conversely, at the beginning of a downward phase we deal with another sort of inertia when the society is not ready to change, which, accordingly, further aggravates the B-phase.

Within the B-cluster of three J-cycles one can observe the emergence of a set of technological, financial, and social innovations, which leads to an accelerated modernization of the semi-periphery, that accelerates the A-phase upswing due to faster growth and increased demand (including the state demand).⁴⁶ Gradually these innovations add up to a system, which is adopted by ‘catching up’ societies. This further explains the inertia force of the upswing: in the first J-cycle of the A-phase one can see belated reforms that would have to be carried out at the B-phase, while during the second J-cycle imitation reforms may be carried out.

Thus, the successful implementation of social innovations against the crisis in advanced countries during the B-phase and the transition to the A-phase is a signal for many ‘catching up’/ modernizing countries. This is amplified by a certain excess of capitals in the core countries of the World System, as at B-phase those capitals are not in enough demand. Modernizing countries are beginning to implement not only technical and economic, but also social tech-

⁴⁶ It appears appropriate to note that many social innovations/counter-crisis technologies emerge not in the central societies of the World System but in those societies that aspire to become central.

nologies. This leads to both more powerful process of modernization in the World System in the A-phase than in the B-phase, and to a more rapid growth of economically active parts of the World System, but also to a more rapid spread of impulses throughout the World System. All together this creates a new situation in the World System, which is very sensitive to the exhaustion of the potency to develop. Therefore, the crisis, which eventually captures the World System center, has an impact to some extent on all at once.

Additional note on the diffusion of technologies. During the A-phase a more active modernization of peripheral countries is usually connected with the adoption of such technologies that can be hardly characterized as the most advanced. Rather, these are technologies of the previous wave. Thus, the most advanced technologies remain in the leading countries. But the core technologies of the previous generation are moved from advanced countries (as this was observed, *e.g.*, in the 1990s). Such outsourcing has disadvantages (structural unemployment, *etc.*), but it also has some pluses, since it clears the advanced countries physically from the old technologies (this is also a kind of innovation at the level of the World System). If such technologies remain and are artificially supported by the state, the leaders start losing their leading positions (as this happened to Britain with her textile and coal industries).

What Limits the Length of the K-Wave A-Phases?

Economists have long pondered over the question, ‘why prosperity does not last indefinitely’ (Mitchell 1913: 452, cited in Hansen 1951). And in the early 20th century they suggested that the prosperity and decline should be explained by the processes occurring regularly within the economy itself (Mitchell 1913: 452–468, cited by: Hansen 1951). We also maintain that growth, although it is an essential feature of the industrial and post-industrial economy, does not occur automatically, but requires sustained efforts.⁴⁷ The faster the growth, the more effort is required, and thus, at some point the system confronts the law of diminishing returns, that is, for each new point of growth more effort is required. Already because of this the rise cannot be infinite.

However, the question arises, why the upswing is limited to a certain period? Above we have explained the reasons for such time constraints. This section will discuss the aspects of the new restrictions, and additionally shows some aspects of the relationship of K-waves and J-cycles.

The reasons that, as a rule, the A-phase does not last more than three or four J-cycles are connected with the following points:

- with the exhaustion of resources or growth factors (that are necessary to ensure upswing dynamics);
- with the inflated optimism about the prospects for business growth, which is also reflected in the excessive increase in the value of assets;

⁴⁷ Internal impulse to the growth created the desire of businessmen to increase their profits, as well as the desire of population to increase the standard of living and consumption.

- with the emergence of long depression pauses in those J-cycles that are situated at the border of upswing and downswing phases of K-waves, which leads to changes of business development strategies.

In this case the first two points in K-waves and J-cycles are substantially similar, and the last point is specific only for the long-term processes, that is, for K-waves. The latter point is part of what can be called the *factor of duration recessive-depressive phases of J-cycles*. In our opinion, it is very important for understanding the causes of the shifts from K-wave upswings to downswings. The fact is that if crisis pauses are brief, they generally do not change dramatically business strategy vector in the direction of growth and investment. During prolonged crisis-depressive phases of J-cycles business strategies can be truly reversed.

Let us consider these reasons in detail.

Exhaustion of growth factors

The upswing weakening is due to the exhaustion of available resources (factors promoting growth) in the broadest sense of the word. We believe that during the A-phase consumption of resources for growth (outstripping their creation) is much faster. As a result, after some time, the resources are exhausted, and the upward movement of the economic inevitably slows down and stops (as, in the conditions of a certain level of technology, resources are always limited). Accordingly, at B-phases accumulation of potential resources runs ahead of their consumption.

Note that we speak about ‘resources’ in the widest possible sense of this word – that is about technological, financial, innovatory, social, demographic (and so on) resources both at the societal level and at the level of the World System.

In particular, important resources are needed to continue the recovery; they include new business technologies (including financial technologies), expansion of markets, removal of obstacles for exchange, trade, export, easy movement of capital; free capital themselves; unsatisfied effective demand for some important goods and services; a number of important unimplemented innovations, *etc.* Finally, this is the willingness of states to invest and support business processes. Within the framework of the World System these are societies that are ready to modernize, *etc.*

During A-phases resource consumption rates tend to be higher than during the phase of resource accumulation due to a rather simple reason: the main attention of business is attracted by the expansion of production, investment and so on, which, by definition, implies a rather high rate of resource consumption (note that these also include credit resources).⁴⁸

For the emergence of additional powerful impulses qualitative changes are required. For this kind of qualitative changes the society needs major restruc-

⁴⁸ It reminds accelerated mining operations during the boom without intensive investment in exploration. Accordingly, the amount of proven reserves decreases.

turing and the involvement of new resources that will not happen automatically, but requires considerable time.

Thus, an A-phase (upswing) gives place to a B-phase (downswing); during the B-phase one can observe not only the systemic restructuring, but also the accumulation of many resources, including both innovations (*e.g.*, Schumpeter 1982, 1939) and such conventional resources as capital that is not invested.⁴⁹

It is important to understand that after a long period of weak growth, interrupted by crises and depressions (i.e., after the B-phase), the momentum to accelerate new K-wave can take place only in the presence of large amounts of resources and growth factors. Synchronism in the rise is achieved because a certain set of resources is required for it, and because one innovation may lead to innovations in other areas; on the other hand, free capital contribute to the acceleration of modernization, whereas development of modernization constantly requires new capital, and so on.

The immediate impetus to the growth of a K-wave is given, as already mentioned, at the recovery stage of one of J-cycles, and the mechanism for the transition from depression to recovery has been already described many times (see, *e.g.*, Mitchell 1930; Hansen 1951). Thus, the mechanism has a great similarity to the transition from growth to slow down and new growth within J-cycles and K-waves. This mechanism is associated with the rapid depletion of resources in the period of growth and boom, leading to a rapid increase in their prices, and then the accumulation of resources during the recession, until finally the abundance of resources will not push the economy to a new upsurge. But only the acceleration of the K-wave A-phase (in contrast to the transition from depression phase to phase of recovery within the J-cycle) requires qualitatively different resources: technological and social innovations, new modernizing societies, new technologies, *etc.*

Excessive business optimism about the prospects for growth and the revaluation of assets

Many projects and investments, which are carried out in the growth phases of J-cycle, are designed to be carried out during rather long periods of time. As stated earlier, if the recessive depressive phases are short, the processes of investment and growth do not lose momentum, nor – that is very important – psychological confidence. As a result, with a short recessive gap various projects get suspended less frequently.

As we have seen, short recessions are typical for K-wave upswing phases, when growth factors (resources) have not been exhausted yet.

However, after the first (and even more so after the second) relatively favorable J-cycle (with short phases of recession and depression) one can observe

⁴⁹ For example, Tugan-Baranovsky (2008 [1913]) connected economic upswing impulses precisely with this factor.

in business and society the growth of optimism (the desire and courage to invest profitably), which is in opposition with the diminishing growth resources.

In the A-phase, the revaluation of assets (stocks, real estate, commodities, *etc.*) is also associated with a lengthy economic growth and bullish price trend, which leads to excessive demand for some resources, large scale speculation and the emergence of ‘bubbles’. Dramatic overestimation of the value of assets is connected with the increasing demand for resources and the growth of unjustified assumptions that asset prices will rise further. In fact, the situation is evolving in a pyramid-like way (whereas the ‘pyramid’ is becoming more and more unstable every month). Below we will see that it is at the moment of the greatest depletion of resources (and at the same time the greatest weakening of the growth potential – both occur by the end of the last J-cycle of the A-phase) the unreasonable optimism among the businessmen about the future growth in asset prices is peaking.⁵⁰

It is clear that, as a result of the collapse, the asset revaluation occurs with a minus sign (which is especially noticeable during the acute phase of the crisis).

Long depression pause emerging within border J-cycles and the change of development strategy

As we have seen, the duration of a recessive-depressive phases of J-cycles is important for understanding the dynamics of K-wave phase changes. Meanwhile, after two (sometimes three) J-cycles in which these phases have been short, in the third (sometimes fourth) A-phase J-cycle the duration of the recessive-depressive period qualitatively increases. Thus, the respective J-cycle becomes a landmark between the A- and B-phases of the respective K-wave.

An increase in the recessive-depressive phases is due to the coincidence of extreme values of divergent trends. On the one hand, the value of assets and the level of revaluation reach their peaks, and the optimism of businessmen and society as a whole is at apogee; on the other hand – the value of resources available for growth (growth factors) reaches a minimum.

Simultaneously, in society and economy there are too many unresolved issues. As a result, the recession acquires a very large scale, and attempts to overcome the crisis and continue to grow do not work out. And as there are not enough resources to resume the upward movement, there is an insufficient momentum to continue the A-phase upswing.

Prolongation of recession and depression phases inevitably leads to changes in business and social strategies.⁵¹ Of course, there is a significant difference

⁵⁰ For example, Hansen (1951) demonstrates in a rather convincing way that during the Great Depression it became perfectly clear how completely resources of new construction had been used, which was one of the drivers of the rise in the 1920s. But the peak of the construction was achieved long before 1929, about 1925–1926. High demand for the construction of real estate at this time is explained by the fact that during the World War II, civil construction was almost entirely frozen.

⁵¹ On the society's strategy and its search for counter-crisis social innovations see above.

between a crisis that continues for a few months, and a depression that continues for several years. It is necessary to adapt to the new situation, and hence to reduce costs and volumes, while starting to rebuild the business and seek new ways for its development. Projects are suspended, investment declines, demand falls, prices (at least on revalued assets) are also falling, capitals are not invested, *etc.* Thus, there is a feedback loop: the longer the recessive period, the less investment, and vice versa – the less investment, the longer the recession. Then a new rise may start, but it will be of a different type (that is characteristic of J-cycles in the downward phase). To maintain upward trend after a fairly prolonged stagnation and depression a society needs an appropriate big enough momentum that cannot appear from nowhere (especially without the presence of effective anti-crisis social innovations).

Thus, the question about the reasons for a certain duration of the A-phase of a K-wave is largely related to the question of the causes of sudden lengthening of depressive phases of the crisis of J-cycles (at the end of the A-cluster of those cycles). And this undoubtedly further demonstrates the close connection between the K-waves and J-cycles.

It is also clear why during the B-phase the economy cannot gain earlier momentum. Firstly, it takes time to develop counter-crisis measures. Secondly, it is necessary to accumulate a sufficient amount of growth factors, including breakthrough technological innovations. Thirdly, you need a push to change the business strategy. Thus, a feedback loop gets established: weak expansions – inactive strategy – lack of investment – no impulses for a strong recovery – weak expansions, and so on. And this feedback loop may operate for a quite long period of time.

7. THE DIMENSION OF THE WORLD SYSTEM

Modernization and World-System Socioeconomic Crises

Tensions of intensive modernization; relationship of the K-wave A-phases to semi-peripheral economic and social crises, as well as wars of certain types

During upswings of the K-wave peripheral and semi-peripheral economic and political crises occur more frequently. Recall that already Kondratieff (1935: 111) noted that ‘it is during the period of the rise of the long waves, *i.e.*, during the period of high tension in the expansion of economic forces, that, as a rule, the most disastrous and extensive wars and revolutions occur’.

This point requires further explanation. One should take into consideration that: a) semi-peripheral modernizing countries tend to borrow social innovations rather fast; b) but often they do not have a sufficient basis for the ‘digestion’ of such innovations (and social innovation can be for them altogether alien). The result is what can be called ‘crises of modernization’, not only ex-

pressed in economic crises, but also in revolutions and even wars.⁵² The Asian crisis of 1997 was largely such a modernization crisis. Revolutions of the early 20th century can also be considered as such crises.

As for the wars, of course, not all, but some of them may well be attributed to a reaction to the rapid modernization, as well as manifestations of the restructuring of the World System. In particular, major wars were connected with the formation of large nation-states in Europe in the 1850s–1870s (Italy, Germany). The war factor will be discussed in more detail below.

World-System Crises and Obstacles for the Emergence of the World-System Innovations. World-System Innovations and their Delays

The increase in the World System modernization (combined with technological and social innovations) leads to the expansion and reconfiguration of the World System, that after some time creates the need for a change in relations within the World System. If the latter is delayed, then crises emerge, and those crises cannot be overcome within individual countries and through individual social innovations. In this case, the World System confronts a series of deep crises (as was observed in the period between 1914 and 1945).

Thus, the development of the World System and modification of K-waves are closely interdependent. Accordingly, some phase of K-waves appears as special, as to exit from the crisis at some stage of the K-wave world-system solutions are necessary, and such innovations may be delayed. In particular, during the third wave (1890–1940s) one could observe a profound transformation of the World System, so the crises of its downswing acquired a military-political form and generally were the most profound.

Already in the early 20th century the World System encompassed, in fact, the entire Globe. The innovations at the level of individual countries were not sufficient (partly because of very strong protectionism, military and colonial rivalries). There were also very different political regimes. Hence, the further development required new world-systemic innovations in relations between the countries. However, at the level of the world-system the old ways of solving conflicts and problems were still operating and new ones did not yet succeed easily. As a result, the restructuring of the World System proceeded in the old military and revolutionary way.

Only after the World War II, it became apparent that it is necessary to look for new innovative solutions at the World System level. But there was no immediate feedback since there was no generally accepted model or supranational

⁵² They become even more dangerous if coincide with rapid population growth that is so characteristic of the period of the escape from the Malthusian trap (for more details on the modernization crises see Korotayev, Zinkina, Kobzeva *et al.* 2011; Korotayev, Khaltourina, Malkov *et al.* 2010; Korotayev, Khaltourina, Kobzeva *et al.* 2011; Grinin, Korotayev, and Malkov 2009, 2010; Grinin 2010a, 2011b).

bodies, and there were large differences between metropolises and colonies. As a result, some countries tried to counteract the crisis phenomena that are characteristic for the World System as its whole in their own ways. At some stage there was a major contradiction: on the one hand, the interactions became very strong and more interdependent, and on the other – clashes between participants became sharper, some development models and social innovations (that were used by some states) were dangerous to others. As a result, the crisis became more and more acute. Ultimately, the World-System contradictions escalated into the huge World War II. Only in this way the world community finally managed to establish the leading model of development and common patterns of behavior in world markets at least in the main part of the World System, and in some major countries – to conduct the necessary social changes that are important for economic development around the world. In this, war gradually ceased to be the leading form of reconstruction of the World System.

Today the situation is rather similar to the one observed in the early 20th century. A serious reconfiguration of the World System is forthcoming, which implies a number of significant world-system innovations in the near future. However, the nature of those innovations is not clear yet. This may lead to the prolongation of depressive processes and aggravation of crisis phenomena (needless to mention that the military forms of the search for such innovations should be excluded nowadays).

How does the K-Wave Synchronicity in the World System Emerge?

To some extent, it reminds growth-generating mechanism in national economies, where growth points emerge, and those growth points – if they are powerful – pull the whole economy. On the other hand, we observe here the emergence of such states that act as locomotives creating momentum for all. To a certain extent this is reflected in the theory of leading sectors and leading economies in the application to the World System (Modelski 1987; Modelski and Thompson 1996; Thompson 1990, 2000; Rasler and Thompson 1994; Rennstich 2002). The leading sector leads a respective national economy, whereas the respective leading economy leads the world economy. It is important that new counter-crisis technologies emerge, which are also gradually adopted; finally the states develop some common solutions that may evolve into the World System solutions. Downswing signals are transmitted in a similar way.

Mechanism of relatively rapid momentum transfer from certain World System zones to its other areas is determined by the mechanisms of the World System economic relations: rising/falling world trade (including the effect of changes in import/export duties); movement of global capital (and the formation of its new centers); currency (gold) fluctuations ; export/import of technology (patents); international agreements; fluctuations in the prices of raw

materials, fuel, food and other commodities. (see examples in Grinin 2011a, 2013b; Korotayev, Zinkina, Bogevolnov, and Malkov 2011). Regardless of whether that was due to growth in certain countries, these mechanisms may well be changing development trends in the World System periphery or semi-periphery, if they have been already changed in the World System core.

If we take the transmission of impulses from the leading countries to the less developed or less actively developing ones throughout the K-wave, the connection with the J-cycles becomes more visible. During the period of one J-cycle (7–11 years) advantages of new technologies, organizational arrangements, and other achievements (that have appeared in the leading country or countries) become more obvious. The second cycle starts with great intensity the modernization of a large number of countries. The third cycle extends modernization, but at this level there are already difficulties associated with the complexity of sharing as well as a fall in the rate of profit, and – very important – especially in the transformation of institutions and relationships both within individual countries and across the World System.

8. GENERAL CHARACTERISTICS OF K-WAVE EVOLUTION, FACTORS, MECHANISMS, AND INDICATORS

How and Why do the Main K-Wave Dynamics Indicators Change?

General direction of changes

We have examined how K-waves and J-cycles interact. Let us now see how and why the main K-wave dynamics indicators change.

As has already been mentioned above, Kondratieff himself and many researchers after him believed that the main indicators of the upswing/downswing dynamics within the K-waves are associated with directions of price trends. But in recent decades this role is rather played by the relative GDP growth rate dynamics (Mandel 1975, 1980; see also Kuczynski 1980; Bieshaar and Kleinknecht 1984; Kleinknecht 1987; Poletaev and Saveljeva 1993). Some researchers use other indicators, including class struggle indices.

This inconsistency adds complexity to the measurement of K-waves: how can we talk about the long process of K-wave alteration, if the figures are different, and sometimes contradicting each other? K-waves in the price dynamics have the most recognized empirical support (see, *e.g.*, Gordon 1978: 24; Van Ewijk 1982; Cleary and Hobbs 1983; Berry 1991, *etc.*). But the logic of K-waves in price dynamics disappeared after the World War II, as then period prices tend to rise even during downswing phases.⁵³

At this stage, the attempts to detect K-wave dynamics in the global GDP (and similar indicators) have yielded rather conflicting results. In particular, empirical tests of some researchers did not confirm the presence of K-waves in the world industrial dynamics (see, *e.g.*, van der Zwan 1980: 192–197; Chase-

⁵³ However, it is possible that it will remain, if we measure the current prices in the prices of gold.

Dunn and Grimes 1995: 407–409). One of the main reasons is, of course, insufficient data on the pace of economic growth in earlier periods. But more importantly, that the data that do exist, cannot demonstrate the existence of global long-wave oscillations until the middle of the 19th century (see, *e.g.*, Poletaev and Saveljeva 1993: 221; Korotayev and Tsirel 2010a). We can assume that this is not accidental, as rising prices and GDP growth can develop in certain periods in different directions (see our analysis of the causes of price trends and changing trends in the increases/decreases of the profit rates below). Similarly, there are some doubts that K-waves can be traced in the dynamics of global GDP in the period up to 1870, though in this period they had been apparently present in the economic macrodynamics of the West (Korotayev and Tsirel 2010a, 2010b, 2010c; Grinin and Korotayev 2010b: 240).

Nevertheless, our analysis of the dynamics of K-waves for over two hundred years suggests that within this apparent incompatibility one may still trace some organic link, if we assume that the factors that define K-wave phases change (at least, according to their importance) in a natural way. K-waves change their manifestations in connection with the development of industrial production, as well as with the expansion of the World System and the World System links. In addition, the role of the state grows. It is worth noting that J. J. van Duijn puts forward a very plausible hypothesis, stating that long waves in economic growth emerged in the second half of 19th century, replacing long waves in price movements (van Duijn 1983: 91).

If we accept the idea of natural changes in the K-wave factors, it allows us to move to an organic synthesis of all the major theories explaining K-waves through monetary, technological, investment, external and military factors. Note that during the A-phase of the 1st K-wave the upward trend in prices was mostly caused by the war (in fact, it lasted for more than two decades – from 1792 to 1815) and the continental blockade policy. But then we observe a gradual transition from exogenous factors generating long waves to endogenous trends related to innovation, large investments and the alteration of technological paradigms.

This also accounts for contradictions of the upswing and downswing phases of the 1st K-wave connected with the transition from one type of reasons determine price fluctuations, to another – namely the replacement of purely external factors with a symbiosis of internal factors associated with the growth of labor productivity with external factors. This may explain the meaning of a rather strange initial assertion when the phase associated with endless Napoleonic wars is declared upward, and the next phase (associated with the industrial revolution, [see Grinin 2007a], the most powerful economic restructuring and a huge increase in productivity) is declared to be downward.

But of course, such a change of the driving forces of long-term trends could not be either rapid or complete. During the downward phase of the first

K-wave changes were really severe in only one country (Great Britain), but this could not change completely the trend towards lower prices in Europe, which was also caused by a very rapid increase in labor productivity, reducing production costs of manufactured products. But already the next K-wave was caused not only by external factors (wars and expansion of gold production), but also by a change in the global trading system (the transition to the principles of free trade). This eliminated the narrowness of foreign markets and led to powerful investments in many different countries. We also note the emergence of a more complex system of industry (heavy and light) and the creation of new transport as well as information and communication technologies (railroads and telegraph).

On the one hand, the transition to the 2nd K-wave A-phase precisely in the early 1850 was to a certain extent a contingency since it coincided with the discovery of gold deposits in California and Australia, which gave a powerful upward momentum. If we take the period between 1814 and 1847, then we would not have been surprised if this phase had started, say, in 1842 and a long upswing had begun. This upswing actually started and, in particular, due to expectations of demand on the part of the Chinese market, so that there was even an acute shortage of workers (see, e.g., Tugan-Baranovsky 2008 [1913]: 122), but the famine of 1845–1846 suspended it.⁵⁴ And during this time opportunities for new growth had improved.

Note that the rise provides sufficiently large reserves to become really long if it is accompanied by the expansion of the World System's core (and, hence, semi-periphery's catch-up).

It seems that the price changes as the main K-wave indicator started to be replaced by the fluctuations in economic growth rates sometime in the early 20th century. This, in particular, is reflected in the competition of Britain and Germany. Finally, this became clear after the World War I and the postwar crisis of 1920, and it is no accident that in the period preceding the Great Depression, prices barely rose (see Grinin and Korotayev 2010b: 123–125; Haberler 2008: 9–10, 28 for more detail), which even was a cause of some forecast errors. Such a radical change in the oscillation factors coincided (but not coincidentally): a) with an almost complete expansion of the World System; b) with the change of its leader; c) the weakening of the gold standard; and d) the fact that the industry, including the heavy industry, began to play a decisive role in the pace and direction of economic growth.

Change of the role of the state

During the 19th century the role of the state changed significantly: it stops being neutral, as states become more and more interested in high economic growth rates (some states showed interest in the development of trade and industry quite

⁵⁴ This is evidenced, e.g., by the following fact: in 1845–1847 the share of food in the British import grew from 3 % to 50 % (Trakhtenberg 1963: 155).

long ago, in particular, parliamentary commissions in England analyzed reasons for the decline of industry during the 1825 crisis, see *e.g.*, Tugan-Baranovsky 2008 [1913]). Prior to this, states at best cared for maintaining stability of the currency and government securities, and partly for the construction of communications. We should also note the state's role in the development of military technology and military orders. Starting from the Great Depression the economic growth became one of the main concerns of the state.

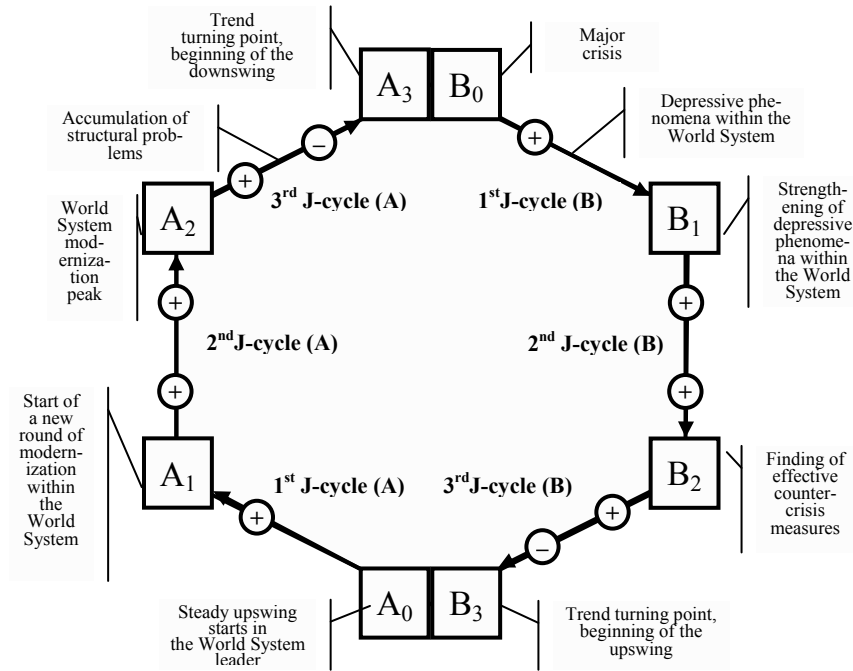


Fig. 10. Correlation between Kondratieff waves and Juglar cycles. Version 1

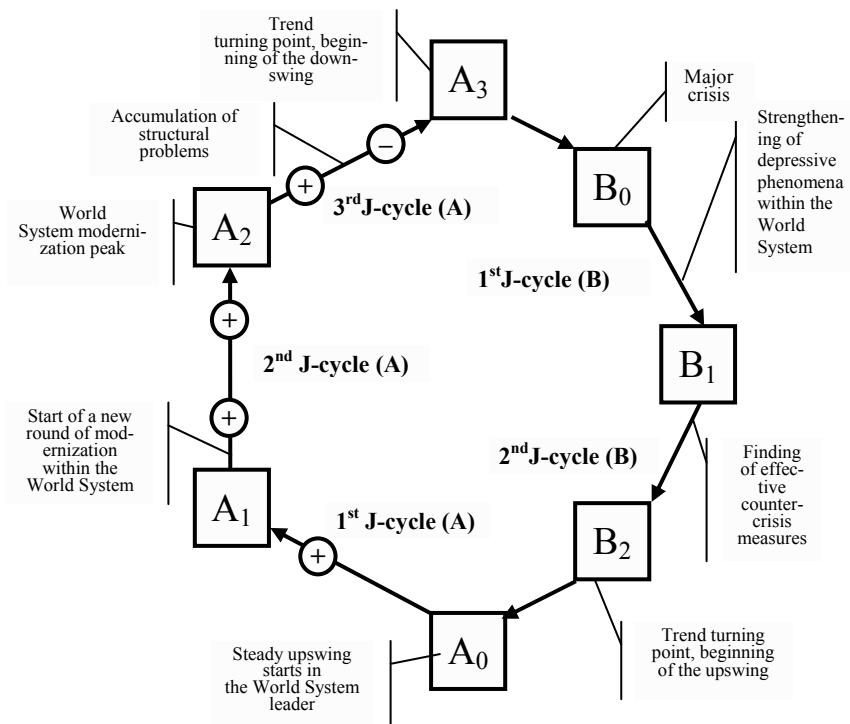


Fig. 11. Correlation between Kondratieff waves and Juglar cycles. Version 2

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2

From Kuznets Theory to a New Global Governance, Using a Mathematical Concept of Relations between Wealth-Creating Kuznets Cycles and a Kondratieff-Inspired System of Management

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Abstract

Debates concerning the significance of economic cycles proposed by Kuznets, Kondratieff, and Tugan-Baranovsky are helping to shape a unifying economic theory, one that also borrows concepts, ideas, and models from neo-Marxist, monetarist, and other neo-classical schools of thought. These theories of economic cycles reveal a structure of the economy which gives perspective to both economic statics and dynamics. Specifically, Kuznets cycles will aid in the assessment of a permanent new leadership in the global economy, while Kondratieff cycles, by pointing to the existence of long periods of crisis, will make explicit an understanding of how to recover from these long periods of crises. In combination, these insights will provide a top-down model of governance, one of which will include both global and institutional objectives. In order to allow for an empirical and theoretical convergence in using such a method we also have to learn from European economic thought before the division into economics and econometrics in the 1930s.

Keywords: *Kuznets swings, Kondratieff waves, global governance, monetarism, Marxism, crises, economics, econometrics.*

In a book, French essayist Alain Minc describes the economists as ‘prophets of happiness’ (Minc 2004). It is true that this discipline emerged among Scottish moralists such as Adam Smith (1999 [1759]) and David Hume (1946 [1740]) during the Era of British and French Enlightenments, as well as among the lawyers of the gentle trade, and is supposed to spread happiness and harmony among people, as David Ricardo (1817) stated. This science also developed an early focus on dimensions related to the social contract (Locke 1985, quoted by Berthoud 1988; Locke 1979, quoted by Giacometti 1984; Dang 1997; Hobbes

Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 96–119

1651; Rousseau 1963 [1762]; Turgot 1970, quoted by Giacometti 1984). And at the same time the West kept under wraps an older source of this focus in Spain as a consequence of religious thought and the concept of attrition due to the contributions of the School of Salamanca.^{1, 2, 3} These Atlantic pathways were

¹ Tortajada (1991) provides a good discussion of the contribution of the School of Salamanca to the creation of economic science in Western Europe. As any human science, it draws initially its arguments from law, and also from the culture of the very religious late Middle Ages Era. As was shown by Bergson (2008 [1932]) in his *Les deux sources de la morale et de la religion*, at the time of the triumph of sociology in France and of the separation of powers between the state and the Church, we look back centuries and see the source of religious thought in the creation of Economics (School of Salamanca). Also, it is worthwhile to remember that the source of moral philosophy came from Scotland, a century or two after the first sources of inspiration from Salamanca. What might appear today as a rather boring phenomenon is very important to clarify the beginnings of the capitalist system. It is perhaps in order to no longer remember, or even deliberately conceal the source of religious thought, that economists have undertaken to relate their mathematical discipline to natural science. Around the time of the general equilibrium theory of Léon Walras (1874), they tried and rejected as much as possible the historically constituted discipline and logical links with the humanities. But still, the sources of Scholastic religious thought related to the education system in the Middle Ages (de Roover 1971; Sierra-Bravo 1975) can contribute to analyzing or decomposing the mechanisms of contracts (especially those involving trade and commerce rather than the organization of manufacture or large industries).

² The interest rate was generated in response to scholarly considerations of time, society, wandering merchants, calculations owners, and tribulations diplomats working for states or for the Church of Rome. The interest rate was 'created' as opposed to the practiced hitherto current rate of usury. And this major legal innovation was probably marked by the desire to weigh 'souls', and to save a maximum [we mean an economic function whose result should be maximized; the result is produced through time and human effort and is a combination of a qualitative part saving one's soul and a quantitative part improving level of life for one's children placed in the future (and the third 'capitalistic formula' which relies on personal organization in order to keep in balance these two parts is kept secret and mainly private and also possibly belonging to a national social model and other community projects); by convention, we will state that the combination will be evaluated quantitatively – so through maximization function – because there is an accumulative process of hope and well-being over time and centuries which is constitutive of the initial concept born in the late Middle Ages] on earth through finance [of course, the link with our former explanation 'maximize what?' is: finance can be defined as commerce made on promises], and therefore the Western economy and capitalist economy! [In a sense the 'legal' part of such a project was not authorized to appear clearly connected with its intellectual and spiritual sources, because the one part of that naturally belongs to religion and the other part belongs to moral sciences, and all in all history of the underlying 'link' (if we can really speak of a 'link' which is not obvious as it would be an unconscious and psychoanalytical one) was the long historical walk by the Western World towards the secularization process]. The influence of the School of Salamanca in the law prior to the birth and development of the capitalist system – first historically being a merchant capitalism – was a coherently packaged legal corpus. With the concept of 'balance of pleasure and pains', it led the way to the doctrine of 'fair price' (Gomez-Camacho 1985; Lapidus 1982; de Molina 1981 [1593]), well before the utilitarianism.

³ But such a concept understood in the sense that the Spanish had in mind arrived too early on the scene to be put into the law. It is notable that this allowed time for the Church in Spain to think in depth about the question of social poverty (de Vitoria 1928, 1934, 1933–1935). Centuries later, Schumpeter and Keynes both felt that it was necessary to think about the relationship between law and economics before laying the foundations of macroeconomics (Keynes 1932; Schumpeter

crossed by a tension at the outset.^{4, 5} The Scottish and Spanish funding pathways had one day to confront a more continental approach, making the social subject not polemic, but the main focus of research. The School of Vienna *et al.* eventually confronted the challenge of a social perspective in economics, notably via the research program of the value of human action (von Mises 1985 [1949]), and also the Social Liberals in Frankfurt (Eucken 1989 [1940], 2004 [1952]), Marx (1983) as early as in the 19th century, as well as thinkers of cycles, such as Lachmann (1937, 1938, 1939, 1940, 1943, quoted by Longuet 1999) in Austria,⁶ Tugan-Baranovsky (1894–1904, quoted by Makasheva 1993) in Ukraine, Chuprov (1889, quoted by Makasheva 1993) in Russia, *etc.*

It took some time before the founders of the economic cyclical theory started this specific debate in a historically troubled period (see Kleinknecht and van der Panne 2006) was between the Russian Kondratieff and Ukrainian Kuznets. But, paradoxically, given the scope of the topic, and the dominant economy, since 1945 the main representatives of this debate have been Ameri-

1954; see also Dempsey 1948; Lapidus 1987; Melitz 1971). After Keynes and Schumpeter, the 20th century macroeconomics was more interested in the industrial sector than in merchants or grossers.

⁴ The French and the English of the same period were less influenced than their Spanish counterparts in their thought by religion and by the Catholic Church. They followed their own original paths and initiated separate calculations. They had in common, however, the sources of social consensus. They mainly appreciated (in England and Scotland), or quite exclusively accepted (in France) such a social consensus. It consisted initially in the definition positioned between moral sciences and religion on the basis of reflection concerning human understanding (Locke 1979). Here we may detect the historical foundations for a solid economic theory the Spanish at that time on the concept of ‘fair price’! Macroeconomic theory has less to do with the definition of currency or even of what macroeconomics is: it is much more concerned with actual recommendations in respect of the macroeconomic theory, which, generally speaking, can barely solve its perspective issues with other sciences, with linguistic and sometimes with national conventions put it in legal terms.

⁵ One could include here also the use of restrictive preconditions – once ‘reasonable’ equations have been accepted about anticipations. In particular, the number of circuits in question will be rather limited in practice for reasons of policy effectiveness due to their quantitative nature. The credit channel may appear to rely more on national conventions – although they evolve extremely fast – than on channel currency officially unique to the institution. During the sixteenth and seventeenth centuries the English and Scottish claimed that the price of currency was a consequence of convention... All other prices would result more due to contracts than due to convention: basically, there would be commercial contracts. According to Locke (see Berthoud 1988; Dang 1997), the average human being uses currency as a marker of their ownership which links in an open game morality, money and property, which in turn is expected to deliver a ‘natural price’ for money. For the French economist Turgot, money would instead be more an opportunity for each individual in a society to express feelings related to social life (Giacometti 1984; Turgot 1970 [1769]).

⁶ After the National Revolutions took place in 1848, Longuet (1999) argues that Lachmann had thought about the major economic fluctuations that are often linked to major historical shocks, whereas the ideas of Keynes would have been more suitable for the relatively average magnitude of fluctuations in the context of an already stabilized financial institution.

can scholars including Kuznets himself who chose to immigrate to the United States. This scientific debate has become relatively diverted from its initial path. The theory of economic cycles has become one of the main paths of economic heterodoxy, providing much evidence of a sociological construction of economic institutions since year 1000 in the World and in Europe (Polanyi 1984), which ultimately implies integration of this phenomena of dependence in the modelling of economics (Kalecki 1987).

That initially masked the debate which have resurfaced in an unexpected way – while some researchers (Diebolt *et al.*) have called it the ‘the Loch Ness Monster’ (Diebolt 2002: 11–16). I also suppose that the concept of economic cycles rears its ugly head from time to time like the Loch Ness Monster. At the same time in the 19th century the existence of economic cycles did not receive due attention. It was considered a strange object of research, which is a characteristic of the phenomenon of national economic development and how economic development is associated with such economic institutions as international trade, or the establishment of central banks, or education, in the cycles of human life. Hence, the first vague indication appeared arising from the ‘cycle of trade and business’, that put us on the path of commercial or financial insurance techniques of merchants. This can affect companies – which rarely brag (about their own information systems and/or the founding source of their capital) – and also affected the analytical framework of the national model, which guided the long path leading to social progress, before financial globalization is tempted to take over.

The objective of sustainable capitalistic foundations (both legal ones and purely financial ones) of companies is to integrate the phenomenon of a ten-year cycle because the typical ‘business cycles’ last ten years on average. At the end of that period of time, companies need to maintain the confidence of their stake holders (employees, banks, advisors) to find the right words to describe the cloud of side effects (legal risk, risk of bankruptcy, business interruption, loss of business, *etc.*), all in order to protect their business with care and discretion, in case they should suddenly face unexpected losses. For instance, if a company gets bankrupt at the end of a business cycle, the company may be bought at a discount price by a competitor, but when times are difficult, chances to survive the next crisis not only depend on the quality and performance of the manufacturing process, but also on the quality and performance of management of the company, which consists in the detail perception of the potentially dangerous defaults of vision of links between legal robustness of the structure, commercial environment of the company, and economic cycles. Specifying legal interests of the stakeholders gives more chance to buy some competitors at a low price, and to detect accurately when to be advised to show legal aggressiveness towards such competitors and with appropriate corporate communication, legal communication, trying to provide the impression that it would

not be a crisis communication. This cycle is basically a market cycle and the beginning of the term between seven and eleven years for the stock exchange and certainly a bit longer, twelve or thirteen years perhaps, for real estate, from which the actors – helped by their analysts – will try to establish assumptions of expectations of significantly greater complication and involving a longer period of time, which will integrate various modes of rationality (administrative, strategic, political, economic, *etc.*). At the same time, the myth of the ‘end of civilization’ begins from the late 19th century, with its foreseeable consequences embedded in the vocabulary of economics.

These debates show more and more: the image of the ‘Great Depression’ or ‘Great Depression, End of the Century’ ... ‘The evil of the century’ as represented by poets, physicians, and sociologists which occurred a century after the first Great Depression was observed in Europe dated by most historians to the period 1873–1896. The genius of the late twentieth century coming a century later and speaking at the outset of the ‘crisis of civilization’ (Amin 1980, 1988, 1991; Morin 1977, 1980, 1986, 1991, 2001; Modelski 1983) which is side by side with dependence (military, financial and economic dependence of South America on the United States America, and again a very comparable situation is coming soon for the European Union with respect to the United States of America) (Cardoso 1977; Herrmann and Tausch 2001; Tausch 1986, 1989, 1993, 1997a, 1997b, 1998a, 1998b, 2002, 2003, 2004a, 2004b, 2006a, 2006b), and this is observed in a context of rising risks (Beck 1986, 2001). This implies the need for new analytical frameworks (institutional economics, theories of regulation, multiple statistical analysis submitting their criteria to varied relationships with their games and challenges) in order to lay a solid basis for a new beginning, a new system which is richer, more globalized, more financialized, and also crippled with multiple risks, now more or less properly taken into account and supported, by the national states, their technical institutions, and the EU28. The delay for such a project, that betrays these anxieties (Ayres 2006: 55–71; Mensch 2006: 80–90; de Greene 2006: 10–21), would not be fatal to the extent that we speak of a future system that will be very readily expanded in complexity and size compared to the old system. So, beware of the risk of ‘a geopolitical tsunami!’ (*e.g.*, the old prediction of geopolitologists that ‘no country is allowed to take total control of resources in Eurasia’ would be placed in default; as a consequence of such a traumatic event, a nuclear strategic negotiation would be bound to start between the United States of America, Russia, Iran, other regional political powers; and at the end the European Project would find it difficult to master one’s own developmental timetable, and would experience various difficulties to correctly cope with the questions related to one’s very identity [What does ‘Europe’ mean? How can a European social project and a European social model be founded and defended?]). Now we should not

continue to speak of ‘the possibility of risks’, we ought to face their arising all together (Beck 1986, 2001).

In light of the possibility of financial collapse, we will focus on the contribution of a Nobel Prize Winner in Economics (in 1971), Professor Simon Kuznets, with special reference to the famous academic dispute (see Kleinknecht and van der Panne 2006: 118–125, quoting Kuznets 1940) between him (Kuznets 1930: 10) and Joseph Schumpeter (1939), but from the perspective of time some eighty years after the famous dispute.

Since the first observations and empirical statistics of the phenomenon of cycles (Parvus 1901; Tugan-Baranovsky 1894), we rather see that the phenomenon of a ‘strange attractor’ of this uncontrolled theory which is used as the starting time of the Great Depression (1929–1953) provides an explanation of this mass phenomenon, both theoretically and statistically. Kuznets believes that one type of cycles exists for sure, one with an 18-year period. He estimates other possible lengths ranging from about 12 up to 30 years. But he suspects the other cycle, a Kondratieff cycle of 54 years, cannot be proved to exist, considering the state of science (both empirically and theoretically) at the eve of the second part of the 20th century. We will show that both approaches – of Kuznets and Kondratieff – are not inherently contradictory, since the essence of the first one shows leadership in the creation of wealth, while the second one indicates the needed direction of the guidance of this phenomenon.

1. Theory

A. Yesterday

As Kuznets wrote (Kuznets 1940: 267) about the Kondratieff cycle theory:

To establish the existence of cycles ... one must first demonstrate that we take here fluctuations which occur lasting approximately regular, simultaneously with the movements representing various important aspects of economic life ... and secondly, there should be an indication that external factors or features of the economic system would be sufficient to account for these recurrent fluctuations. As the old framework of analysis of economic life will be in effect, the concept of such a cycle could be accepted without questioning the cohesion of economic life in general ... If the second condition, theoretically, is not met, we cannot establish a link between the findings on empirical observations concerning a certain type of cycles ... with the broader context of existing knowledge. Neither of these two conditions has never been satisfactorily completed in terms of Kondratieff cycles ... The prevalence of cycles of fifty years has not been demonstrated in the volumes of production or employment, or more in the physical commercial part, ... no satisfactory theory has been offered to explain these swings of 50 years that are supposed to return.

The future winner of the 1971 Nobel Prize in Economics, Kuznets, when he created the NBER in Chicago, which over the following 50 years was the most prominent Institute in the World to apply methods in National Accountancy Systems, really developed all bridges between the basic legal private companies' accountancy and the way to measure the broad equilibrium measurement tools of national accounts, was honest and quite tough – in other words, still conceptually rigorous – in such a global acceptance on the theory stated by Kondratieff. In fact measuring national balances and account is a sophisticated art, which supposes first the indication of how we measure a profit or a deficit in foreign commercial exchanges. It is certainly not an easy task, for it implies giving accurate expert advice on all aspects treating of the foreign commercial trade including some sophisticated legal and other conceptual aspects. Which is the more difficult to build – or, when built, to deconstruct, because time has changed and organizations have changed – might be the bridges in human team work and technical, accountant and legal organizations. Kuznets said in 1940 it was impossible to say if Kondratieff's theory was true or false. As a consequence it would have proved impossible at that time to build a legal, administrative and accountancy system on it. But 80 years after this important dispute, we ought to remember that Kondratieff, just as Kuznets and Slutsky, was among the founders of the International Econometrics Society. And if the length of the announced Kondratieff cycle appeared to be too long, so as to build administrative bridges on its premises, one of the main reasons is that the World System was not so open as it is today, so it would have not been realistic to manage the World System directly. And any administrative system was more dependent on legal historic national traditions than on a true scientific basement, as Slutsky proved that often fallacious regressions can be identified in place of a cycle that is 54-years long. That is why we can reasonably think that everybody used the Kondratieff theory, but they preferred not to recognize it. From, say, 1945 to 2015, we can reasonably think that mainly due to the worldwide tax evasion of the MNCs and avoiding of different legal, accountancy and administrative traditions, the Kondratieff theory was a collateral victim of a sort of 'Loch Ness Monster effect', and world economic organizations used its reputation to promote 'semi-fallacious-regressions' and was as close as possible to the place where one could invest industrially and make money but without being the first to pay cash! God Save the Loch Ness Monster then... by all means!

B. Today

With respect to Kondratieff's theory, it was recognized first by those who consider innovation as the main source of growth (*e.g.*, Schumpeter 1939), growth which is motivated by the Kondratieff cycles, with scheduling depending on a pendulum effect. This position is more motivated by pedagogy than by true

pure researches in economics; it is rigorous but would seem to evade the more complex aspects of an open World Society and World Economy that failed to exist at this time. Schumpeter's approach appears to be quite mechanical in its effects. Nowadays a number of psychological aspects in an open World should absolutely be brought into consideration in addition to a more complete explanation and should be a key to build the needed bridges on the theoretical side of the scientific trial. At the same time, when on the administrative tools' side of things, we should start from the new world situation and again confront technical points from both Kuznets and Kondratieff, including this time the new possible necessary condition to eliminate interpretations inspired by 'fallacious regressions'. After doing so, the next step is taken by Mensch (1979) who always assigns the role of innovation as the main causal factor explaining growth. However, by saying that innovation occurs constantly, whether during the periods of rapid growth or during the periods of 'depression' when growth is slowing, Mensch believes that new thinking could one day help overcome the inevitable long depressive phenomena.

New education also helps to skillfully mask indirect economic functions (e.g., cultural or media-intermediated) of society: for example, hegemony (the explanation of long waves by political factors like hegemony), the World System (the center overlooking the suburbs), training and organizational planning issues, etc. This 'recovery' (trying to justify an ideological position by putting forward the so-called 'central function' of the global economy or the occidental society) may manifest the domination of the newest, upcoming or recently occurring factors, possibly including the factor represented by the economic system itself, the factors of another completely different nature (economic policy); and this influence can lead to two important practical consequences for the formalization of the research. There may be displacement of this research program by another research program, especially in political science. However, this risk seems rather limited, because we live in the age of interdisciplinary research. So, we allow ourselves to address these aspects, because it is a way for us both to report the presence and the existence of complexity and to describe a normal way to address this complexity and scientific processing. However, this issue is important in econometrics. We cannot just say that since econometrics has grown massively, since roughly the 1970s when it was used first to conduct tests to compare theories and classify them in order to advise economic policies, now those who use econometric results would need a new historical narrative accepted by all in order to validate the methods and the use of statistics. These methods should work simultaneously on theory (which may include input from what history teaches us facts like this that can teach us the history of ideas), and also on methodology, which also opens new epistemological questions, which do not necessarily arise as a possibility of prior reflection, but may also arise (to reflect new insights in response to the use of statistical

tests and the results made) during and parallel to ongoing research. This is the guarantee of a search process based on solid foundations and in a cultural context of the 21st century in which we prefer to postulate open-mindedness. We must then report the consequences of this on 'the maintenance' of econometric systems. Traditionally, if we perform statistical tests in order to test these theories, this methodology emphasizes the analysis of statistics based on stylized facts, then some forecasts and finishes with a review of decent policy implications in terms of recommendations. Gold is always a cause of problems that an econometrician cannot always deal with.

Theoretical choices are then of great importance. We chose to focus on the following assumption of the existence of long monetary cycles (Jourdon 2010a, 2010b). These long monetary cycles are motivated, insured, and re-insured by Management Systems of Property Rights, which in each new cycle indeed contribute a new social project. Each new key currency in comparison to the succeeding one constitutes and attributes to support such a social project. The end of the Kondratieff cycle is always characterized by a loss of coherence, the practical consequences of which are manifested through foreclosure effects felt by all stakeholders in solidarity with the World System. Here we see, with the end of the long cycle of the currency called US dollar, which is both a national currency for the USA and a support for developing commercial, financial and monetary exchanges all over the planet, and also a cause of the phenomenon of tax evictions, tax and social competition in Europe, and increasingly sophisticated financial technologies to avoid taxes. These include refuge in tax havens whose number continues to grow, refuge in sectors such as real estate shelters, refuge in the energy business which suggests geopolitical shocks and a difficult transition to another long cycle. As a consequence, we may evoke financial wealth grabbing along with private information or innovations which were also deprived of small businesses by multinational companies in order to pay less tax. (As for 'private information', let us on the political side of things, mention the strange attitude of a talented French politician, Mr. François Hollande, who officially took over as first secretary of the French Party, Parti Socialiste, for eleven years in succession, but on a day-to-day basis seemed to orally intervene as if he had been not his first secretary, but his official porta-voice [is there a 'hidden imam' in French Parti Socialiste?...]; if we rather speak of business, private information means the brutal market for top executives in the 1980s and more clearly in the 1990s, which became a world market, so these high pressured executives accepted their jobs in exchange for generous bonuses, because the value-chain had become worldwide without people being properly informed of that; after this hidden turning point occurred, 'private information' means in the spirit of Institutional Economics that there were a lot of asymmetries of information, for strategic reasons and also for protection of the citizens and sometimes a global fight against terrorism). Ultimately, the social consequences

such as indebtedness and loss of access to bank credit will be overwhelmed. In particular, we agree with the analysis (Mensch 2006) saying that a long depression is not necessarily inevitable. These phenomena can be juxtaposed with nondestructive forms of social and even economic – or political – innovations such as participatory democracy (Jourdon and Tausch 2009), sustainable development (Chistilin 2006: 100–108), the Dialogue of Civilizations, Global Democratization, and Global Development. But this only confirms one thing, that the development must be globally administered.

That is why we believe the debate between Kuznets and Kondratieff must now take a completely different form. Kuznets said that Kuznets cycles existed anywhere except in China. It was the era of confrontation between two political models which also politically defended their economic efficiencies: the U.S. capitalists and the Soviet Union of Real Socialism. But even other Communist powers of that time were opposed to these two approaches, the industrial and planning approach towards the future of the USSR (1917–1991), on the one hand, and the Chinese approach (1949–2014), on the other hand. This also applies to China emerging from underdevelopment implying the necessity of walking on two legs, those legs being agriculture and industry. However, almost all the theories in the economics of development are based on a structuralist reading of the economy with the core areas and sectors more or less industrialized as well as with established infrastructure and finally with a domestic or informal economy. Kondratieff's theory is also sectorial, according to the teaching of Schumpeter, regarding his concept of 'creative destruction'. But his structuralism is different in nature; statistical structure seems to create a prism through which one should pass to read a secondary reality. If we adopt today a comprehensive approach to development without separating the developed and developing countries, we should be able to compare the views in order to adopt the perspective of the Dialogue of Civilizations. Clearly then, China's point of view of its civilization appears in many respects to be a Civilization of Commerce, as this has always been. This point of view can cause service wealth creation for the world. Kuznets cycles in their life cycles coincide with periods of transport and also with periods of construction. These interfering processes in their internal functioning (the construction industry is a kind of working draft form of these interfering processes, as each project is a new company that must first sell service logic and simultaneously manage industrially the issues of timeliness, quality, and cost control; transportation is, thanks to new forms of energy, a new source of the revival of each long cycle, but this new source also implies hidden costs with respect to the service of economic organization) contain some features of a globally regulated economy and society.

Transport. In the early history of the modern economy, the elasticity of the market was calculated from distances, which created the costs of transportation. Even the interest rate reckoned by bankers (Chilosi and Volckart 2009) at the

nerve center of Europe (Rhine, Swiss German, Czechoslovakia) were based on the travel distance to reach potential customers, both physically and through information channels, and now at the age of information and communication revolution the transport issue arises increasingly in two directions at once, physically and intangibly. The result of this will affect the movement of money to manage portfolio, and also raises issues of transportation of people. All this complexity invites us to compare the transportation system to the nervous system of the economy. Provided that transportation is a highly important constituent of the fixed costs of organizations, and because of the importance of those organizations, they must be properly insured!

Construction. This is the primary distinction between ecology (home management) and economy (trade management in both professional and private areas). So, it would appear to be the first element of heritage that underpins much of the overall security of the economic system. Therefore, it is to be compared to 'the backbone of the economy'.

The discovery of the Kuznets cycles and their importance clearly confirms the importance of these two sectors for the health of the economy. As the French proverb says: 'Quand le bâtiment va tout va!' (When the building goes all goes!). Of course, this is not inconsistent with the fact that China can be an engine of wealth creation around the world through trade. Factors guiding the creation of wealth in China's direction may come from structuring sectors such as construction, transportation, logistics, advertising, marketing, trade. Maybe we can dare to assume today that the Kuznets cycle, around 1940, was not very noticeable in China, which was fighting to get out of underdevelopment. However, today when the world is changed, as Aristotle would say: 'The truth is in the middle'. There would exist Kuznets cycles, as well perhaps in China. Even in 'l'Empire du milieu' there would exist Kuznets cycles. The symbol of rationality, 'four directions', would exist in the place where everything can be sold for money (including children wrapped in carpet, little prostitute girls, goods issued from counterfeiting).

2. Methodology. Epistemology

A. Yesterday

For Kuznets, inequality is understood to be represented by an inversed U-curve. At the beginning of its development inequality grows quickly, because entrepreneurs playing a pioneering role are likely to get rich much faster than the rest of the population. In the second period, when society became more structured, it was consequently better managed. As a result, it may well pay more in wages and benefits associated with social protection mechanisms that must accompany them. Income gaps between all the agents are reduced through the increase of the mass of properly treated employees. Today, many countries emerging out of the Third World show more dynamism – both economic and

demographic – than industrialized countries that hardly continue to retain their technological edge. We can then say the problem should now be addressed at the global level. Is there an inversed U-shaped inequality [^] acting globally? If yes, then how is it possible to manage? The theory of Kuznets shows the path of hope – the increase of wealth – and then hope that these resources would be better administered, managed, shared ... but unfortunately, how this can be accomplished in the very long term or in the part of the World System that has become very complex and currently subject to a series of serious crises – financial, food, energy, geopolitics, social, and so on...

The second approach developed by Kuznets seems rather to give us a direction that will address the phenomenon of wealth creation. But this does not seem to offer technical alternatives to avert risks that could accompany that phenomenon of wealth creation. Unlike Keynes (1969: 112–152), Kuznets assumes that when a country's GNP increases, the propensity for consumption by agents as long as earnings, increases even more. This leads us to believe that the increase in the propensity to consume more than the rate at which income grows is also accompanied by a growth of the size of inequalities that are likely to occur in phase with the growth of income when in times of crisis the center of the world economy (debt, crises closer to the center of the global system as the financial crisis in 2007 and the subprime crisis the following year) is hurt. These changes in growth would not find solutions without a new system of administration. But given the unconscious factors at play⁷, is not it necessary then to focus attention on finding the causes of the phenomenon from the beginning?

B. Today

It is about time and constructing calendar that the actions of different agents can coordinate. The only Nobel Prize in Economics who has spent his entire academic career in France, Maurice Allais, was once severely criticized for its introduction of the mathematics in economic models in France. As in many countries, in France the teaching of economics was a teaching in method and critical thinking by getting in touch with moral philosophy, law and economics itself. The whole of economics was so minimally mathematized. As an example, even the *General Theory of Employment, Interest and Money* (Keynes

⁷ If the lower turning point can be easily calculated, assuming that one has even been able to determine if it was a problem of price or quantity of the image ...from the 'Loch Ness Monster of economic theory' proposed by C. Diebolt [2002: 11–16] sometimes appear to be sound!; we mean 'lower turning point' implying that in the mathematical space associated with our theory there certainly exists a lower turning point associated with a 'price' interpretation of the studied situation, and an upper turning point associated with a 'quantity' interpretation; or, on a purely mathematical point of view, it may be an upper turning point linked with a 'price' interpretation and a lower turning point linked with a 'quantity' interpretation; in fact, it all depends on the mathematical design of the space we are confronted with. In any case the final synthesis between 'price' and 'quantity' interpretation will be concerned with the nature a global 'tax' design.

1969) does not include a single equation. Consequently, it seems that building an economic system of equations as complex as those of Astrophysics would not pose difficulties if only two criteria are at the same time also met in the strictest possible way. These criteria are as follows.

The question of timing. Tell us where it is: What is the space-time mathematical global design we are working in, in our model? Where are we today in the process of deduction of the predictions made by the World System Theories? Usually, the hegemonic power (since 1945, it has been the United States of America) generates the master calendar. This gives the hegemonic power a monetary authority to fix the price of money and control the actions of most agents and how those agents are coordinated. The rejection of economics or its mathematization is often the rejection of the possible consequences of the sense of control by the 'Big Brother' imagined by George Orwell (1994). Time is likely to be a conditioning parameter for understanding the course of the series we are studying (by 'series' we mean a series of events linked to the World System theories, *e.g.*, in Goldstein (2006) they are sparrings, war, inflation,⁸ stability, sparrings again which begin a brand new cycle, *etc.*); and, at the same time, for those who reject the power that goes with it, it is possible to consider it – even if it is a parameter and not a single variable – as a discrete parameter, and it goes without saying that we would not limit the need to clarify the existence in the equations. The economy then runs the risk of slipping into a non-computational or even informal way of being. Sometimes by circumstances of extremely cold conjuncture, awareness of the mystical dimension of time emerges, and it will relate more readily to the 'time of the universe', that of nature or cosmological equations, better than that of 'World Time', that is of constructed actions and society started by humans, then we might be led to reject the international currency and all that goes with it.

The issue of self-beliefs. Hence, our second criterion: our recommendations must also be able to apply the equations in a space that is institutionally recognized in the economic system, a space where self-belief in human beings is respected. These beliefs are of religious or humanistic essence, or even atheistic as long as they relate to a provable moral paradigm... one with beliefs, with preferences (these often come second in contradiction with the materials) and with strategies (these are the result of the 'precipitation' of chemical inter-

⁸ Works by Goldstein are particularly interesting to show how analyses can be in depth developed from an econometric point of view. Goldstein (2006: 137–144; 139, table) shows a general presentation of his theory with four phases: expansion, war, stagnation, rebirth. Goldstein shows an analytical presentation by including the turning points, which as a result produce six transition phases: price, innovation, real wage, production, investment, war (Goldstein 1988: 257–274; 259, table); and also a dynamic presentation of one's theory including eight poles each one with each other moved by attraction and repulsion mechanisms: war severity, social memory of war, national capabilities distribution, prices, real wages, production growth, capital investment, innovation (*Ibid.*: 274–278; 275, table).

actions between the first two, even by including the strategies themselves, which are constantly forming, reforming, and changing as a result of collective action or individual actions). If we should consider autonomy of the person in relation to the individual games, there would be no problems using 'astrophysical equations', provided that one knows 'where we are'. Therefore, we would also know the origin, the repository from which we begin to measure and study the series of events, with the intent of trying to clarify the 'nature' of the events described.

3. 'Économétrie' vs. 'Econometrics'

A. Yesterday

Since the 1970s, 'économétrie' has developed. It was used to compare schools of thought in economics and political economy in particular in order to look at the consequences of applying their recommendations. Thus, the natural development of the model was to go with the consequences of policies based on the application of the model. In doing so, this would subject the model to appropriate testing. We will always model the consequences of some possible decisions and at the same time understand the consequences to the model, and do so as if the underlying cause was necessarily known and controlled. The idea here is to add the scientific tools of statistics to clarify discussions about representations of reality and their possible actions. The objective here, clearly, is to avoid falling into pure ideology.

The second major reason for the massive development of the use of statistics, except the development of the technological tools themselves, with the creation of econometric software, was the growing complexity of an economy that has become multifunctional and multi-purpose. Many companies have tended to create their own 'system', whether of information or decisions. With regard to multinational firms, they tend to make the behavior of the macroeconomy contradict the opinion of the creators (Galbraith 1989 [1967]) of macroeconomic theory. The macro-open economy that has begun to develop over the last decade of the twentieth century does force the development of the analytical tools of econometrics, which were ever altered in order to mathematically predict the consequences of the combined effects of several factors acting simultaneously.

However, logically, when one considers the future consequences of potential decisions still to be taken, it may often happen that one approaches or has the impression of being closer to the discovery and understanding of the causes. Sometimes one may have the impression of discovering a fundamental underlying cause, or, the ultimate cause, in analyzing reality. Therefore it was pedagogically useful to distinguish 'économétrie' (the French most common word) and 'économétrique' ('econometrics' captures both French concepts). The first expressive concept acts as a general theory of statistics applied to the study of

a phenomenon which can easily measure profitability with respect to its financial, productive, and physical aspects, and link these to a representation of political economics which is known to be fairly well expected in terms associated with moral philosophy. With regard to the second concept, on the contrary, given the intertwined phenomena, the approach here is to screen the risk of calculating profitability. One example of this very frequently confronted difficulty may be when material productivity contradicts with financial rentability: in such a case the management should screen the risk, for instance, if the differential between productivity and rentability is low leveled, the management may present the end of exercise accounts in a way that would put light on a particular aspect of the company's strategy, which in turn would repay full consistency of the company's main activity. If the differential is medium-leveled, probably some specific measures in the tax policy or account policy of the company should be easy to enhance. Then if the differential is high-leveled (due to the rapid change in technology, or some cyclic or contra-cyclic behaviors of the prices which rapidly vary and are particularly in purely commercial activity in which the presentation of things is so important), it is necessary for economists to try to plan precisely how to model the changes between the 'trend' and the 'cycle', and when changes occur, what part is for financial aspects and what is for productive aspects, and maybe the remaining aspects – primarily unstated in the model – being for human specificities (part of the shared history of the team) ... and for other miscellaneous factors. The second example is when it is difficult to define, which activity of the company is the main one (when it is a multi-activity company), then the filter or computer screen may calculate profitability incorrectly, because the support of the calculations, that is the product, is not so clearly established in this case; it would be highly preferable to start studying the profitability of the company by the 'observed-risk-aspect' than by the 'predicted-profitability' aspect, in order to have in mind an order-list of priorities in decisions (but probably in some sectors, particularly connected with public markets, other aspects should come into play, because these markets cannot be really 'transparent', and it is possible that in such cases it would be preferable to partly 'hide' the decision-making process instead of having an order-list... because the decision-making process is supposed in such cases to be 'public' ... so that there is no one sole decision-maker...). These reflections identify the point at which the tools for screening risk can be applied (it helps to be systematic): 1) to avoid taking useless risk; 2) to have a method to confront the 'risks-aspects' and purely 'profitability aspects'; 3) to adapt and even constantly improve the company's strategic processes and make the company feel more rational in regard to its corporate identity. However, we hope to go further in understanding the ultimate cause, thanks to the improved visibility of reality that gives us a proven ability to filter the risk and overcome the obstacle that is

part of reality. In theory, of course, this must allow us to go further in understanding the ultimate cause.

B. Today

Wolff (1993: 233–246) pointed out already that any statistical theory begins by accepting the more or less affirmed existence of a series of events associated with cyclic economic behavior (of a market, of natural disasters, financial cyclically observed minor or major bumbles, booms, crashes...). This decision of acceptance can be achieved in a ‘search for the frequency’ of a style of research in comparison with a landmark event which always recurs with some frequency. It can also be understood as a ‘residuals-diversion’ style of approach of an existing series. So, if one understands that a deterministic series of events is a factor of the system, that is a root of mathematical explanation, one can then hope to reconstruct the inferential function and constitute a ‘residue’, even if sometimes the latter appears as an undesired initial consequence. Then, by mathematically integrating the residue, one can hope to reconstruct a vision, a more concrete model, which is consistent with reality and a scientific theory.

Many researchers have recently put their focus on spectral analysis methods in order to deduct a genesis-type logic in the very detail of the ‘root-residue’ – and to link the aspects of the residue with the aspects of frequency – all the more importantly since it appeared to be probably the only solution to treat a very long series in time. But these methods imply that you use a lot of complex technical details in the mathematical treatment of the series. So, currently, spectral analysis as it was has the potential for confusion. Spectral analysis acts on the frequency of observed events under scrutiny, assuming that the phenomena, which are presumably found, ought to correspond to the existence of a ‘memory’ of the entire system. However, if these phenomena are found through this filter actually to be comparable in form, but possibly different in nature and structure, then we could not only acquire more ‘memory’ to serve the entire system, but also increase the risk of misinterpretation! In biology we know the example of plants that, viewed from outside, seem to belong to the same family, although they are genetically very different and cannot interbreed, unlike other plants, which look very different, belong to the same family, and are interfertile.

These new methods do not suffice to explain a phenomenon like that of Kondratieff cycles, which manage to create a ‘structure’ by subsequently serving as a statistically grounded ‘filter’ for scientific interpretations. By construction through four different types of parameters, this theory resurrects an old mathematical mystery at the very foundation of the building of some famous civilization – the ‘four elements’ of the Greeks ... a base that becomes five in Chinese. For a Chinese in addition to air, water, earth and fire, he would immediately add wood, which allows even more factors to act on the living nature of

things and the ability to act generally as paid humans. The transition from four to five aspects in the spirit of fostering better actions may be, however, conceptually not easy to reach – beyond any description other than switching to a dynamic, inclusive (and potentially itself included) paradigm for the social sciences. In the other direction, to find a semblance of unity, a drop from four to three aspects could be little easier: allowing us to achieve that ‘squaring the circle’? The practical solution adopted by many researchers could be ‘calculating a direction’ for the ‘creation of wealth’ ... and reasoning based on three elements of ‘direction’ ... in failing to not concern the ‘meaning’ to be intended to be the systematic ‘fourth’ element. This fourth element acting as a horizon of research would be devised to give meaning to the first three. It could well stabilize the whole system.

In fact, when the system with four elements would change from a passive state to an active state, it could discern the existence of a fifth vector. This vector will represent the action whose effect is produced by a single vector system, and that effect will be to expand the size of the entire system. The reverse operation is also possible: the fourth parameter can be ‘inhibited’ by the entire system, sometimes due to simple ‘statistical noise’ made about this vector by the overall system, because such a faulty understanding of its members emerged of the ins and outs of the system. In this case only three vectors will be clearly visible... as the carrier of meaning would be hidden. Probably, that is why Kuznets was more recognized in the West than Kondratieff is: this method calculates directions of profit, regardless of when it comes to address the tax dimension of things – including globally.

* * *

Thus, for our part, we prepared an *Economic History of Europe* showing the progressive income collected by *homo monetarius* since 1800, a *Monetary History of Europe* (Jourdon 2009a) showing the concerns of the Central Bank in securing and diversification of the income of the *homo monetarius* within the World System since 1800. Our theory: it should partially rewrite the history of money to reflect this new agent, *homo monetarius*. Our theory should address the following: 1) make decisions allowing it to diversify and take financial risks; 2) increase sense that a new political philosophy ought to be designed; 3) perform information transfer with the environment and with a monetary character of this information so as to better ensure the system. The next monetary Long Cycle (1992–2090) is the cycle of the new key currency, the euro (Jourdon 2011a, 2011b). It follows the respective cycles of pound sterling (1848–1945) and the dollar (1917–2015). The EU euro will specify its reservations vis-à-vis the system embodied by the US dollar (1980–2020), becoming the first reserve currency in the world while bearing the debt-load of the World System (2015–2055), then weaken, decline, and pass the baton to another key

currency (2050–2090). The EU euro brings with it a new social project: the balance between private property, social property, and self-property, thus following the projects of the US dollar (a balance between private ownership and social ownership) and the UK sterling pound (liberalism in defense of private property). The works of Kuznets, as that of Kondratieff, remarkably fit into our perspective. They enrich it. If the Kuznets cycles show wealth creation, and those of Kondratieff the best way that is humanly imaginable to administer them, how to think about the borders between sectors, countries ... in order to enhance coordination. An approach of semi-monetary long cycles (Jourdon 2008: 95–122; 2009b: 13–26) or monetary rethink could help both series of cycles – Kuznets and Kondratieff – find new paths of convergence.

Clearly, the long cycle of the US dollar does not take completely into account the potential for lasting justice. On the contrary, the miracle of the last fifteen years is that, from a more technical point of view, the holders of economic interest accurately managed their investments, while moving them towards new growth-areas in order to reduce taxable income; this strategy was successful... And, at the same time, these holders of economic interest contributed (*e.g.*, the American magnate Warren Buffett, who holds one of the most prominent hedge funds in the World, is regularly contributing to the public by readdressing more than 80 % of his gains, according to the French Newspaper *L'Expansion*; the second richest captain of industry in the World, the American citizen Bill Gates, generously funds a number of causes in the Third World). If we consider these facts and arguments from the perspective of history, we could put it in parallel with the opinion-influencing public behavior of such British personalities as Lord Keynes and more recently Tony Blair ... Being a leader in international monetary negotiations, Keynes was as important a personality in probability reasoning in economics (in which he used to be a generalist). Tony Blair, being an initiator of actions in the Gulf War, was highly criticized for that in Continental Europe, but being a leader, he also had to assume his position and role in front of history. So from an ethical point of view, I suppose, the Gulf War is not a case where we could try to assert his, if any at all, moral duplicity. We only say that the long process of post-modernity with collateral effects on sex and gender, on finance and tax, and on social and societal characteristics seems, according to us, to deliver one important lesson, that finance is not the villain in international professional relations, but any attempt to regulate it – certainly needed – would mean to put it into historical and global perspective first before discussing any further detail. To this statement on the more general point of view that there is a current consensus on a relative stabilization – perhaps, the calm before the storm... in political discourse, we observed these effects in Europe: the so-called ‘the single thought’ approach (1990–2005) within which the right and the left defended the same values for tightly managing the EU macroeconomics, which seems a remarka-

bly empty historical *doxa* with respect to positions asserted on a separate original social project (or maybe on the very contrary notion that it may have been a more than a perfect legal arborescent architecture which resulted as a consequence of its very logical construction in both ‘as if empty content’ and ‘as if empty box-of-social-and-societal-values’). More than ever, Kuznets and Kondratieff become inseparable in their paradise of Great Economists: the world today, which is 50 % democratized (Modelski 2006) and 50 % monetized (Jourdon 2010b), requires prudent management, but also some innovative method to bridge unpredictable differences.

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3

Long-Wave Economic Cycles: The Contributions of Kondratieff, Kuznets, Schumpeter, Kalecki, Goodwin, Kaldor, and Minsky¹

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Tom Palley, and Willi Semmler

Abstract

The current work highlights the empirical and epistemological contributions made by economists regarding the cyclical nature of economic and social development. We examine the main mechanisms of economic cycles involving different time scales, with a particular focus on long wave theory. Long wave theories include Kondratieff's theory of cycles in production and relative prices; Kuznets' theory of cycles arising from infrastructure investments; Schumpeter's theory of cycles due to waves of technological innovation; Keynes–Kaldor–Kalecki demand and investment oriented theories of cycles; Goodwin's theory of cyclical growth based on employment and wage share dynamics; and Minsky's financial instability hypothesis whereby capitalist economies show a genetic propensity to boom-bust cycles. The paper also discusses the methodological and empirical challenges involved in detecting long duration cycles.

Keywords: *production cycles, infrastructure cycles, accelerator – multiplier mechanism, innovation cycles, Goodwin cycles, Keynes–Kaldor cycles, Samuelson accelerator-multiplier cycles, Kalecki cycles, Minsky asset price-leveraging cycles, spectral analysis, wavelet analysis.*

*All things come in seasons – Heraclitus
One can never step into the same river twice – Heraclitus*

1. Introduction

After a thirty year period of relative tranquility in the world economy – the so-called period of ‘great moderation’ – the U.S. economy suffered a financial

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meltdown in 2008 that triggered the ‘great recession’. These events have motivated new interest in theories that can explain long periods of expansion that end suddenly with deep recessions. One approach, which has been intellectually unfashionable for many years, is the theory of long economic waves.

This paper examines the empirical and epistemological contributions made by economists regarding the cyclical nature of economic and social development. The paper discusses the main mechanisms of economic cycles involving different time scales, with a particular focus on long wave theory. As part of this survey, the paper shows the continuing relevance of the theoretical constructs developed by Nikolai Kondratieff (also, Kondratiev, Кондратьев) and Simon Kuznets (Кузнец), both for modern macroeconomics and for assessing possible future scenarios. The paper also shows the difficulty of modeling long wave analysis as it poses significant challenges to the equilibrium method which dominates shorter period economic analysis.

Empirical economists and economic historians have voiced diverse views on economic cycles. On the one hand, there seems to be good evidence for business cycles based on a shorter time scale, and the endogenous dynamics of shorter cycles appear to be clear and distinct. On the other hand, long wave cycles are more controversial, involve different theoretical mechanisms, and are harder to verify empirically – in part because data is inevitably more limited owing to the reduced frequency of such cycles. Several different theories of the long wave exist. These include Kondratieff's theory of cycles in production and relative prices; Kuznets' theory of cycles arising from infrastructure investments; Schumpeter's theory of cycles due to waves of technological innovation; Keynes–Kaldor–Kalecki demand and investment oriented theories of cycles; Goodwin's theory of cyclical growth based on employment and wage share dynamics; and Minsky's financial instability hypothesis whereby capitalist economies show a genetic propensity to boom-bust cycles.

Business cycles of shorter duration can be explained by inherent mechanisms that generate cyclical fluctuations in economic activity. However, the mechanical view of long waves is more problematic and challenging. We discuss both those challenges and a recently ‘discovered’ evidence regarding components of long duration cycles. The notion of a financially based long wave Minsky super-cycle, which has been largely overlooked by contemporary economist, appears to have become more relevant in the wake of the financial crisis and the end of the ‘Great Moderation’.

The paper is organized as follows. Section 2 examines the long wave theories of Kondratieff and Kuznets. Section 3 builds on the preceding discussion and analyzes varying time scales and mechanisms of economic cycles prevalent in economic theory. Section 4 examines a Minsky-type of long-period cycles. Section 5 discusses the methodological and empirical challenges involved in

detecting economic cycles, particularly those of long duration. Section 6 concludes the paper.

2. The Legacy of Kondratieff and Kuznets

2.1. Kondratieff and theory of long waves

Writing in the early 1920s Nikolai Kondratieff advanced the idea of the probable existence of long wave cycles in capitalist economies lasting roughly between 48 and 60 years. Within that, there is a period of accumulation of material wealth as productive forces move to a newer, higher, level of development. But at a certain point there commences a decline in economic activity, only to re-start growing again later (Kondratieff 2004 [1922]). This mechanism has been dubbed, in economic literature, as Kondratieff cycles.

It should be noted that prior to Kondratieff, some empirical efforts on systematizing the cyclicity of economic crises was carried out by van Gelderen (1913), Buniatian (1915), and de Wolff (1924), which Kondratieff admits to in his publications (see end note in Kondratieff 1935). Though Kondratieff's ideas were not well accepted by the official Soviet economics he insisted on his main argument and in short time followed up with more rigorous publications. Only few English language translations were available at the time (most notably, Kondratieff 1935). Nevertheless, the potency of his ideas was recognized quickly entering the work of subsequent economists (*e.g.*, Schumpeter 2007 [1934]; Kuznets 1971; Rostow 1975; and others) as we review in the next section.

The gist of Kondratieff's argument came from his empirical analysis of the macroeconomic performance of the USA, England, France, and Germany between 1790 and 1920. The economist looked at the wholesale price levels, interest rate, production and consumption of coal and pig iron, production of lead for each economy and price movements (Kondratieff 1935). Using a peculiar statistical method – de-trending the data first and then using an averaging technique of nine years to eliminate the trend as well as shorter waves of Kitchin (Kitchin 1923) type – Kondratieff suggested a regularity of ups and downs in the data on a long time scale. Within that there were intermediate waves along with long waves. As a result, Kondratieff stated that economic process was a process of continuous development. Among possible explanations to the long wave cycles Kondratieff mentions: a) changes in technology; b) wars and revolutions; c) appearance of new countries on the world map; and d) fluctuations in production of gold (Kondratieff 1935, 2002).

All four appear as valid external shocks in pushing any particular economy or the world economy into a downward or upward cycle path. However, after careful analysis it became evident that external factors could not be the sole determinants of shocks in economic transformation. The missing part is the accumulation of preceding events, and the development of economic – but also

social, and political – relationships over long cycles that may help to endogenize the external factors.

Fig. 1a illustrates an approximation of Kondratieff's original timeline of long wave cycles. Kondratieff's original estimation was based on a commodity prices index for the USA, England, and France in his work of 1935 (see Kondratieff 1935). Subsequently, with popularization of Kondratieff's views, extensions to the original analysis, roughly following the 40–60 years rule, began to appear.

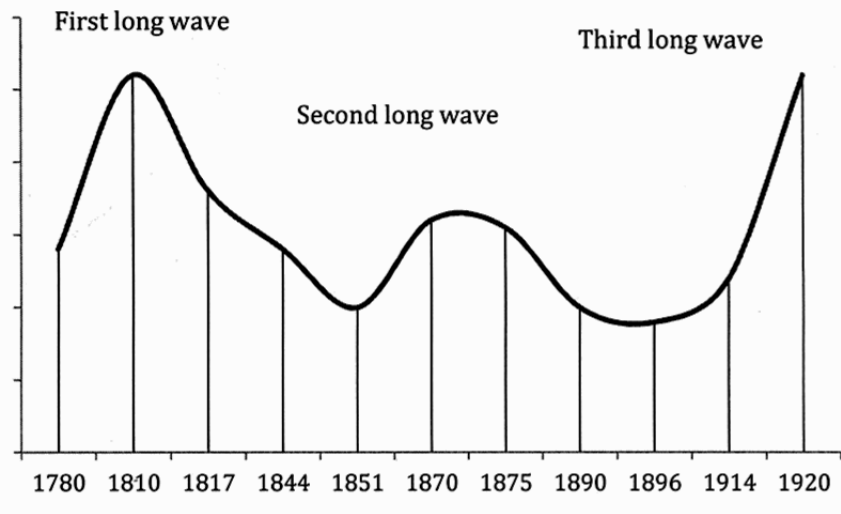


Fig. 1a. Long waves cycles illustration

Source: authors' approximation based on Kondratieff (1935).

One of the first to catch on the logic was Schumpeter (1939) who pointed out the distinction between short (Kitchin cycles of 3–4 years), medium (Juglar cycles of 9–10 years),² and long (Kondratieff cycles of 54–60 years) cycles in his analysis of economic development. We discuss some of them below.

As to mechanisms, Kondratieff already pointed to a large-scale accumulation of innovative activity, that is inventions and processes modifications that required fifty or more years before complete insertion, absorption in the production method. The role of innovation, implied in Kondratieff's analysis, is captured by the internal dynamic tendencies described in detail in Schumpeter's *The Theory of Economic Development* (Schumpeter 2007 [1934]). In turn, Garvy (1943) subjects Kondratieff's proposition to sharp criticism from positions of Soviet economists and from the point of view of Western economics. Paradoxically, in either case the conclusion appears to be that Kondratieff was too hasty in assigning the term 'cycle' to his propositions, as those do not correspond to the internal evolutionary dynamics following some mechanism of cycles.

² See Juglar 1862.

There was a difference however in the Western economists' views and their contemporary Soviet counterparts. From the Western economist point of view, articulated by Garvy (*Ibid.*), there was no sufficient statistical evidence to warrant any regularity, that is cyclicity, to Kondratieff's analysis. The Soviet economists writing around the time of Kondratieff's original publications and shortly after (*e.g.*, Studensky, Oparin, Pervushin, Bogdanov, Sukhanov and others, see Garvy 1943 for concise discussion and references) rejected the term 'cycle' in reference to the capitalist production mode since that implied some type of capitalist system's perpetuity. At the time that was in direct opposition with the socialist beliefs of gradual phasing out of the capitalist economy into its next logical stage of socialism, as was implied by then dominant interpretation of Marx's *Capital* (2003 [1867]). These beliefs in rapid phased successions picked up from simplistic interpretations would feed into initial enthusiasm around shock therapy reforms in post-socialist economies in the early 1990s (Gevorkyan 2011).

Recently, researchers working within Kondratieff's original methodological scope have attempted to extend their analysis across the twentieth century with focus on predictive capabilities of such work into the nearest future. Some find the ongoing economic deterioration in the world economy fitting calculations of the Fifth Long Wave of the Kondratieff cycle (*e.g.*, Korotayev and Tsirel 2010; Kondratieff 2002; Akaev 2009; and others), some of them using spectral analysis. A re-validation of the very four exogenous shocks (technology, wars, shifts in boundaries, and value of gold) so carefully documented and refuted by Kondratieff himself took place in some of those papers. Exogenous shocks are surely important 'occurrences', yet, the internal dynamics in the evolution of economic relationships over a long time period and staging economic development must be considered as well. We address this in further detail below, using more modern empirical methods.

2.2. Kuznets' novel analysis of development

Simon Kuznets received the Nobel Prize in Economics in 1971 for his empirical analysis of economic growth, where he identified a new era of 'modern economic growth'. Like Kondratieff, Kuznets relied on empirical analysis and statistical data in his pioneering research. Absorbing his findings on historical development of the industrial nations with initially abstract categories of the national income decomposition, Kuznets developed a concept of long swings, though disputed, now referred to as Kuznets cycles or Kuznets swings (*e.g.*, Korotayev and Tsirel 2010).

The Kuznets swings' period is ranged between 15–25 years and initially connected by Kuznets with demographic cycles. In that analysis, the economist observed and quantified the cyclicity of production and prices, linking with immigrant population flows and construction cycles. Researchers have attempted to connect these cycles with investments in fixed capital or infrastructure investments (see *Ibid.* for literature review). Focusing on developed economies of North America and Western Europe, Kuznets computed national income

from late 1860 forward with structural breakdowns by industry and final products. He also provided measures of income distribution between rich and poor population groups.

Kuznets unveiled the deficiency of constrained theoretical work built on simplified assumptions. He was critical of capital and labor as the sole factors sufficient for economic growth. Instead analysis must encompass information on technology, population and labor force skills, trade, markets, and government structure. Kuznets carried his analysis further in developing measures of national income through categories of consumption, savings, and investment (e.g., Kuznets 1949, 1937, 1934, *etc.*), eventually leading to a system of national income accounting.

It should also be noted that while working on the problem of income inequality, Kuznets was one of the first to look at economic growth measurements in the developing world (e.g., Kuznets 1971, 1966, and 1955). His well-known inverted U-shaped curve measuring inequality on the y-axis and economic development, expressed as change in GNP on the x-axis was an intellectual breakthrough of the time (see Fig. 1b). The conclusion is that while the economy remains in agricultural stage income inequality among different groups within the economy is low. As the national economy embarks on the process of industrialization inequality rises over time, then it falls again.

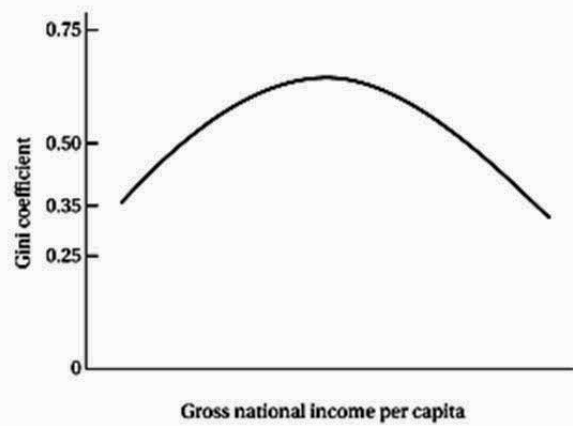


Fig. 1b. Kuznets curve

This describes the experience of developed economies in Western Europe and North America, that is the initial phases of industrialization cause sharp rises in inequality. Upon reaching a critical saturation point, inequality subsides while economic growth continues. This happens through the emergence of a 'middle class', improved education facilities, health care, and governance. It is interesting to note that further structural change and the shifting of resources to services and the financial sector, may increase inequality again, as, for example, is

seen in the U.S. economy since the 1980s. It may be argued that this somewhat correlates to a popular analysis in development economics on the transition mechanisms from traditional to modern industrial sectors.

A variant of the Kuznets curve is also utilized in the analysis of environmental problems. This application suggests an immediate deterioration in air quality and intensification of environmental problems at the initial industrializing stages until spreading affluence and emergence of middle class introduces legislative and other controls on hazardous production (WB 1992; Grossman and Krueger 1995 and more recently Stern 2004). Elsewhere, these implied predictions of fading inequality offered a strong intellectual foundation for the mentioned reforms of the early 1990s in Eastern Europe and the former Soviet Union (Gevorkyan 2011). In studies of sequencing of market liberalization reforms and limitations of the state in the economy there were omitted the negative externalities of shock therapy policies. Yet, in the early 1990s, the promise of immediate market reforms and potential access to greater income opportunities did not materialize at the height of the reforms. In fact, income inequality problems still remain relevant and critical on policymakers' agendas two decades since the 'transition'. The absence of the universal tendency of declining income inequality raises a question of how one measures economic development and what time-frame to consider is 'sufficient' to measure the rise of 'welfare' over time.

Finally, Kuznets (1973) brings up six key characteristics of modern economic growth, based on methodology consistent with national income accounting and historical analysis of economic development: 1) increase in per capita growth and population in developed economies; 2) increasing productivity rates; 3) increasing rate of structural transformation; 4) rising urbanization and secularization; 5) spread of technology and infrastructure improvements (communications); 6) limits to wide-scale spread of economic growth and benefits. Therefore despite seeming improvements, Kuznets noted persistence of disproportionate economic growth worldwide and apparently some broader measures of welfare.

Broadly speaking, such persistence of long wave-like tendencies on a global scale, a feature of contemporary industrial and financial globalization, supports the concept of redefined fundamental uncertainty (Gevorkyan and Gevorkyan 2012). Here the uncertainty of the direction, length, and capability of the post-great recession's potential recovery remains unclear. The lesser-developed economies (aka emerging markets) are worst affected in such circumstances, as the speculative foreign capital exits and industrial capacity remains inadequate on global competitive scale with absent technological advance.

Common between the work of both Kondratieff and Kuznets was the motivation to define the mechanisms of economic growth and development, and

systematize core tendencies driving the transformational momentum. That in turn connects directly to the earlier discussion on cyclicity in development.

3. Time Scales and Mechanisms of Economic Cycles

As mentioned, the work of Kondratieff and Kuznets fostered a systematic approach to modern understanding of long economic swings. Numerous authors have further proposed not only different mechanisms underlying cycles but also cycles on different time scales. An early theory of cycles was put forward by Robert Owen in 1817, who stressed wealth inequality and poverty, originating in industrialization, yielding under-consumption as a reason for economic crises. Sismondi, in the middle of the 19th century took a similar view and developed a theory of periodic crises due to under-consumption. This led to the discussion of the ‘general glut’ theory of the 19th century, which Marx and other classical economists also extensively contributed to.

More specifically, a mechanism of cycles on a shorter times scale, of 8–10 years duration, was developed by Juglar (Juglar cycles), resulting, as he saw it, from the waves in fixed investment. Later, Kitchin, in the 1920s, introduced an inventory cycle of 3–5 years. Later an important contribution was made by Schumpeter (1939), who referred to the ‘bunching’ of innovations and their diffusion as a cause for long waves in economic activity.

Roughly at the same time, Samuelson (1939), influenced by the Spiethof accelerator and the Keynesian multiplier principle, developed the first mathematically-oriented cycle theory using difference equations.³ Others, such as Rostow (1975), had proposed the theory of stages of growth. Simultaneous with Samuelson, Kalecki (1937) developed his theory of investment implementation cycles where he saw significant delays between investment decisions and investment implementations, formally introducing differential delay systems as tool for studying cycles.

Kaldor (1940), rooted in Keynesian theory, developed his famous nonlinear investment-saving cycles, which took into account aggregate demand. Later, Goodwin (1967) proposed a model of growth cycles, which took into account classical growth theory, but was based on unemployment-wage share dynamics, since the overall growth rate, as well as productivity growth, are kept constant in the long run. We will first discuss cycle theories on a longer time scale and then move to the Goodwin and Keynes-Kaldor cycles. We also briefly include a discussion of Kalecki's cycle theory (1971) and how it might relate to Kondratieff.

3.1. The Kondratieff long swings

The above review raises a few critical questions that need proper evaluation. For example, it is difficult to detect clear mechanisms in the Kondratieff cycles

³ A review of the mechanisms of cycles on a shorter time scale is given in Semmler (1986).

(*e.g.*, as sketched in Fig. 1a above). If anything is working here as a mechanism, it must be some exhaustion of endogenous and exogenous factors: in the long upswing prices are rising, interest rates rise and wages rise, raw materials and non-renewable resources may be exhausted, causing to drive up prices and wages. New technologies are discovered in periods of long down swings, which come to be used in a new upswing. New resources are discovered, such as iron ore, coal, gold and other metals, which Kondratieff argues to be endogenously expanded through new discoveries but both technology and resources will finally be exhausted too: resource and product prices rise, deposits at saving banks rise, but also interest rates and wages rise and a downturn begins. There is a struggle for markets and resources. New countries are opened up. There are market limits, such export limits, which restrict further expansions, as Kondratieff data on French exports show. Then, in the long downswing, prices fall, wages fall, interest rates fall, plenty of resources and unused production capacity push prices down, and unemployment reduces wages. Overall, there are some mechanisms indicated in Kondratieff, but not specifically modeled.

3.2. The Kuznets long swings

Further, Kuznets theory of development and fluctuations can be seen as an interesting intersection of two traditions in the economics of his time. On the one hand, he was interested in cyclical movements in numerous time series data, such as volume of all types of production and prices, seasonal and secular movements in industry income and national income and its components, long swings in economic activities, and business cycle analysis. On the other hand, he saw development as a time irreversible process of industry and national income development, which evolves in stages of economic growth, with plenty of structural changes. Each stage may have its particular saving rate, consumption patterns, unevenness and disequilibrium as well as income inequality. As described above, inequality first rises with industrialization and later declines. Kuznets conceptual framework can be seen as a mixture of cycle theories, referring to the accelerator principle for infrastructure investments, and a theory of stages of economic growth that were similar to those pursued by Rostow (1975). A similar view on stages of growth, that taken by Kuznets and Rostow, is also pursued by Greiner, Semmler and Gong (2005). Overall, Kuznets was ambiguous whether there are regular mechanisms generating cycles. He conjectured that cycles may be in the economic data solely as a result of certain historical ‘occurrences’.

3.3. The Schumpeter innovation cycles

Schumpeter's concept of competition deviates from the neoclassical conception in some essential aspects. First, competition is not limited to price or quantity adjustments. It is described as an evolutionary process, as a process of ‘creative

destruction'. The engines of this development are capitalist enterprises. 'Capitalism, then, is by nature a form or method of economic change and not only never is but never can be stationary ... The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumer's goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates' (Schumpeter 1970: 83). The incentives for developing these types of technical change originate in transient surplus profits. What is taken as given in neoclassical general equilibrium analysis as parametric data, when the price and quantity adjustments occur is the explicandum in Schumpeter: process innovation, product innovation, new forms of organization of the firm and new forms of financial control.

Second, Schumpeter stresses that competition is not necessarily an equilibrating force. When referring to the existence of entrepreneurial firms and their rivalry, Schumpeter maintains that 'there is in fact no determinate equilibrium at all and the possibility presents itself that there may be an endless sequence of moves and counter-moves, an indefinite state of warfare between firms' (*Ibid.*: 79). Moreover, competition as an evolutionary process takes place through time, in discrete steps. For example, he writes, 'Now the first thing we discover in working out the propositions that thus relate quantities belonging to different points in time is the fact that, once equilibrium has been destroyed by some disturbances, the process of establishing a new one is not so sure and prompt and economical as the old theory of perfect competition made it out to be, and the possibility that the very struggle for adjustment might lead such system farther away instead of nearer to a new equilibrium. This will happen in most cases unless the disturbance is small' (*Ibid.*: 103). Indeed, in Schumpeter it is the product and process innovation, undertaken by the entrepreneur, which brings the economic system out of equilibrium, resulting in long waves and business cycles. Moreover, he even does not seem to be very interested in a theory of centers of gravitation for market forces as developed by the classical economists.

Third, in Schumpeter, competition is an evolutionary process, one of rivalry between firms motivated by the search for surplus profit. He calls this surplus profit the transient 'monopoly profit' of new processes and new products, 'Thus, it is true that there is or may be an element of genuine monopoly gain in those entrepreneurial profits which are the prizes offered by capitalist society to the successful innovator. But the quantitative importance of that element, its volatile nature and its function in the process in which it emerges put it in a class by itself' (*Ibid.*: 102). 'The transient surplus profit does not appear as deviation from the perfectly competitive state of the economy and as a waste in the allocation of resources, but as a reward for the innovator and a gain for the capitalist society. On the contrary, the perfectly competitive economy, where

every market agent behaves in the same way under the condition of parametrically given external conditions seems to imply a waste of resources ... working in the conditions of capitalist evolution, the perfect competitive arrangement displays wastes of its own. The firm of the type that is compatible with perfect competition is in many cases inferior in internal, especially technological, efficiency. If it is, then it wastes opportunities' (Schumpeter 1970: 106). Thus, in Schumpeter's view, the entrepreneurial firms are powerful engines of progress and 'in particular of the long-run expansion of total output' (*Ibid.*).

Following Schumpeter's footsteps, the literature after Schumpeter has distinguished between radical and incremental innovation. The major waves of radical innovations, which were followed by the diffusion of this new technology and incremental innovations are.⁴

- The water-powered mechanization of the industry of the 18th and early 19th century;
- The steam-powered mechanization of the industry and transport of the middle of the 19th century (rail ways, steam engines, machine tools);
- The electrification of industry, transport and homes at the end of the 19th century;
- Motorization of industrial production, transport, civil economy and the war machinery (from ~1914 onward);
- Computerization and information technology from the 1960s and 1970s onward.

According to Schumpeter's oriented long wave theories, each of those radical innovations did not only create long waves in economic development, but each of those long waves were driven by different technology, originated in different countries and then diffused world wide.

3.4. The Samuelson accelerator-multiplier cycles

A model of medium-time scale is the one created by Samuelson (1939). The basic construction is as follows: consumer spending (via increased sales by firms) accelerates investment; output changes results in income changes through the multiplier, which, in turn, again stimulates sales, that is consumer spending.

The multiplier-accelerator model of Samuelson (*Ibid.*) can produce cycles. Take C_t = consumption, I_t = investment, Y_t = income, C_0 = autonomous consumption, I_0 = autonomous investment, and $G = C_0 + I_0$; $I = S = sY$, therefore

the multiplier is: $Y = \frac{1}{s}$. Use:

$$C_t = C_0 + \alpha Y_{t-1}, \quad (1)$$

⁴ For details see Reati and Toporowski (2004).

$$I_t = I_0 + \beta (Y_{t-1} - Y_{t-1}), \tag{2}$$

$$Y_t = C_t + I_t. \tag{3}$$

Substituting (1) and (2) into (3) gives

$$Y_t = C_0 + \alpha Y_{t-1} + I_0 + \beta Y_{t-1} - \beta Y_{t-2},$$

$$G = C_0 + I_0,$$

$$Y_t = G + (\alpha + \beta) Y_{t-1} - \beta Y_{t-2}.$$

The standard form of a second order linear difference equation is:

$$Y_t - (\alpha + \beta) Y_{t-1} + \beta Y_{t-2} = G, \tag{4}$$

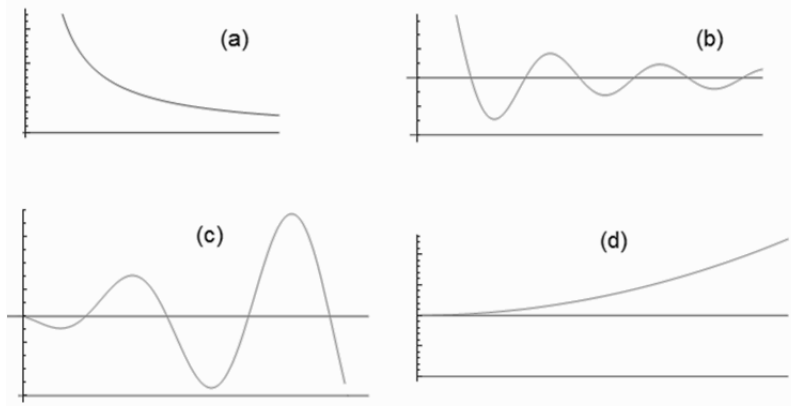
which is stable or unstable depending on the size of β . Moreover, one can have contracting or expanding cycles depending on whether there exist imaginary parts of the eigenvalues (see Figs 2a – 2d).

When we replace income by profit flows R_t , one can turn the above into a kind of Kalecki model such as: $I_{t+1} = A + \alpha R_t + b(R_t - R_{t-1})$. If one writes for

$s_p R_t = I_t$, $R_t = \frac{I_t}{s_p}$, we get a similar second order difference equation:

$$I_{t+1} = A + \frac{(a+b)}{s_p} I_t + \frac{b}{s_p} I_{t-1}, \tag{5}$$

which again can be stable or unstable and it can produce unidirectional change or oscillations. The Kalecki model is further studied in Sub-section 3.7.



Figs 2a – 2d. Stable and unstable development and oscillations

3.5. The Goodwin growth and income distribution cycles

Other types of cycles that have been discussed, particularly in the Post War II period, where Goodwin's growth cycle theory that postulates an interaction of employment and wage share. It looked like a business cycle model when it was

first proposed but, in fact, empirically it seems to operate also on a medium time scale.⁵

Goodwin (1967) postulates cycles driven by growth and income distribution. Low growth, generated by low profits and investment, generates unemployment, which in turn limits wage growth as compared to productivity. This gives rise to lowering the wage share: low wage share means high profit share and slowly rising investment, which reaches a turning point as employment and wage growth make the wage share rising and the profit share falling. By utilizing nonlinear differential equations, originally developed by Lotka and Volterra for the models of interacting populations, we can rewrite the Goodwin model of wage-employment dynamics as follows:

$$\begin{aligned}\dot{x} &= P(x, y) = (a - by)x \\ \dot{y} &= Q(x, y) = (cx - d)y\end{aligned}$$

or as

$$\begin{aligned}\frac{\dot{x}}{x} &= a - by \\ \frac{\dot{y}}{y} &= cx - d\end{aligned}$$

where \dot{x} represents the time rate of change of the ratio of the employed to the total labor force and \dot{y} is the change of the wage share. Both variables depend on the level of x and the constants $a, b, c, d > 0$. The coefficient, a , denotes the trend of employment if all income is reinvested ($y = 0$) and d is the fall in real wage if ($x = 0$). The symbol by denotes the influence of the wage share on the employment ratio, and cx the positive influence of employment on the wage share. Due to this interaction of the variables the employment ratio is prevented from rising and the wage share from falling without limits.

For a growth model with trends as represented by Goodwin, the coefficients can be interpreted as follows: $a = b - (m + n)$ where b is the output/capital ratio (Y/K), m is the growth rate of productivity and n is the growth rate of the labor force. All of those are taken as constants. Assuming a linear-

ized wage function (for instance, $\frac{\dot{w}}{w} = -e + cx$) and with m the growth rate of productivity as before, we obtain for the growth rate of the wage share the term $\frac{\dot{y}}{y} = \frac{\dot{w}}{w} - m$, with $m = d - e$. Thus, the second pair of differential equations can be written as:

$$\frac{\dot{x}}{x} = b(1 - y) - (m + n),$$

⁵ For details of the subsequent dynamic modeling see Semmler 1986.

$$\frac{\dot{y}}{y} = cx - (e + m),$$

which is indeed equivalent to the first equation of the (above) system, except that it is written in terms of growth rates. The core of the last system shows that the change of the employment ratio depends on the profit share $(1 - y)$ and that the change of the wage share depends on the employment ratio. This form has been used to explain the fluctuation of the employment ratio and the fluctuation of the industrial reserve army in Marx (Marx 2003 [1867]: ch. 23; see Goodwin 1967). The basic structure of this model represents the interacting variables of the employment ratio and wage share as dynamically connected.

The last system has two equilibria: $(0, 0)$ and $\left(\frac{d}{c}, \frac{a}{b}\right)$. The linear approximation of the system is with ξ_1, ξ_2 as small deviations from the equilibrium values

$$\begin{pmatrix} \dot{\xi}_1 \\ \dot{\xi}_2 \end{pmatrix} = \begin{bmatrix} J_{11} & J_{12} \\ J_{21} & J_{22} \end{bmatrix} \begin{pmatrix} \xi_1 \\ \xi_2 \end{pmatrix}.$$

The calculation of the Jacobian for the first linear approximation gives for the equilibrium $\left(\frac{d}{c}, \frac{a}{b}\right)$

$$J = \begin{bmatrix} 0 & -bd/c \\ ca/b & 0 \end{bmatrix}.$$

The real parts of the eigenvalues are zero and the linear approximation of the equilibrium point represents the dynamical structure of a center (Hirsch and Smale 1974: 258). With real parts of the eigenvalues zero, the linear approximation of the system through the Jacobian does not allow conclusions regarding the behavior of the dynamical system in the neighborhood of the equilibrium. Yet, as can be shown, by constructing a Liapunov function for the above system, which is constant in motion and hence has time derivatives $\dot{V} = 0$, the wage share-employment dynamics results in closed solution curves (*Ibid.*; Flaschel and Semmler 1987).

The closed trajectories of the system are, however, only closed curves and the wage share-employment dynamics does not allow for persistent cycles, such as limit cycles (Hirsch and Smale 1974: 262; Flaschel 1984). In addition (see Flaschel and Semmler 1987), the dynamical system is structurally unstable, since small perturbations can lead to additional interaction of the variables (J_{11} or J_{22} can become nonzero). This leads to a qualitatively different dynamical behavior of the system, hence it can become totally stable or unstable. Un-

der certain conditions the above system can also become globally asymptotically stable. This can occur if the conditions for Olech's theorem are fulfilled (see Flaschel 1984).

Equivalent results are obtained when in place of a linear wage function a nonlinear wage function is substituted in the system (see Velupillai 1979). The wage share-employment dynamics worked out originally by Goodwin for a model of cyclical growth and then applied by him to explain an endogenously created unemployment of labor depict a growing economy, whereas often models of nonlinear oscillations refer only to a stationary economy.

Since the change of the wage share and the change of labor market institutions such as bargaining and other protective legislature are slow, this model of economic cycles, however, does not really model business cycles but rather medium run cycles. On the other hand, for a theory of longer cycles the dynamical interaction of other important variables over time (such as waves of innovations, changes of capital/output ratio, productivity, relative prices and interest rates) as well as demand factors are neglected.

3.6. The Keynes–Kaldor demand driven cycles

The demand factors are considered in the next section presented here. The Keynes–Kaldor model seems to operate on a shorter time scale. It essentially refers to the role of demand, defined by the relation of investment and savings. In his article, Kaldor (1940) proposed such a shorter scale cycle model, a nonlinear model of business cycles, which after that has been reformulated in the light of mathematical advances in the theory of nonlinear oscillations, which take into account demand changes (Kaldor 1940, 1971; Chang and Smyth 1971; Semmler 1986).

Kaldor relies on a geometric presentation of a business cycle model which depends on a nonlinear relation between income changes and capital stock changes and which seems to generate self-sustained cycles without rigid specifications for the coefficients, time lags and initial shocks. The geometric presentation of his model of persistent business cycles due to the dynamic interaction between income changes and accumulation and dissolution of capital indeed also includes the possibility of limit cycles, that is asymptotically stable cycles regardless of the initial shocks and time lags.

His ideas are also formulated for a stationary economic system and can be represented by nonlinear differential equations in the following way (Chang and Smyth 1971):

$$\begin{aligned}\dot{Y} &= \alpha(I(Y, K) - S(Y, K)), \\ \dot{K} &= I(Y, K),\end{aligned}$$

where α is a reaction coefficient, \dot{Y} the rate of change of income, \dot{K} the rate of change of the capital stock, I = investment and S = saving as functions of

the level of income and capital stock. According to the assumptions underlying the model, there is a unique singular point (*Ibid.*: 40). This type of Keynesian–Kaldorian model can give rise to persistent cycles (see Semmler 1986), it does not model the specific role of growth and income distribution, as Goodwin has stressed. Yet it stresses the role of endogenously changing demand. The linear approximation is:

$$\begin{pmatrix} \dot{\xi}_1 \\ \dot{\xi}_2 \end{pmatrix} = \begin{bmatrix} J_{11} & J_{12} \\ J_{21} & J_{22} \end{bmatrix} \begin{pmatrix} \xi_1 \\ \xi_2 \end{pmatrix},$$

where the Jacobian is

$$\frac{\partial(\dot{Y}, \dot{K})}{\partial(Y, K)} = \begin{bmatrix} \alpha(I_Y - S_Y) & \alpha(I_K - S_K) \\ I_Y & I_K \end{bmatrix},$$

where $(I_K - S_K) > 0$, since $I_K < S_K < 0$ and $I_Y > 0$ (Chang and Smyth 1971: 41). The determinant is $(I_Y S_K - S_Y I_K)$, which is positive because for the existence of a unique singular point it is assumed that $(I_Y S_K < S_Y I_K)$. The element, $J_{22} = I_K$, is always negative. The linear approximation with the Jacobian represents at its core the investment-income dynamics according to which the change of income depends negatively on the level of the capital stock J_{12} and the change of capital stock depends positively on the level of income J_{21} , but there is a negative feedback effect from the level of capital stock to the change of capital stock and an ambiguous feedback effect from the level of income to the change of income J_{11} . This will be explained subsequently.

Analyzing the singular point one can conclude that the equilibrium is a focus or a node and that the equilibrium is stable or unstable accordingly as $\alpha(I_Y - S_Y) + I_K > (<) 0$. This singular point also allows for a limit cycle, since the necessary condition for a limit cycle is that the dynamic system has an index of a closed orbit, equal to 1 (Minorsky 1962: 79). This excludes a saddle point as a singular point (see *Ibid.*: 77). Moreover, the most interesting point in this dynamic system is the ambiguous element J_{11} . According to Kaldor's graphical presentation, it is assumed (see Kaldor 1940: 184) that

- (1) $I_Y > S_Y$ for a normal level of income;
- (2) $I_Y < S_Y$ for abnormally high or abnormal lowly levels of income; and
- (3) the stationary state equilibrium has a normal level of income.

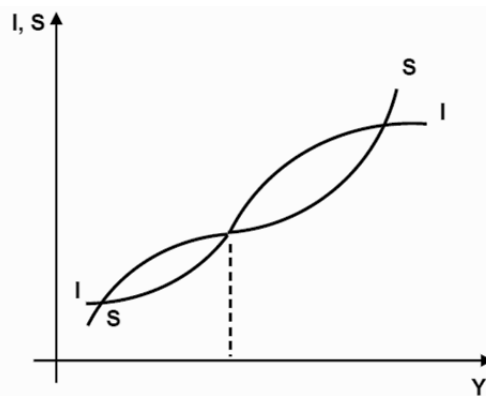


Fig. 3. Kaldor graph on nonlinear investment and saving functions

This might be illustrated by Fig. 3 with Y being the level of output, which shows that the normal level of Y is unstable and the extreme values of Y are stable. Mathematically this means that the trace $J_{11} + J_{22}$ changes signs during cycles. This is the negative criterion of Bendixson (Minorsky 1962: 82) for limit cycles, that is if the trace $J_{11} + J_{22}$ does not change signs, persistent cycles – limit cycles – cannot exist (see also Guckenheimer and Holmes 1983: 44). As proven by Chang and Smyth (1971: section V), there indeed exists the possibility of stable cycles, limit cycles, under the assumption proposed by Kaldor.

However, the three conditions as formulated above and originally formulated by Kaldor (1940: 1984) are not necessary for the existence of cycles. What is actually necessary for cycles is only that $I_Y > S_Y$ (i.e. that J_{11} switches signs) at some level of Y . Moreover, the singular point at the normal level of Y does not have to be unstable as a necessary condition for a limit cycle. The critical point can be stable (see Minorsky 1962: 75). In addition there also is the possibility that the system is globally asymptotically stable. This is the case if: $\alpha(I_Y - S_Y) + I_K < 0$ and (2) $(S_Y I_K < I_Y S_K)$ everywhere.

The global asymptotic stability under these conditions follows from Olech's theorem (see Ito 1978: 312).

Evaluating Keynes–Kaldor's model of a demand driven business cycles one can say that Kaldor's formulation of an income-investment dynamics brought some advances regarding a theory of endogenously produced business cycles, especially formulations of the theory of cycles in terms of a theory of nonlinear oscillations (see also Kaldor 1971) one can extend this to include a formulation concerning the dynamics in employment and wage share which was originally more visible in classical models that referred to the profit-investment dynamics.

3.7. The Kalecki profit and investment cycles

To draw some similarities to the Kondratieff long wave theory, we can follow Kalecki (1971) and replace the income, Y , by profit flows Π ⁶ and allow for $J_{11} = \alpha(I_{\Pi} - S_{\Pi})$ to change its sign during the cycle. In some sense the role of profit, wages and income distribution – as in the Goodwin model – can be allowed to come in here.

In general it could be assumed that:

$$\text{(Case 1) } \frac{\partial I}{\partial \Pi} > \frac{\partial S}{\partial \Pi}, \text{ for profit income in an interval such as } \Pi_1 < \Pi < \Pi_2$$

(see Fig. 4). This may be due to a previous decrease in capital stock, production and employment which entail low construction cost for plants, low material and resource cost and low wage costs (relative to productivity), high profits and low interest rates and easy access to credit. These factors then may give rise to an expectation of rising profits on investments.

On the other hand, in other regions we can have:

$$\text{(Case 2) } \frac{\partial I}{\partial \Pi} < \frac{\partial S}{\partial \Pi}, \text{ with two clarifying conditions:}$$

(a) for $\Pi > \Pi_2$ due to capacity limits, rising construction cost for plants and rising material and wage cost (relative to productivity), exhaustion of exhaustible resources, rising interest rates and but falling actual and expected profits. Profits and expected profits may fall due to the rise of those costs and wages – that cannot be passed on – in the long upswing. This looks similar to a mechanism that Kondratieff has indicated to eventually occur in his long upswing (see Sections 2.1 and 3.1).

(b) for $\Pi < \Pi_1$ in a recessionary or slow recovery period, where firms invest in financial funds instead of in real capital (Minsky 1983) but due to the economic conditions in a recessionary period, the rate of change of saving in response to falling profits tend to drop faster than the rate of change of investment. Wage share may have been rising previously, and profit share falling but here investment is still not dropping completely to zero. This resembles the Kondratieff scenario of a long downswing and recessionary or stagnation period.

Though the economic intuition appears the same in our above stylized business cycle dynamics and the Kondratieff long waves phases, the time scales are probably different ones: one is a shorter one and the other a longer one, but the mechanisms may be the same. Yet, for a longer time scale much of the economic structure and relationships are likely to change.

⁶ This conversion seems permissible as long as there are no savings out of workers income and thus workers income is completely spent for consumption. This is what Kalecki assumes.

In the history of economic thought the change of sign for J_{11} during the economic cycle was verbally anticipated by many writers on the study of capitalist dynamics (Kalecki 1971: 123; Kaldor 1940: 184) and can be regarded as essential for a theory of fluctuations in economic development. Mathematically $J_{11} + J_{22}$ must change signs in order to generate self-sustained cycles. If J_{11} and J_{22} were zero, J_{12} and J_{21} alone would determine the profit-investment dynamics. There would only be structurally unstable harmonic oscillations. The negative signs of J_{12} and J_{22} exert a retarding influence on accumulation, and J_{21} represents an accelerating force on capital accumulation, whereas J_{11} exerts a retarding influence in the boom period and an accelerating impact on profit and accumulation in the later phase of the recession.

Intuitively, the existence of self-sustained cycles can be seen in Fig. 4 from the fact that the trajectories of $\Pi(t)$ and $K(t)$ are bounded in absolute values and the profit-investment dynamics follow certain directions in the plane. Roughly speaking, for large enough $\Pi(t)$, $\dot{\Pi}$ turns negative and for large enough $K(t)$, \dot{K} turns negative and *vice versa*. Geometrically, this is illustrated by Fig. 4.

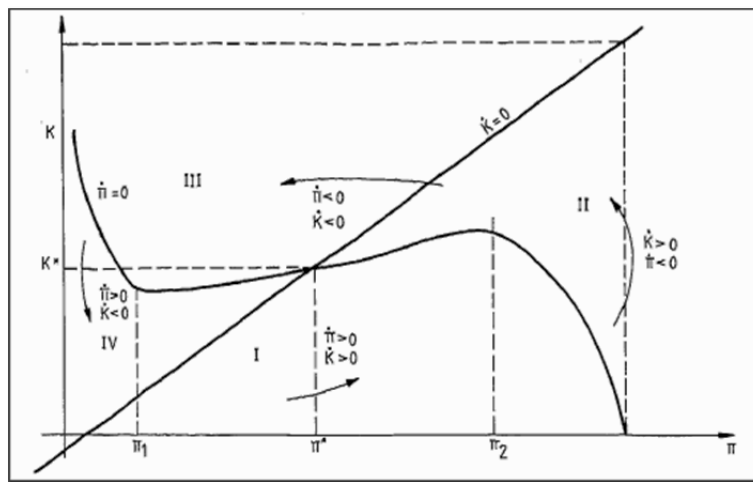


Fig. 4. Phase diagram

For $\dot{\Pi}=0$ we get the slope

$$\frac{dK}{d\Pi} = \frac{S_{\Pi} - I_{\Pi}}{I_K - S_K} \leq 0,$$

and for $\dot{K}=0$ the slope is

$$\frac{dK}{d\Pi} = -\frac{I_{\Pi}}{I_K} > 0.$$

Thus, in the plane of the Fig. 4 there are four quadrants. For reasons of simplicity we have assumed a linear investment function in Fig. 4. The system has a unique solution at Π^* and K^* since the curve $\dot{K}=0$ has a steeper slope than $\dot{\Pi}=0$ when the latter is upward sloping in a certain region. This follows from the assumption in the model.⁷ The determinant of the Jacobian of the dynamical system above is $\alpha(S_K I_{\Pi} - S_{\Pi} I_K) > 0$. The singular point is a focus or a node and is stable or unstable accordingly as $\alpha(I_{\Pi} - S_{\Pi}) + I_K \leq 0$. A saddle is excluded, and the singular point has index 1 as necessary condition for a self-sustained cycle (Minorsky 1962: 176). (The singular point does not have to be unstable as Kaldor originally assumed; see Kaldor 1940: 182.) The existence of a self-sustained cycle follows intuitively from the analysis of the vector fields in the different regions, which correspond roughly to stages of economic cycles.⁸

For region I, which expresses the dynamics of a recovery period, $K(t)$ is below the $\dot{K}=0$ curve and $\Pi(t)$ is below the $\dot{\Pi}=0$ curve; the decline in capital stock and its effect on profit (*i.e.* the effects of Cases 1 and 2) as well as other changes in economic conditions in a recessionary period will generate a positive rate of change of profit (since $I_{\Pi} > S_{\Pi}$ in region I, see also Case 1). Therefore, in region I we will find $\dot{\Pi} > 0$ and $\dot{K} > 0$.

The increase of profits and investments after a recessionary period will lead to rising $K(t)$, but through the effect of Cases 1 and 2 (*i.e.* the negative effect of growth of capital stock on profits) the growth rate of Π will become negative. Thus, in region II, indicating a boom period, we have $\dot{\Pi} < 0$ and $\dot{K} > 0$. Hence, the arrows in Fig. 4, indicating the direction of the vector field of Π and K , will start bending inward (see Case 2a which leads to $I_{\Pi} < S_{\Pi}$). With capital stock rising and $\dot{\Pi} < 0$ due to a magnitude of capital stock greater than its stationary value K^* , the capital stock must eventually decline (*i.e.*

⁷ The curve $\dot{\Pi}=0$ is downward or upward sloping when $S_{\Pi} > I_{\Pi}$ (or $S_{\Pi} < I_{\Pi}$). By assuming that for a certain region $\Pi_1 < \Pi^* < \Pi_2$, $\dot{\Pi}=0$ is upward sloping and $\dot{K}=0$ also has a positive but steeper slope, it follows that there is only one unique equilibrium point. For similar assumptions concerning an income/investment model, see Chang and Smyth (1971: 40).

⁸ A proof using the Poincaré–Bendixson theorem is given in Semmler (1986).

through the effect of Case 2). We also have $\dot{\Pi} < 0$ due to $I_{\Pi} < S_{\Pi}$ at the beginning of a downswing period (capital may be accumulated more as money capital than as real capital).

In region III, indicating a downswing period, through the influence of $\dot{\Pi} < 0$ on $K(t)$, $K(t)$ also starts declining; thus $\dot{\Pi} < 0$ and $\dot{K} < 0$. Hence, for $\Pi(t) < \Pi^*$ and $K(t) < K^*$ the vector field is pointing inward. A decline of capital stock below K^* in region IV, the recessionary period, however, eventually causes profits to rise. The recessionary period may slowly then turn into a recovery period, indicated by region I. This, of course, assumes again that eventually $\dot{\Pi} > 0$. The investment of financial funds turns into investment in real capital, thus investment out of profit tends to become greater than savings out of profit. The recessionary period (with wage increase below productivity, low material and capital cost, low interest rates and easy access to credit as well as a decline in capital stock and thus rising profit expectation⁹ must have its impact on $\dot{\Pi}$, for otherwise the recessionary period will endure.

Therefore, under the economic conditions stated in Cases 1, 2a, and 2b the profit-investment dynamics creates its own cycles by which profit, investment and thus output and employment cannot exceed certain boundaries. The dynamic system is self-correcting and fluctuates within limits: for large enough $K(t)$ is $\dot{K} < 0$ and for large enough $\Pi(t)$ is $\dot{\Pi} < 0$. A similar argument holds for small enough $K(t)$ and $\Pi(t)$. Thus, whereas the system with Cases 1 and 2 becomes stable at its outer boundaries (indicated by the negative sign of $J_{11} + J_{22}$), it cannot converge towards equilibrium, since the equilibrium is unstable (indicated by the positive sign of $J_{11} + J_{22}$). Therefore, the dynamics of the system will result in cycles (see Semmler 1986). These self-sustained cycles, resulting from the profit-investment dynamics, can be regarded as close to classical dynamics and conceptions and the original Kalecki model and reflects to a certain extent also the dynamics of output, income, resource cost, price level, wage and bank deposit and interest rate dynamics of the Kondratieff long wave theory. Though for such a cycle on long time scale many structural changes may occur that could significantly change the mechanisms and economic relationship over the cycle.

⁹ In a monetary economy, a very important factor effecting the change of signs in J_{11} seems to be the financial condition of firms and the banking system (see Minsky 1983).

4. The Minsky Financially Driven Basic Cycle and Super-Cycle

Next we discuss a Minsky long cycle: a financially-based approach to the long wave theory. Long cycles have historically been interpreted as an interaction of real forces with cost and prices. Kondratieff cycles emphasize secular changes in production and prices; Kuznets cycles are associated with economic development and infrastructure accumulation; Schumpeterian cycles are the result of waves of technological innovation; while Goodwin cycles are based on changes in the functional distribution of income arising from changed bargaining power conditions in a period of high growth rates and Keynesian theories express demand factors.

The work of Hyman Minsky provides an explicitly financially driven theory of business cycles. Minsky's own writings were largely devoted to exposition of a short-run cycle and a very long-run analysis of stages of development of capitalism. The short-run analysis is illustrated in two articles (Minsky 1957, 1959) that present a financially driven model of the business cycle based on the multiplier-accelerator mechanism with floors and ceilings. A later formalization is the Delli Gatti *et al.*'s work (1994) in which the underlying dynamic mechanism is increasing leveraging of profit flows, which roughly captures Minsky's (1992a) hedge-speculative-Ponzi finance transition dynamic that is at the heart of his famous financial instability hypothesis. The very long-run analysis of stages of capitalism's development is illustrated in Minsky's (1992b) essay on 'Schumpeter and Finance'. These stages of development perspective have been further elaborated by Whalen (1999) and Wray (2009).

Recently, Palley (2010, 2011) has argued Minsky's (1992a) financial instability hypothesis also involves a theory of long cycles. This long cycle explains why financial capitalism is prone to periodic crises and it provides a financially grounded approach to understanding long wave economics.

A long cycles perspective provides a middle ground between short cycle analysis and stages of development analysis. Such a perspective was substantially developed by Minsky in a paper co-authored with Piero Ferri (Ferri and Minsky 1992). However, unfortunately, Minsky entirely omitted it in his essay (Minsky 1992a) summarizing his financial instability hypothesis, leaving the relation between the short and long cycle undeveloped.

Minsky's financial instability hypothesis maintains that capitalist financial systems have an inbuilt proclivity to financial instability that tends to emerge in periods of economic tranquility. Minsky's framework is one of evolutionary instability and it can be thought of as resting on two different cyclical processes (Palley 2010, 2011). The first is a short cycle and can be labeled the 'Minsky

basic cycle'. The second is a long cycle that can be labeled the 'Minsky super cycle'.

The Minsky basic cycle has been the dominant focus of interest among those (mostly Post Keynesians) who have sought to incorporate Minsky's ideas into macroeconomics and it provides an explanation of the standard business cycle. The basic cycle is driven by evolving patterns of financing arrangements and it captures the phenomenon of emerging financial fragility in business and household balance sheets. The cycle (see Fig. 5) begins with 'hedge finance' when borrowers' expected revenues are sufficient to repay interest and loan principal. It then passes on to 'speculative finance' when revenues only cover interest, and the cycle ends with 'Ponzi finance' when borrowers' revenues are insufficient to cover interest payments and they rely on capital gains to meet their obligations.

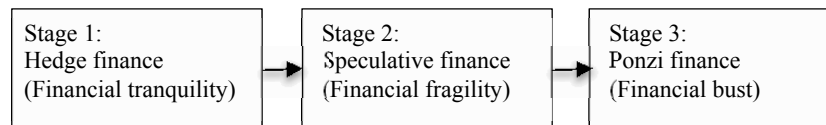


Fig. 5. Minsky financing practices

The Minsky basic cycle embodies a psychologically based theory of the business cycle. Agents become progressively more optimistic in tranquil periods, which manifest itself in increasingly optimistic valuations of assets and associated actual and expected revenue streams, and willingness to take on increasing risk in belief that the good times are here forever. This optimistic psychology affects credit volume via the behavior of both borrowers and lenders – not just one side of the market. That is critical because it means market discipline becomes progressively diminished. Leveraging is increased but the usual text book scenario of corporate finance, whereby higher leverage results in higher risk premia, is not visible in the cost of credit. Instead, credit remains cheap and plentiful because of these psychological developments.

Our empirical analysis in Section 5.4 illustrates this credit dynamic for the recent long financial cycle beginning in the 1990s. Initially, it was a real cycle driven by information technology (IT). This IT bubble burst around 2000/2001. However, expansion resumed, owing to Minsky's financial cycle of over-optimism, high leverage, underestimation of risk, and expansion of new financial practices. The data show a high degree of leveraging during this period, an optimistic view of profit expectations, low risk premia, low credit spreads, and few credit constraints. Thus, contrary to corporate finance textbooks, the market generated high leveraging with low risk premia.

This process of increasing optimism, rising credit expansion and low risk perception is evident in the tendency of business cycle expansions to foster talking about the 'death of the business cycle'. In the USA, the 1990s experienced much 'talk' of a 'new economy' which was supposed to have killed the business cycle by inaugurating a period of permanently accelerated productivity growth. That was followed, in the 2000s, by 'talk' of the 'Great Moderation' which claimed central banks had tamed the business cycle through improved monetary policy based on improved theoretical understanding of the economy. It is precisely this 'talk' which provides *prima facie evidence* of the operation of the basic Minsky cycle.

Moreover, not only does the increasing optimism driving the basic cycle afflict borrowers and lenders, it also afflicts regulators and policymakers. That means market discipline is weakened both internally (weakened lender discipline) and externally (weakened regulator and policymaker discipline). For instance, Federal Reserve Chairman Ben Bernanke (2004) openly declared himself a believer in the Great Moderation hypothesis.

The basic Minsky cycle is present in every business cycle and explains the observed tendency toward increased leverage and increased balance sheet fragility over the course of standard business cycles. However, it is complemented by the Minsky super cycle, that works over a longer time scale of several business cycles. This long-cycle rests on a process that transforms business institutions, decision-making conventions, and the structures of market governance including regulation. Minsky (Ferri and Minsky 1992) labeled these structures 'thwarting institutions' because they are critical to holding at bay the intrinsic instability of capitalist economies. The process of erosion and transformation of thwarting institutions takes several basic cycles, creating a long phase cycle relative to the basic cycle.

The basic cycle and long-cycle operate simultaneously so that the process of institutional erosion and transformation continues during each basic cycle. However, the economy only undergoes a full-blown financial crisis that threatens its survivability when the long-cycle has had time to erode the economy's thwarting institutions. This explains why full-scale financial crises are relatively rare. In-between these crises, the economy experiences more limited financial boom-bust cycles. Once the economy is in a full-scale crisis, it enters a period of renewal characterized by thwarting institutions, with new laws and regulations established and governing institutions empowered. That happened during the Great Depression of the 1930s and it is happening again, following the financial crisis of 2008.

Analytically, the Minsky long-cycle can be thought of as allowing more and more financial risk into the system via the twin developments of 'regulato-

ry relaxation' and 'increased risk taking'. These developments increase both the supply of and demand for risk.

The process of regulatory relaxation has three dimensions. One dimension is regulatory capture whereby the institutions intended to regulate and reduce excessive risk-taking are captured and weakened. Over the past twenty-five years, this process has been evident in Wall Street's stepped up lobbying efforts and the establishment of a revolving door between Wall Street and regulatory agencies such as the Securities and Exchange Commission, the Federal Reserve, and the Treasury Department. A second dimension is regulatory relapse. Regulators are members of and participants in society, and like investors they are also subject to memory loss and reinterpretation of history. Consequently, they too forget the lessons of the past and buy into rhetoric regarding the death of the business cycle. The result is willingness to weaken regulation on grounds that things are changed and regulation is no longer needed. These actions are supported by ideological developments that justify such actions. That is where economists have been influential through their theories about the 'Great Moderation' and the viability of self-regulation. A third dimension is regulatory escape whereby the supply of risk is increased through financial innovation. Thus, innovation generates new financial products and practices that escape the regulatory net because they did not exist when current regulations were written and are therefore not covered.

The processes of regulatory capture, regulatory relaxation, and regulatory escape are accompanied by increased risk taken by borrowers. First, financial innovation provides new products that allow investors to take more risky financial positions and borrowers to borrow more. Recent examples of this include home equity loans and mortgages that are structured with initial low 'teaser' interest rates that later jump to a higher rate. Second, market participants are also subject to gradual memory loss that increases their willingness to take on risk. Thus, the passage of time contributes to forgetting of earlier financial crisis, which fosters new willingness to take on risk. The 1930s generation was cautious about buying stock in light of the experiences of the financial crash of 1929 and the Great Depression, but baby boomers became keen stock investors. The Depression generation's reluctance to buy stock explains the emergence of the equity premium, while the baby boomer's love affair with stocks explains its gradual disappearance.

Changing taste for risk is also evident in cultural developments. One example of this is the development of the 'greed is good' culture epitomized by the fictional character Gordon Gecko in the movie *Wall Street*. Other examples are the emergence of investing as a form of entertainment and changed attitudes toward home ownership. Thus, home ownership became seen as an investment opportunity as much as providing a place to live.

Importantly, these developments concerning attitudes to risk and memory loss also affect all sides of the market so that market discipline becomes an ineffective protection against excessive risk-taking. Borrowers, lenders, and regulators go into the crisis arm-in-arm. Lastly, there can also be an international dimension to the Minsky long cycle. That is because ideas and attitudes easily travel across borders. For instance, the period 1980–2008 was a period that was dominated intellectually by market fundamentalism, which promoted deregulation on a global basis. University economics departments and business schools pedaled a common economic philosophy that was adopted by business participants and regulators worldwide. Organizations like the International Monetary Fund and World Bank also pushed these ideas. As a result, developments associated with the Minsky long cycle operated on a global basis giving rise to common financial trends across countries that multiplied the overall effect.

The twin cycle explanation of Minsky's financial instability hypothesis incorporates institutional change, evolutionary dynamics, and the forces of human self-interest and fallibility. Empirically, it appears to comport well with developments between 1981 and 2008. During this period there were three basic cycles (1981–1990, 1991–2001, and 2002–2008). Each of those cycles was marked by developments that had borrowers and lenders taking on increasingly more financial risk in a manner consistent with Minsky's 'hedge to speculative to Ponzi' finance dynamic. The period as a whole was marked by erosion of thwarting institutions via continuous financial innovation, financial deregulation, regulatory capture, and changed investor attitudes to risk, all of which is consistent with the idea of the Minsky long cycle.

The Minsky long cycle enriches long wave theory. In addition to adding financial factors, the Minsky cycle has different implications for the pattern of long waves compared to conventional long wave theory. Conventional theories see a separate long wave on top of which are imposed shorter waves. In contrast, the Minsky long cycle operates over a long time scale to gradually and persistently change the character of the short cycle (*i.e.* the Minsky basic cycle) until a crisis is generated.

This pattern of evolution is illustrated in Fig. 6, which shows a series of basic cycles characterized by evolving greater amplitude. This evolution is driven by symmetric weakening of the thwarting institutions, represented by the widening and thinning of the bands that determine the system's floors and ceilings. Eventually the thwarting institutions become sufficiently weakened and financial excess becomes sufficiently deep that the economy experiences a cyclical downturn that is uncontainable and becomes a crisis.

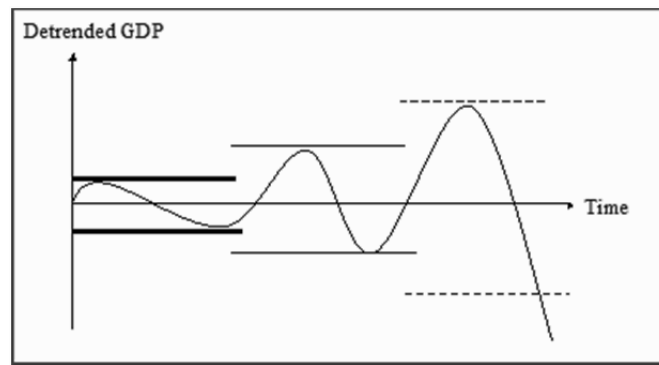


Fig. 6. De-trended GDP – symmetric fluctuations

Fig. 6 shows the case where economy undergoes basic cycles of symmetrically widening amplitude prior to the crisis. However, there is no requirement for this. Another possibility is that cycles have asymmetrically changing amplitude. This alternative case is shown in Fig. 7 which represents Minsky's endogenous financial instability hypothesis as having an upward bias. In this case thwarting institution ceilings are less durable than the floors, giving rise to stronger and longer booms before crisis eventually hits. A third possibility is a long-cycle of constant amplitude and symmetric gradual weakening of thwarting institutions that eventually ends with a financial crisis. This richness of dynamic possibilities speaks to both the theoretical generality and historical specificity of Minsky's analytical perspective. The dynamics of the process are general but how the process actually plays out is historically and institutionally specific.

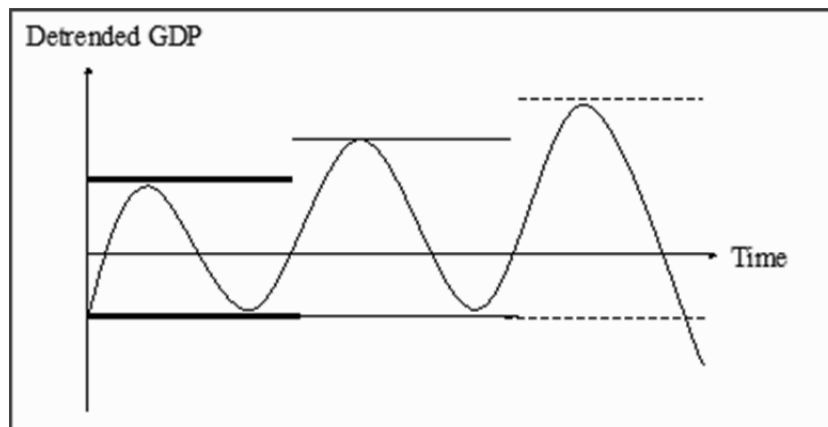


Fig. 7. De-trended GDP – asymmetric fluctuations

Analytically, the full Minsky system can be thought of as a combination of three different approaches to the business cycle. The dynamic behind the Minsky basic cycle is a finance-driven version of Samuelson's (1939) multiplier-accelerator formulation of the business cycle (see Section 3.4). This dynamic is essentially the same as that contained in new Keynesian financial accelerator business cycle models (Bernanke *et al.* 1996, 1999; Kiyotaki and Moore 1997). Thwarting institution floors and ceilings link Minsky's thinking to Hicks' (1950) construction of the trade cycle. The thwarting institutions are explicitly present in the floors and ceilings, but they can also be present in the coefficients of the multiplier-accelerator model, which determine the responsiveness of economic activity to changes in such variables as expectations and asset prices. Shifting and weakening of floors and ceilings and changing of the behavioral coefficients then capture the long-cycle aspect. This connects Minsky to long wave theory, with the role of financial innovation linking to Schumpeter's (1939) construction of an innovation cycle.

Despite these commonalities with the existing cycle theory, formally modeling Minsky's financial instability hypothesis is difficult and can be potentially misleading. Though models can add to understanding, they can also mislead and subtract.

One problem is that formal modeling imposes too deterministic phase length on what is in reality a historically idiosyncratic process. Adding stochastic disturbances jostles the process but does not adequately capture its idiosyncratic character, which Heraclitus described as 'No man ever steps in the same river twice'. A second modeling problem is that the timing of real world financial disruptions can appear almost accidental. This makes it seem as if the crisis is accidental when it is, in fact, rooted systematically in prior structural developments, which had generated vulnerabilities.

A third problem is the financial instability hypothesis is a quintessentially non-equilibrium phenomenon in which the economic process is characterized by the gradual inevitable evolution of instability that agents are blind too, even though it is inherent in the structure and patterns of behavior – and agents may even know this intellectually.

This problematic of non-equilibrium is explicitly raised by Minsky (1992b: 104) in his 'Schumpeter and Finance' essay, 'No doctrine, no vision that reduces economics to the study of equilibrium seeking and sustaining systems can have long-lasting relevance. The message of Schumpeter is that history does not lead to an end of history'.

5. Empirical Evaluation of the Cycle Theories of Different Time Scales

Next we discuss some methodology used in the extraction of cycles from data. In the literature there are three typical methods to empirically study cycles. These are, first, spectral analysis (Fourier's theorem), second, filtering methods (HP – filter, BP – filter and penalized splines), and, third, wavelet theory.¹⁰ Since the advantages and disadvantages of the second one have been discussed widely, we will here more extensively focus on the first and the third methods.

5.1. A general approach of extracting cycles from data: Fourier's theorem

Generally speaking, a function is termed periodic if it exhibits the following properties:

$$f(x) = f(x + T).$$

In this case, T is known as the 'period' and, if x is time, then is the frequency. In the physical world there are many phenomena that exhibit periodic behavior, for example, pendulums, springs, and waves, to name just a few. Mathematical examples also abound.

It is interesting to consider what happens when periodic functions are added together. When several periodic functions are added together, some parts reinforce each other (when both are positive) and other parts cancel each other (when the functions are of opposite sign). But the interactions may be more or less complex and form surprising shapes, for example, a square wave.

From the physical world, we can readily observe certain properties of periodic phenomenon, for example, cancellation, reinforcement, damping, *etc.* When one moves away from two sound sources emitting tones of different frequencies, one hears, alternately, louder and softer tones.

It was observations of this kind that motivated Joseph Fourier, in the early 1800s to speculate that virtually any function could be formed by adding together the correct combination of periodic functions. In his famous analysis, Fourier defined a sequence of trigonometric values as follows: for any function, f , which is integrable from $-\pi$ to π

$$a_n = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \cos(nx) dx$$

$$b_n = \frac{1}{\pi} \int_{-\pi}^{\pi} f(x) \sin(nx) dx .$$

¹⁰ On the usefulness of wavelets to study cycles at different time scales see Gallegati, Ramsey and Semmler (2011).

Using these terms, then the function, f , may be approximated by

$$f(x) = \frac{a_0}{2} + \sum_{n=1}^{\infty} [a_n \cos(nx) + b_n \sin(nx)].$$

Thus, any function may be approximated by a sum of trigonometric functions. This is a powerful result. For example, as presented in Tolstov (1962), we may write that the trivial function, $y = x$, thus:

$$f(x) = x \sim 2 \left(\sin(x) - \frac{\sin(2x)}{2} + \frac{\sin(3x)}{3} \dots \right).$$

This is illustrated in Fig. 8, below.

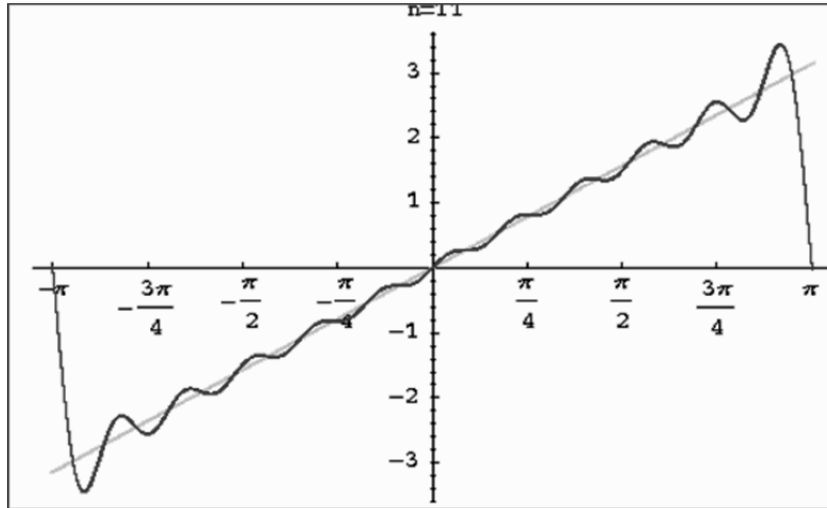


Fig. 8. The function $y=x$ expressed as a sum of periodic functions

5.2. Spectral analysis and Kuznets, Kondratieff, and other Waves

The mathematical implication is that for any time series, a sequence of periodic functions may always be found that add up to approximate the original time series. The above mathematical fact does not, in and of itself, imply that there is any actual or other interpretation of this equivalence. In other words, the fact that there is a mathematical equivalence does not imply that there are real phenomena that exhibit the same characteristics. Nonetheless, it does not imply the reverse either, that is that there may be periodic behavior lurking behind some phenomena. In this case, Fourier analysis could be useful in teasing out the details.

Mankiw (2008) states flat out that there are no regularities in economic phenomena. Garrison (1989) states that Kondratieff waves are a product of ‘creative empiricism’ and equivalent to the fanciful shapes, for example, the head-and-shoulders or candle sticks, of technical stock traders – and have ‘no basis whatever in theory’. However, he later modifies this position to allow for wave-like phenomena that have some structural basis.

In fact, as we have shown above, economists have much reason to suspect that the latter is the case. They have long recognized periodic phenomena of both long and short periods. Business cycles are but one example, which are easily detected and found in data. Thus, it is not unreasonable to replicate the stylized facts of economic phenomena by suggesting that it is, in fact, the combination of a number of periodic phenomena. This has the advantage of reducing observable phenomena to other phenomena already explained.

Kondratieff waves, described in the previous sections, are cycles that alternate between periods of high growth, with rapid price rises, and periods of relatively slow growth, with falling prices. Regardless of the existence of the illustrated sequence of historical events, it remains controversial if there is, in fact, any fundamental periodic phenomenon of which these facts are manifest. However, recently, as we have outlined in the above sections, a number of researchers have found evidence for such waves.

A number of arguments against this include: (1) the fact that even though certain types of human events tend to recur, people learn from their mistakes and some expectations of cycles may smooth them out. Also, (2) the types of production and investment change over time, (3) long waves are hard to verify empirically, (3) we have shown (see Section 3) that there may be different mechanisms working for cyclical behavior at different time scales, and, lastly, (4) Fourier's theorem shows one can always find waves in any data set (even in a data set generated by random numbers).

Although Korotayev and Tsirel (2010) find evidence not only for Kondratieff waves, but also for Kuznets swings, Juglar cycles, and Kitchin cycles. Without going into too much detail, suffice to say that each of these periodic phenomena are characterized by different frequencies and amplitudes. Thus, it is no surprise (see argument 4 above) that analysis of data will show, with suitable adjustments/calibration, that the data series can be replicated by a sum of periodic functions.

Korotayev and Tsirel (2010) use spectral analysis in their research. They study world GDP growth rates and prices going back over 100 years. The particular form of spectral analysis they use is adapted to time-series. In this technique, the time-series is analyzed ‘based on the assumption that a broad class of aperiodic natural, technical, and social processes may be represented as sums

of random process with stationary increments of different orders'. Now although this seems natural enough, and, in fact, given what we know about Fourier Series, must be mathematically true, the problem with the reasoning is this: we are assuming, in some sense, that what we want to find is already there; and then we go and find it. On the other hand, in any sort of modeling, one generally assumes some sort of structural relationship and then considers empirical data to see if there is evidence that supports it. Some might criticize the method of Korotayev and Tsirel because the period of the Kondratieff waves in their research has a period of around 50 years. Thus, no more than three complete cycles could exist in their database.

However, their approach is statistical, not a simple Fourier decomposition, and it has been shown that, even with such a small sample, the test statistic follows an χ^2 distribution. Thus, they obtain low p-values for those components with periods of approximately 50 years (Kondratieff waves; $p = 0.04$), periods of around 8 years (Juglar cycles, $p = 0.025$), and periods of close to 3.5 years (Kitchin waves, $p = 0.025$). With such p-values, most statisticians would accept the presence of these cycles. The key arguments regard the interpretation of historical economic and political events. Note that Korotayev and Tsirel prefer to regard Kuznets swings as harmonic elements of Kondratieff waves, rather than as a separate cycle.

5.3. Other methods of cycle detection

Another issue that comes up in Korotayev and Tsirel is the pre-processing of data. For example, in addition to eliminating the years of the two world wars, (1914–1919, 1939–1946), they also have 'replaced all the values for the period between 1914 and 1946 with geometric means (1.5 % per year)'. This seems a rather extreme and arbitrary replacement. If cycles are to explain economic behavior, only limited adjustment of the data should be permitted. Further, in the second more radical departure from the actual data, 'the values for years between 1914 and 1946 were replaced by the mean value (3.2 %) for the whole period under study (1871–2007), that is, those values were actually excluded from the spectral analysis'. Thus, it seems to bring into question as to what, in fact was being analyzed.

Additionally, we believe that a wiser course would have been to follow a more robust method of analysis – one that does not require such a large degree of pre-processing. For example, in Gallegati *et al.* (2011) a wavelet approach is used to determine the factors that effect output with considerations of size, scale, and time.

The key issue in the empirical analysis is the fact that there may be cycles of different times scales. This leaves open the possibility that they may amplify

or counteract each other. For example, Kondratieff cycles in output and prices are estimated to have periods of around 45–60 years; Kuznets infrastructure cycles have periods of around 25 years; Schumpeter's 'innovation', 50 years, the Goodwin cycle of maybe 20 to 30 years, and Keynes–Kaldor–Kalecki cycles of demand: 7–9 years. Thus, the empirical analysis needs to be able to verify these cycles.

Wavelet analysis is similar to and sometimes more accurate than traditional spectral analysis because it uses short 'wavelets' instead of infinite periodic functions. In contrast to the Fourier analysis, wavelet analysis deals with the signal at varied frequencies with varied resolutions. Instead of the fixed time-frequency results of the Fourier analysis, the wavelet method provides excellent frequency resolution at low frequencies and good time resolution at high frequencies. Thus, this methodology allows both time and frequency to vary in time-frequency plane, but also the mechanisms driving those cycles.

In Gallegati *et al.* (2011), a wavelet approach was used to analyze the time series data underlying the Phillips curve.¹¹

Thus, wavelets provide a good method to see relationships on different time scales and allow one to disentangle what drives output at different time horizons. Wavelet variance and cross-correlation methods can be used to determine leads and lags in time series and how different time scales affect them. This is likely to be a better approach to cyclical analysis of macroeconomic time series.

Yet another methodology for the decomposition and filtering of time series is the technique of penalized splines (see Kauermann *et al.* 2011). Here, a time-series is decomposed into a smooth path and a series of residuals, which are assumed to be stationary around the trend. This technique is robust with regard to correlation of residuals. The residuals exhibit business cycle features. Splines are basically a type of smoothing, using basis functions, in which piecewise polynomial functions are joined together to form a 'smooth' shape. Then the 'smoothed' shapes or periodicity and other features can be studied more easily than the original data-stream. In their paper, Kauermann *et al.* discuss several sub-methodologies including the Hodrick-Prescott (HP) Filter and the Bandpass (BP) Filter; these are contrasted with the method of penalized spline. They study GDP and its components from 1953 to 1996.

We see that there are a variety of approaches to the identification of cycles within time series methods. Each of them has some advantages and disadvantages.

¹¹ Note that Goodwin uses such a Phillips curve but assumes a constant productivity growth rate and real variables.

5.4. Some empirics on the Goodwin cycle

Other analysis, for example, Flaschel *et al.* (2008) show how cyclical behavior can appear as Goodwin cycles, based upon predator-prey dynamics as discussed in Section 3.5. In their case, they show how, with suitable assumptions about the wage-price spiral and certain other variables, a Lotka-Volterra type of model gives rise to periodic phenomena, as explained in Section 3.5 above. In this case, the ambiguities are only pushed into the background, that is into the parameters and structure of the pair of differential equations that give rise to the dynamical system. In other words, it is not in question if the system they develop gives rise to periodic behavior, it does. The question is whether the system is well-grounded in the empirics of the variables being used.

At this point, we do not seek to advocate for or against the existence of wave-like phenomena in economic behavior. Instead, we only wish to point out two things: (1) Fourier's theorem guarantees that one can find a set of waves which fully simulate any curve; (2) there is a fundamental ambiguity about the nature of the economic behavior being explained with respect to frequency, amplitude, *etc.* as there is sufficient freedom for interpretation of virtually any periodic phenomena as 'economic' phenomena.

An empirical test of the cyclicity of synthesis of the Goodwin and Keynes-Kaldor models is given in Flaschel *et al.* (2008). Often the Goodwin model has been interpreted as business cycle dynamics, but as Flaschel *et al.* (2008) show, the employment and wage-share dynamics seems to hold more for a longer time scale, where the wage-share movement can be found to be related to a large time scale with a delay.

Employment seems to lead the change of the wage-share in the context of long waves (see Fig. 9).

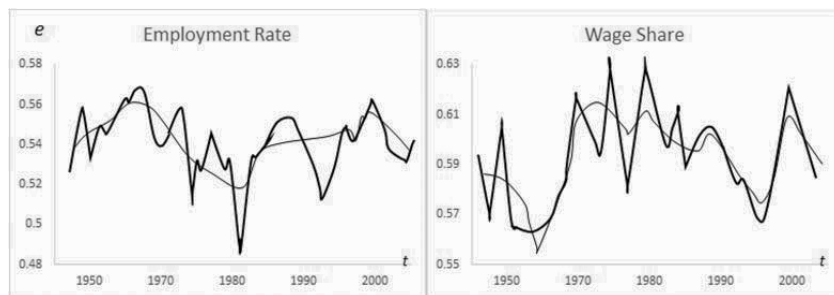


Fig. 9. U.S. Goodwin cycles

In examining business cycles, we note there is some negative correlation between employment and wage share. This interaction appears to come less

from real wage movements, but rather from pro-cyclical productivity movements. As to the longer time scale – here captured by the thin solid trend line – as it is shown in Fig. 9, there seems to be a strongly delayed reaction. With employment rising, wage shares seem to rise with a delay, and as wage shares continue rising, employment seems to fall with a significant delay. Most of our current cycle models – on short or long scales – do not exhibit such delays.

5.5. Some empirics on the Minsky cycle

The period 1981–2007 provides evidence from the U.S. economy that is strongly supportive of the idea of a long Minsky cycle. The Minsky basic cycle embodies a sentiment-based theory of the business cycle (see also Semmler and Bernard 2012). The tranquil period generates increasingly greater risk taking as agents become progressively more optimistic. That optimism manifests itself in increasingly optimistic valuations of assets and associated revenue streams. It also manifests itself in credit markets where both borrowers and lenders become more optimistic. That is critical because it means lender-imposed market discipline becomes progressively weaker. Leveraging increases but the usual text-book scenario of corporate finance, whereby higher leverage implies a higher risk premium, is not visible in the cost of credit. Instead, credit remains cheap and plentiful.

Fig. 10 shows the ratio of home prices to rents during the period from the 1960s to 2006. Since 1999, the ratio suddenly starts to increase. Such a development would be consistent with a dramatic drop in interest rates, thereby generating a large increase in the present value of anticipated rents. However, that did not happen. Instead, the increase in home prices relative to rents was driven by speculative anticipations of higher resale values. This corresponds exactly with the Ponzi phase of the basic Minsky cycle in which agents borrow to finance asset purchases in anticipation of higher resale values.

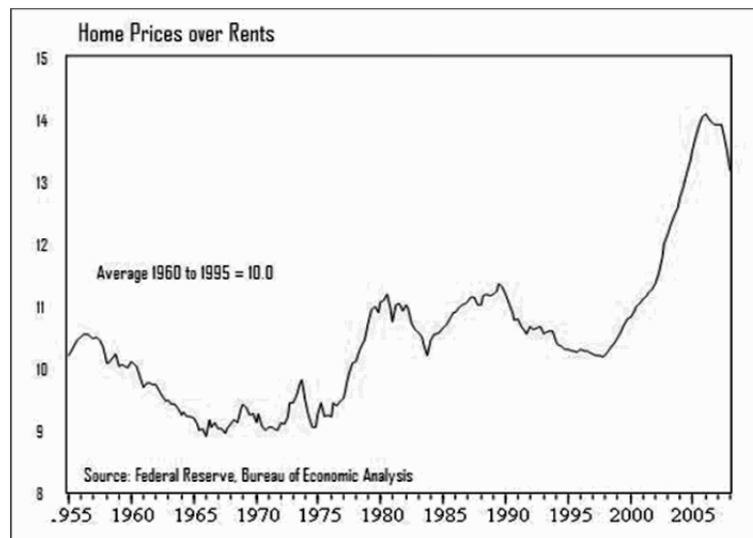


Fig. 10. Ratio of home prices: Rents

Fig. 11 shows nominal mortgage rates over the period 1971–2008. The figure shows that nominal mortgage rates rose sharply in the 1970s through to 1981, and then fell steadily through to 2002. Under ‘normal’ circumstances, it would be surprising to see a simultaneous increase of mortgage interest rates and the home price to rent ratio. However, the 1970s and early 1980s were a period of stagflation – rapid inflation plus relatively high unemployment. The rise in the home price to rent ratio can therefore be explained by the combination of increased demand for hard assets that are more protected against inflation and lowered rents attributable to a weak economy. With regard to the Minsky cycle, the main feature of interest in Fig. 11 is that mortgage interest rates remained roughly constant over the period 2002–2007. This was a period when the bubble in house prices had already set in and buying homes therefore involved larger mortgages.

Yet, despite this, there was no increase in risk premiums, reflecting the increased optimism and complacency of lenders.

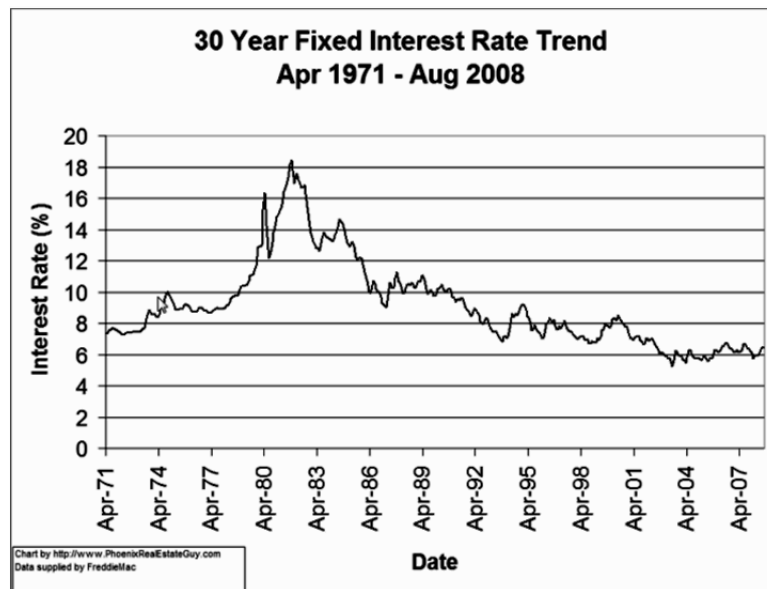


Fig. 11. Historical mortgage rates

Two further pieces of evidence consistent with the Minsky basic and super cycles are provided in Figs 12 and 13. Fig. 12 illustrates the percentage of disposable income devoted to servicing debt for the period 1980–2007. This is a fairly good proxy of risk since the lower the percentage of disposable income a borrower needs to pay (*i.e.* the lower the debt service burden), the less risky is the loan. Fig. 12 shows a cyclical pattern, with the debt service burden rising in the expansion of the 1980s and then falling when the economy went into recession. It rose again with the expansion of the 1990s, briefly flattened at the end of that expansion, and then continued increasing in the 2000s. This pattern is consistent with the interaction between the basic Minsky cycle and the Minsky super-cycle discussed earlier.

The basic cycle is evident in the expansions of the 1980s and 1990s, but by the 2000s the old thwarting institutions had been rendered obsolete and the economy enters a period of unsustainable boom that ends with a financial crisis.

During this last period, leverage increases massively but there is no increase in interest rate risk premiums because lender discipline was in tatters owing to the spread of optimism amongst lenders that weakened market discipline.

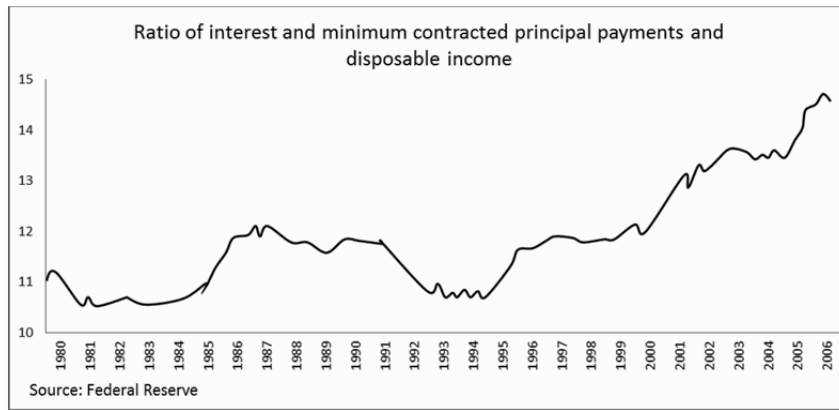


Fig. 12. Debt service to disposable income ratio

Fig. 13 shows the volume of funds in collateralized debt obligations (CDO) over the period 1992–2002. Collateralized debt obligations are financial assets constructed by bundling smaller loans. The interest and principal on these loans are paid to a trust entity, which then divides those payments among CDO owners. Distributions from the trust entity may also be *tranche*d, with less risky CDOs receiving payment first and more risky CDOs receiving the remaining income. Mortgage-backed securities (MBS) represent a specific type of CDO backed by home mortgages.

As discussed earlier, an important ingredient of the Minsky super-cycle is financial innovation that escapes the regulatory net, permits increased risk-taking, and encourages financial complacency. CDOs represent such an innovation. The bundling of loans in CDOs enabled banks and other lenders to sell their loan portfolios and thereby off-load risk. This created the ‘originate and distribute’ model whereby banks and other lenders shifted to selling their loans rather than holding them. That in turn changed patterns of incentives, giving banks an incentive to push loans rather than engage in sound lending. That is because banks increasingly made money by taking the fees, commissions, and profits associated with creating CDOs and did not bear the ultimate risk associated with loan performance.

If the loan subsequently went bad it was no longer on the bank's book.

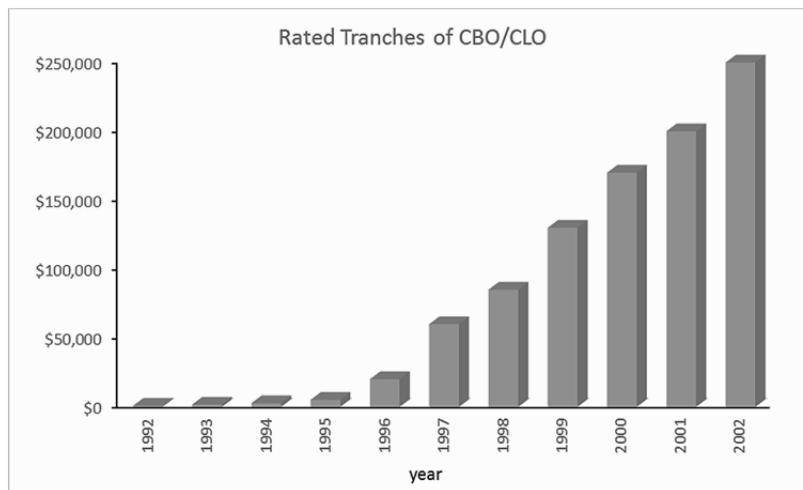


Fig. 13. Securitization of debt: Complex securities

The new CDO ‘originate and distribute’ lending model therefore relaxed lender discipline since lenders felt they were not ultimately on the line. This helps explain why debt service burdens were allowed to increase so much and why interest rates did not rise to reflect increased risk premiums. On a global scale, proliferation of such ‘robust’ new financial instruments invokes the redefined fundamental uncertainty framework (Gevorkyan and Gevorkyan 2012). With unclear recovery prospects as investors, driven by portfolio maximizing strategies, pour in and abruptly exit the emerging financial markets, the full brunt of the recent crisis is yet to unravel in the structurally weaker economies.

6. Conclusion

Empirically detecting the mechanisms of long cycles is difficult. First, there are technical challenges associated with filtering and spectral methods. Second, and more important, economies are characterized by continuous change that becomes ever more significant as the period of analysis lengthens. For instance, Kuznets and Kondratieff waves of twenty-five to fifty year duration will inevitably take place in a context of significant structural change. Over the last two hundred years, a repeated sequence of structural change has been the transformation of economic activity from agricultural dominance to manufacturing dominance, then on to service sector dominance. Economies are also characterized by institutional change concerning labor markets, regulatory arrangements, and the organization of firms.

These institutional changes alter the processes of decision-making, introduce new decision actors and interest groups, and change the balance between market and government. Technological change has promoted a trend to economic activity that involves less physical production and resource use, and is more intensive regarding knowledge based production activity. As a result, the character and forces of growth are likely to change.¹² From that perspective, one can never step in the same river twice.

The existence of so much historically idiosyncratic matter makes it empirically difficult to detect cycles of fixed periodicity and amplitude based on time invariant cycle generating mechanisms. Wavelet methods appear to be the most suitable means of empirically identifying economic relationships over cycles of different duration. Technical difficulties notwithstanding the data for some macroeconomic variables (particularly profits) exhibit the dynamics of ups and downs. It also appears possible to talk about stages, or phases, regarding the economic dynamics of developed and emerging market economies. If long cycle theory holds, that raises the question of where we stand today. Are we in the middle of a cycle or at the end of one and awaiting the beginning of another? Those are the questions that the application of long cycle theory and methods may help answer.

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¹² Greiner, Semmler and Gong (2005) show how modern growth involves more copying from others, combined with build-up of education and human capital, infrastructure, and knowledge creation.

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II. LONG CYCLES: ECONOMIC AND POLITICAL ASPECTS

4

K-Waves, Technological Clustering, and Some of Its Implications

William R. Thompson

Abstract

The etiology of Kondratieff wave (K-waves) is complex because its effects are so pervasive. It may also be that its sources are equally numerous. However, one of the unfortunate byproducts of the K-wave's political-economic centrality is that it means different things to different analysts. Since price data were studied early, a number of observers equate K-wave fluctuations with monetary pulsations. Others link it to generational shifts, investment spikes, stock market oscillations, or war impacts. K-waves encompass all of these activities but it is not clear that it serves our analytical purposes to leave the identity of the core nature of long-term economic pulsations so open-ended. The causal ambiguities contribute strongly to K-waves' controversial status. The more elusive the core identity of K-waves, the easier it is to take the subject less than seriously. The proposed remedy is to acknowledge technological clustering as the central K-wave motor, until or unless we find otherwise.

Keywords: *transduction, energy, time, money, Snooks–Panov curve, acceleration, singularity, global intelligence Kondratieff waves, technological clustering, innovation, inequality, economic growth, North-South gap, relative decline, industrial revolution, long cycles.*

K-waves (or Kondratieff waves) mean many things to different people. I propose that we would all benefit from adopting a stance that views these long-term fluctuations as instances of technological clustering. I borrow the ‘technologically clustering’ term from Grubler (1998: 117) who refers to a technological cluster as a ‘set of interrelated technological and organizational innovations whose pervasive adoption drives a particular period of economic growth, productivity increases, industrialization, trade, and associated structural changes’. If we were to converge on this technological clustering as the central focus of K-wave analysis, as a number of analysts are doing, the significance and centrality of these processes would become more salient, the need to elaborate

Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 164–180

our theoretical infrastructures would become more imperative, and the unification of many findings pointing in different directions might become more feasible. In other words, the potential payoffs could be considerable.

I attempt to advance the case for this approach by elaborating empirically some of the implications for technological clustering and world inequality reinforcement and systemic leadership decline. Earlier cases have been made for explaining the North-South income gap in terms of uneven technological diffusion (Thompson and Reuveny 2010) without being able to demonstrate fully the contours of the uneven diffusion. A relatively new dataset developed by Comin and Hobijn (2009) facilitates a more direct examination of this phenomenon. At the same time, uneven technological clustering within the principal source of innovation, the lead economy, also helps explain puzzles relating to the relative decline of the incumbent system leader.

Technological Clustering

Receptivity to K-wave analyses is subject to unusually heavy perceptual burdens and a great deal of ingrained resistance. Given the early history of Kondratieff fluctuation study, especially its emphasis on mainly inductive and empirical as opposed to theoretical examinations and the initial heavy emphasis on prices, K-wave analyses have struggled to proceed beyond seeking existential evidence that the long-term fluctuations are real. For many economists, they simply do not exist. Not only do they not fit easily into the short-term focus of contemporary economic analysis, they also can be dismissed on the grounds of underdeveloped or contradictory theoretical explanations. It does not help that we continue to quarrel about the roots of K-wave fluctuations – is it prices, wages, radical technology clusters, generations, wars, demographic changes, or investment – let alone astrology and numerology – that ultimately drives the 40–60 year undulations? What is the scope of K-wave fluctuations – are they universal, restricted to more developed economies, or do they start and become most characteristic in the world system's lead economy? And, of course, what is the timing of the K-wave fluctuations? Virtually all K-wave analyses seem to prefer different periodizations.

Despite these persistent disagreements, we may at least be moving toward something resembling an emerging consensus that radical technology clusters lie at or near the heart of these irregular perturbations.¹ To the extent that this is the case, we might do well to stress the uneven development of new technology and its myriad implications as the central focus of K-wave analyses. The problem then is not that much of economic scholarship ignores K-wave phenomena

¹ See, among many, Freeman and Perez (1988), Ayres (1990a, 1990b), Modelski and Thompson (1996), Grubler (1998), Boswell and Chase-Dunn (2000), Freeman and Louca (2001), Devezas and Modelski (2006), Thompson (2007), Rennstich (2008), Korotayev *et al.* (2011), Archibugi and Filippetti (2012), Edmonson (2012), and Linstone and Devezas (2012).

as figments of overwrought imaginations; the problem is that much of economic scholarship ignores the uneven development of new technology and its implications. It is more the assumption that technological developments are virtually constant and incremental that seriously handicaps the analysis of economics and political economy – than it is the disinclination to take K-waves seriously. We would all be better off if we embraced the idea of uneven technological development, even if that meant losing the K-wave conceptualization and its long history of fringe acceptance at best.

But it is not enough to accept the centrality of the unevenness of technological developments. If the pace and processes of technological development are indeed central, some other elements should become clearer. Technology does not fall from the heavens, it must be invented and innovated by someone. Although inventions are widespread, innovation tends to be restricted in geographical scope.² Innovations tend to appear in some part(s) of the world before they diffuse to some other parts of the world. Note that there is no reason to assume that technological diffusion is universal. It is not. Technological diffusion is just as uneven as its innovation. It is the unevenness of these processes that lead to and/or reinforce structured world inequalities. New technological innovations appear in the North and some elements of the novelties eventually appear in parts of the South. Yet this lead-lag process means that much of the South is always lagging behind the North. If a few states in the South have some potential of catching up with Northern technological complexity and affluence (and have done so), many do not. Not only does much of the South lag behind the North, the magnitude of the lag implies more economic divergence than it resembles anything like economic convergence.

If K-waves are about uneven technological innovations, then K-waves are also responsible in part for world inequality. But there is much more to the story. As the main engine of long-term economic growth, technological clustering processes concentrate wealth globally, carry out Schumpeterian ‘creative destruction’, and transform periodically how the world – or some of the world – literally works. Technological clustering has also become increasingly critical to the rise and relative decline of lead economies. There are different ways to elaborate this premise. My preference is linked to the Modelski-Thompson leadership long cycle perspective.³

In this perspective, long-term economic change is stimulated by radical innovations in commerce and industry. These innovations are spatially and temporally concentrated in one state for a finite period of time, as delineated in

² This generalization is based on historical tendencies. Like many others, it may not hold into the future.

³ See, *e.g.*, Modelski 1987; Modelski and Modelski 1988; Modelski and Thompson 1988, 1996; Thompson 1988, 2000; Rasler and Thompson 1994; Reuveny and Thompson 2004; Modelski, Devezas, and Thompson 2008; and Thompson and Reuveny 2010.

Table 1 and Fig. 2. After they are introduced, they bring about major changes in the way economies function as their techniques and implications diffuse throughout the pioneering economy and then to other advanced economies that are in a position to adopt or adapt the new ways of doing business.

Table 1. Leading sector timing and indicators, 15th to 21st centuries

Lead Economy	Leading Sector Indicators	Start-up Phase	High Growth Phase
Portugal	Guinea Gold	1430–1460	1460–1494
	Indian Pepper	1494–1516	1516–1540
Netherlands	Baltic and Atlantic Trade	1540–1560	1560–1580
	Eastern Trade	1580–1609	1609–1640
Britain I	Amerasian Trade (especially sugar)	1640–1660	1660–1688
	Amerasian Trade	1688–1713	1713–1740
Britain II	Cotton, Iron	1740–1763	1763–1792
	Railroads, Steam	1792–1815	1815–1850
United States I	Steel, Chemicals, Electronics	1850–1873	1873–1914
	Motor Vehicles, Aviation, Electronics	1914–1945	1945–1973
United States II?	Information Industries	1973–2000	2000–2030
	?	2030–2050	2050–2080

As pioneers, the initial source of new best practice technologies reap major profits and lead in economic development. They need sea power to protect the affluent home base and the sea routes via which its products are distributed around the world from potential predators. In the early leaders, major advances in ship construction were critical to the packages of innovations being introduced to the world economy. More generally, though, the gains from pioneering new commercial networks and industrial production financed the leading arsenals of global reach capabilities developed by system leaders. Those same gains later led to system leaders becoming a, if not the, principal source of credit for the world economy.

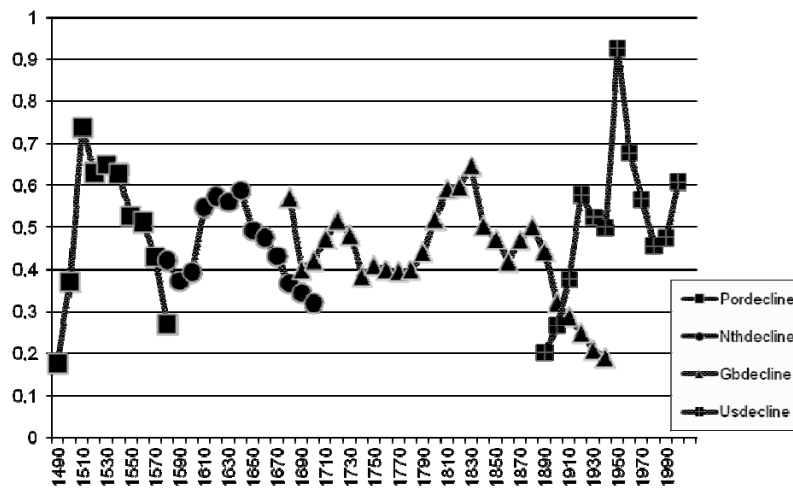


Fig. 1. Leading sector concentration

Thus, at the heart of leadership long cycle theorizing is a historicized model of long-term economic growth (Modelski and Thompson 1996; Rennstich 2008). There is no denying the importance of population size, resource endowment wealth, mass and elite consumption, savings, and other standard foci of economic growth models. But these are primarily short-term considerations. Over the long haul, development is driven by radical technological revolutions that spike roughly every half century or so. These are the long waves of economic growth that are also referred to as Kondratieff or K-waves. They are more irregular waves than neat cycles coming and going with precise periodicity. They also can best be visualized as sequential, S-shaped, logistic growth curves. New technology enters the lead economy slowly at first, then accelerates and ultimately peaks at some point before decaying in impact as new technology becomes increasingly routine and/or is pushed aside by even newer technology.

By focusing on the leading sectors that are at the heart of these technological breakthroughs, it is also possible to measure them, thereby providing important empirical support for the claims that these phenomena exist. It has also been possible to demonstrate that their main carriers, the leading sectors, stimulate the economic growth of the system leader's national economy and the world economy (Reuveny and Thompson 2001, 2004; Rasler and Thompson 2005).

Two applications will have to suffice. One involves world inequality. The argument is that technological clustering is one of the main drivers of the continuing income divergence between the North and the South. Southern incomes have improved but Northern incomes have improved even more so. One reason

is that new technology clusters diffuse unevenly and the process is subject to long lags. The South, or most of it, tends to fall farther behind with the arrival of each subsequent technology cluster. The North, on the other hand, tends to absorb these sequences of new technology clusters more readily. As a consequence, Northern incomes have tended to converge.

The second application concerns systemic leadership decline. Much ado is currently being made about China approaching the position of possessing the largest economy in the world. Of course, it has held this position before and some would even argue, historically, that China has the longest claim on possessing the world's largest economy. Yet while size matters, it is not the sole criterion of power in the world economy. A stronger case can be made for leadership in technological innovation, the qualitative dimension of economic clout in the world economy, as being more crucial. But adopting this position suggests that the incumbent lead economy is faltering on both quantitative and qualitative criteria. Or is it? Another possibility is that we do not yet know how to interpret the observed sequence of technological clustering. What appears to be current U.S. relative decline may reflect just that but it may also reflect uneven impacts of technological clustering over time. In other words, our tendency to assume that each cluster is more or less equal in transformational potential may simply be wrong. If some clusters are weaker than others, we need to take that into consideration in evaluating who leads in contemporary technological innovation – just as we need to contemplate who might lead in the next cluster, assuming there is one.

World Inequality

The North South income gap is diverging with the North improving its relative position much faster than the South. One quick empirical demonstration of this tendency is displayed in Table 2. Average regional gross domestic product per capita improved everywhere from the 19th through the 20th centuries. But it improved most dramatically in the places that generated new technology and that could absorb the new technologies that were generated – initially, Western Europe, then the Western Offshoots, and, later, Japan. Between 1820 and 2001, Western European GDP per capita increased 16-fold. The Western Offshoots GDP per capita in 2001 was 22.4 times as large as it had been in 1820. Japanese income per capita increased by a factor of nearly a 31-fold increase.

Table 2. Changes in regionally averaged gross domestic product per capita

	1820	1870	1913	1950	1973	2001
Western Europe	1204	1960	3458	4579	11416	19256
Western Offshoots	1202	2419	5233	9268	16179	26943
Latin America	692	681	1481	2506	4504	5811
Former Soviet Union	688	943	1488	2841	6059	4626
Eastern Europe	683	937	1695	2111	4988	6027
Japan	669	737	1387	1921	11434	20683
Asia	577	550	658	634	1226	3056
Africa	420	500	637	894	1410	1489

Source: Maddison 2003.

In contrast, regions in the rest of the world started lower and expanded less quickly. Eastern Europe managed nearly a 9-fold increase and Latin America area was not too far behind (8.4-fold increase). The former Soviet Union area's expansion was in the middle of the other five regions (6.7-fold increase) – no doubt influenced by the severe economic deterioration of the FSU economy in the 1990s. Asia (without Japan) comes next, followed by Africa which registered only a 3.5-fold increase in GDP per capita. One known concomitant of these changes is that the income gaps between the early leaders (Western Europe and especially Britain and the Western Offshoots and especially the United States) and the slower growing areas diverged rather than converged. The gap in 1820 between the early leaders and the rest ranged from 1:1.7 (with Latin America) to as much as 3:1 in reference to Africa. By 2001, the income gap between the western offshoots and Latin America had grown to 1:4.6 and the gap with Africa was 1:18.1.

To what extent might we attribute the widening gap to uneven technology diffusion? Bairoch's (1982) data on the geographical distribution of manufacturing provides a useful starting point for this question. Manufacturing, as one imperfect index of the location and innovation of higher technology, became increasingly concentrated in the global North (Western Europe, North America, and eventually, Japan). Table 3 focuses on the chief technology pioneers of the nineteenth and twentieth centuries, Britain and the United States, and two Bairoch aggregations, the Developed Countries (DCs) and the Third World (China,

Indian, and a few Latin American states.) We view these two aggregations as rough approximations of the global North and South, respectively.

Table 3 shows world manufacturing residing largely in the South through the first third of the nineteenth century but moving increasingly to the North by mid-century. The two individual leaders in this shift were Britain peaking around 1880 – (with 22.9 percent) and then the United States peaking in the early 1950s (44.7 percent). For much of the twentieth century (until the 1990s), Bairoch's data suggest that most of the world outside the most affluent zone produced from 7 to 13 percent of world's manufacturing output. After 1980, the global South continued to make solid gains but the global North continues to monopolize manufacturing. In 2005, the developed world's roughly 3:1 ratio was exactly the reverse of its 1:3 ratio in 1750.

Table 3. Proportion of world manufacturing production

Year	Britain	United States	Developed World	Third World
1750	1.9	0.1	27	73
1800	4.3	0.8	32.2	67.8
1830	9.5	2.4	39.5	60.5
1860	19.9	7.2	63.4	36.6
1880	22.9	14.7	79.1	20.9
1900	18.5	23.6	89	11
1913	13.6	32	92.5	7.5
1928	9.9	39.3	92.8	7.2
1938	10.7	31.4	92.8	7.2
1953	8.4	44.7	87	13
1963	6.4	35.1	91.3	8.7
1973	4.9	33	90.1	9.9
1980	4	31.5	88	12
1991	4.5	23.5	84.2	15.8
1995	4	23.5	81.6	18.4
2000	3.9	26.6	78.8	21.2
2005	3.6	22.3	72.3	27.7
2010	2.3	17.6	60.7	39.3

Notes: The 1750–1980 data are based on numbers reported in Bairoch (1982).

The 1991–2010 figures are based on World Development Indicators (WDI Online) value-added manufacturing, substituting 'high income' aggregations for Bairoch's 'developed world' and 'low/middle income' for the Third World aggregation.

Manufacturing retains the claim to constituting the primary vehicle of economic transformation in the past few centuries. It brought about the possibility of continuous and sustained economic development by transforming worker atti-

tudes and skills as well as structures and institutions of production and socio-political regulation. Lall and Kraemer-Mbula (2005: 4) conclude that manufacturing 'has been, and remains the main engine of structural transformation'. Moreover, the leaders in world manufacturing also specialize in introducing new technology through their manufacturing (Kozul-Wright 2006).

Yet an examination of historical distributions of manufacturing suggests that the North-South imbalance in manufacturing is returning to a more symmetrical relationship – or perhaps even where it stood in the 18th century. If so, it would suggest that technology may not have been a main driver of the widening North-South income gap. Otherwise, the Southern share of manufacturing would not be moving up (as shown in Fig. 2) while its income fell farther behind proportionately.

That is one interpretation. An alternative one is that manufacturing relies on different mixtures of routine and novel technology. Bairoch's data does not discriminate among the two. If the improvements in Southern manufacturing production tend to be more routine while the North retained the advantages of the newest technological clusters, we would still expect to see a widening income gap – as long as the new technology was more profitable than technology that had become routine.

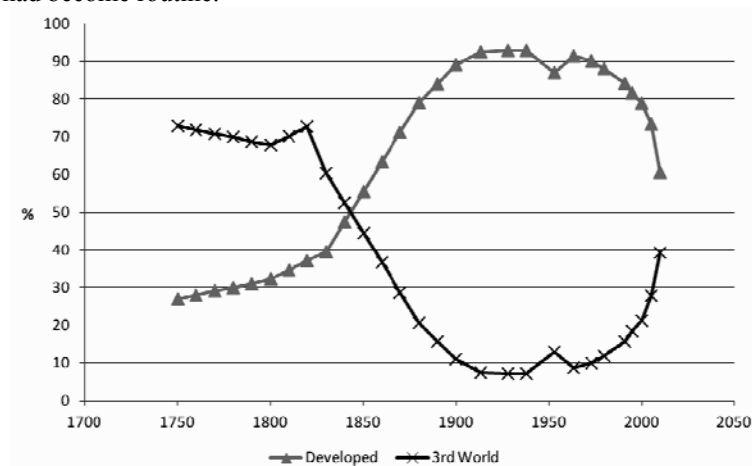


Fig. 2. Developing and developed manufacturing proportions

We know that economic growth rates have varied in different parts of the world and that the disparity between the most advanced economies and the less developed economies is expanding – subject, of course, to some notable exceptions. What is less common at least in mainstream treatments is to link these changes to the Kondratieff or K-wave process via technological clustering. Although it is not difficult to show North-South Divergence in terms of gross do-

mestic product per capita (Thompson and Reuveny 2010), it has not yet been examined directly in terms of technology. Comin and Hobijn's (2009) relatively new data set on the acquisition of a large number of technologies (100) for some 150 states since 1800 makes it possible to look at these shifts without relying on GDP per capita or un-differentiated manufacturing production.⁴ To simplify the complexity introduced by examining a large number of technologies simultaneously, nine technologies of some significance (identified in Table 4) are extracted for examination in a comparative regional frame. An overall technology score is computed by aggregating the standardized raw scores of each indicator and dividing by nine. Regional scores are then computed by averaging the overall technology scores of the member states.

Table 4. Major technology indicators

Indicators
Steam ship
Passenger train
Telegraph
Telephone
Electric power
Car
Passenger plane
Cellphone
Computer
Overall Technology = sum of the standardized raw scores/9

Table 5 re-calculates growth rates for the 1870–1913 and 1950–1973 periods. The most striking pattern in Table 5 is that some regions did better in one of the two growth waves than they did in the other. With the exception of Latin America, the regions other than the Western Offshoots did better in the catch-up, 1950–1973 wave than in the epochal 1870–1913 wave. The Western Offshoots fared best in the 1870–1913 wave and did somewhat less well (compared to past changes) in the next up-wave. At the same time, some of the regions were passed over altogether by some of the growth waves. Asia and Africa, for example, benefitted little in the 1870–1913 wave. Parts of Asia benefitted considerably in the 1950–1973 (Japan, South Korea, Taiwan, and Singapore) while other parts of Asia did not benefit immediately. The scores for Africa suggest it only fell farther behind in the 1950–1973 wave.⁵

⁴ Some caution should be exercised in using CHAT. Entries are not always comparable because they have been taken from sources that use different metrics (*e.g.*, some data are reported in thousands while others are reported in millions). There are missing data and data reported cover the last two-thirds of the 19th century but all of the 20th century. Data for some countries, however, only is reported after World War II.

⁵ This could be an artifact of the very few African countries for which there were pertinent data in the 1950s.

Table 5. Changes in regional technology scores

	1870	1913	1950	1973	1998
Western Offshoots	.008	.929	2.351	2.601	1.861
Western Europe	.107	.438	.406	1.361	1.772
Japan	-1.033	-.231	n.d.	.584	1.980
Former Soviet Union	-.904	-.509	-.054	.796	-.558
Eastern Europe	-.509	-.408	-.357	.161	.129
Latin America	-.474	-.473	-.394	-.377	-.364
Asia	n.d.	-.925	-.534	-.268	-.187
Africa	n.d.	n.d.	-.338	-.481	-.568

Table 5 also suggests that, technologically speaking, things do not stand still after and in between periods of technological acceleration. By 1998, the Western Offshoots no longer could claim technological centrality. This position was now shared more or less with Western Europe and Japan. The Soviet Union collapsed and experienced a setback in the gains achieved in the 1950–1973 catch-up period. Latin America's relative regional standing did not change much in the second half of the 20th century. Asian scores continued to improve, albeit slowly, while African scores continue to fall behind. These results seem to jibe with what is found in gross domestic product per capita accounts. Not surprisingly, the correlation between the overall technology scores and regionally averaged gross domestic product per capita is quite high.

These observations raise another interesting question about the basic pulse of technological clustering. K-wave analysts prefer roughly a two beat per 'century' pace while others are more comfortable with what is effectively a one beat per 'century' rhythm. This is of course an empirical question. Much of the two beat pace is based on extensive empirical work to support it while one beat pace authors are usually content to simply declare their long phases. But it is also clear that the growth and change reverberations of each new technological cluster can persist long beyond its onset.⁶ Comin and Hobijn (2010), for instance, find evidence for 100 year lags in the diffusion of some technologies but their reference is global.⁷ Just how long it takes for new technology to diffuse throughout single economies is less clear. But one can assume it varies by economy and technology. It seems most reasonable to assume that technology clusters overlap as opposed to the advent of one cluster indicating the demise of its predecessor(s). Such an assumption means only that we have much to map in terms of the diffusion of technology diffusion within and across states.

⁶ Railroads provide an excellent example. First introduced in the 1820s and 1830s in places such as Britain and the United States, it took decades for them to dominate transportation networks in these countries. Should we focus on their high growth rates in the early-mid century or their increasing predominance later in the century and into the next one?

⁷ Comin and Hobijn also start their diffusion clocks from the point of invention which can add a number of decades to the diffusion of some technologies, especially in the 19th century.

System Leader Relative Decline

The technological clustering perspective on the K-wave suggests five features of Kondratieff processes that have not yet received sufficient attention. One is that every growth wave is not equal. Some growth waves are strong while others are comparatively weaker. A second feature that has not been explored much is just how long the impacts take to be fully registered at the source. While we think we can isolate periods of high growth due to innovational changes, these remain largely guesswork. A third feature is that the extent of diffusion varies from one wave to the next. Some areas benefit more than others but not necessarily consistently. The combination of the first three features suggests a fourth – K-wave processes are anything but uniform over time and space. Their effects are neither instantaneous nor are they experienced equally across space. Finally, the unevenness of the K-wave's geographical diffusion is matched by the unevenness of the innovation source's advantage. Other parts of the world catch up while the center is either standing still or even backsliding, relative to its own past successes, or experiencing relative decline.

That these same generalizations apply to the concentrated sources of technological innovation should not be surprising. When we talk about repetitive wave-like motion or even a sequence of S-shaped growth curves, the imagery of similar shaped waves comes readily to mind. Yet it is becoming increasingly apparent that K-waves are not equally shaped. Some have more impact than others. The economist, Robert J. Gordon, has been one of the more persistent critics of the idea of continuous technological growth. Some of his assumptions resemble broadly those of the long cycle / K-wave model.⁸ He argues that first Britain and then the United States became the leaders in output per capita – Britain very slowly beginning around 1700 and the United States at a faster pace in the early 20th century. Three industrial revolutions, beginning around 1750, were the main vehicles for improving output per capita – which had not seen much improvement prior to 1750.

The first industrial revolution lasted from 1750 to 1830 and focused on steam, textiles, and railroads. Its impact in terms of transforming the U.S. economy persisted for another 100 years. The second industrial revolution was shorter (1879–1900) but much greater in transformational impact. Its focus encompassed electricity; internal combustion engines; running water/indoor

⁸ While some assumptions do not and it is the assumptions that differ that help explain Gordon's pessimism. He starts with the assumption that nothing fundamentally changed before 1750 and the advent of a series of overlapping industrial revolution. Where he sees one revolution that lasted from 1870 to 1970, the long cycle model and most K-wave arguments see at least two revolutions. While Gordon recognizes three revolutions, he does not seem to anticipate the fourth industrial revolution any time in the foreseeable future. Rather, he sees diminishing intervals of revolution with variable impacts, both initially and over time. From his perspective, the weakness of the third revolution is apt to be with us for some time to come and aggravated by a number of problems characterizing the U.S. economy and society.

plumbing and its sanitation implications; molecular re-arrangements in petroleum, chemicals, plastics, and pharmaceuticals; and communication/entertainment innovations (telephone, phonograph, photography, radio, and motion pictures). These innovations continued to transform the U.S. economy up to about 1970, with particular emphasis on the diffusion of air conditioning, home appliances, and highway systems.

The third industrial revolution, centered on information technology, began to be discernible from about 1960 on. Robots, credit cards, and computers were introduced and had some impact to be sure but not enough to change overall productivity all that much. The second push came in the 1990s with the internet, web, and expanding e-commerce. This second push was sufficient to bring about some positive change in productivity statistics but it has proved to be short-lived.

Gordon (2012: 13) notes that the average growth rates for U.S. labor productivity was 2.33 % for the 1891–1972 period, despite wars and depression. From 1972 to 1996, the average growth rate declined to 1.38 %. Then it improved considerably but for only a decade (1996–2004 = 2.46 %). For almost the last decade, it has retreated to 1.33 %. Gordon's main point is that the second industrial revolution was able to sustain productivity improvements for over 80 years while the third revolution is associated with a meager 10 year bump. The reason is that the changes wrought between 1870 and 1900 were more transformational than the impact of the 1996–2004 period. Each revolution brings about unique transformations but some are more unique than others. Stretching his own periodization, Gordon argues that transportation speeds accelerated from horseback pace to jet engines by 1958 and that we are unlikely to see any such acceleration ever again. A less debatable example is the shift from a society that is primarily rural to one that is primarily urban.

Unique transformations have occurred as a consequence of the third revolution as well. Typing has shifted from mechanical machines that were awkward to correct to easily correctible computerized keyboards. Hard-bound books are in the process of disappearing. Transistor radios have been replaced by ipods. Yet these transformations do not quite measure up to the revolutionary impacts of replacing horse-drawn plows with tractors or being able to control the internal temperature of residences and work places. Vaclav Smil (2005) has made the same point in a book devoted solely to this topic. The technological innovations, in his accounting, from 1867–1914, constituted the greatest technological discontinuity in history.

It may be that both Gordon and Smil will prove to have been overly pessimistic. K-wave analysts are conditioned to anticipate continuing revolutions in technology. We do not know exactly what is coming down the pike. It may well be that analysts in the future will talk about the complete disappearance of human labor in favor of robots or the radical implications of nano-manufacturing in the

same way that we now look at the transition from horse-drawn plows to tractors. Then, too, we have not yet seen the full impact of information technology or its interaction with biotechnology. Perhaps, we need to wait until 2050 to be able to fully assess the productivity impact of the latest industrial revolution. This admonition suggests caution in interpreting the incumbent system leader's economic weaknesses. Structurally, it is difficult to deny relative decline, albeit fairly slow paced relative economic decline on the part of the United States. It may be, however, that: a) the latest technological cluster's impact was also relatively weak, or b) we have yet to experience the full impact of the transformations associated with the ongoing technological cluster.

The leadership long cycle perspective (see Table 1) sees the high growth period of the current technological cluster as lasting through 2030. We may need to hold our breath collectively for a while to see how things shake out technologically-speaking, at least in terms of the full impact of the latest cluster. We also need to pay less attention to the size of the economy and look more closely at where the current technological clustering is being manifested. In many respects, the primary location, if there is one, also seems less than clear. That may mean that technological clustering has become less geographically limited in initial innovation. Or, it may mean that we do not know exactly what to look for in terms of the best indicators of contemporary technological clustering.

The Gordon–Smil point of view, nonetheless, remains well-taken. We should not expect every upsurge to be equal in strength or significance. We already recognize that every K-wave downturn has not been equal – even if we have been slow to explain precisely why that is the case. Technological development is uneven in pace. This rule holds for the privileged leader in innovation as well as it does for the places to which the innovations eventually (or not) diffuse. In this respect, the relative decline of the system leader can be explained in the same terms that we use to explain world inequalities. It is certainly reductionist to attribute both relative decline and the North-South gap to the nature of K-wave processes. Yet it is a useful form of reductionism and one that should prove more fruitful than focusing primarily on whether evidence exists for irregular fluctuations in a variety of behaviors.⁹ By this point, how and where K-waves operate unevenly should be more important than whether they show up in every possible indicator at all times and places. To proceed otherwise amounts simply to misunderstanding the fundamental nature of K-wave processes or the processes and implications of uneven technological development.

⁹ By no means am I denigrating the search for temporal periodicities in K-wave phenomena. That activity must continue and is highly valuable. But we also need to spend more time with the theoretical and conceptual dimensions as well.

Conclusions

Technological clustering is what Ocampo and Parra (2006) call the global development cycle. As such, it shapes who develops, at what pace they develop, and just how stratified the world economy becomes as a consequence of economic development. Technological clustering is anything but deterministic; it also interacts with a number of local variables. Different local economies are impacted differentially and certainly unevenly. The sooner we come to terms with the existence of this fundamental, long-term growth process and its myriad implications for diffusion, the better off we will be in terms of explanatory power in a number of different disciplines.

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5

The Hallmarks of Crisis. A New Center-Periphery Perspective on Long Economic Cycles

Arno Tausch

Abstract

Our analysis, based on a variety of standard econometric techniques, aims to be a fairly comprehensive test of the hypotheses about long cycles, associated with the name of Kondratieff and Kuznets. Our work, which takes up a recent approach by Barro (Barro and Ursua 2008; Barro et al. 2013) tries to link the issue of long cycles with the issue of economic convergence and divergence in the World System, because there are very strong cyclical ups and downs of relative convergence in the World System in comparison to world averages or leading economies, and not just in 'national' growth rates and 'national' economic cycles. Already the Japanese economist Kaname Akamatsu, who lived from August 7, 1896 to December 20, 1974, and who was a great admirer of Kondratieff, hinted at this connection. His most well-known tribute to Kondratieff (Akamatsu 1961) specifically links the rise and decline of the global peripheries to the larger Kondratieff cycle. In this article, we attempt to establish the empirical relationship between the Kondratieff cycles and the Akamatsu cycles, using advanced quantitative techniques with the Maddison data base, covering 31 countries. The Akamatsu cycles, analyzed in this work, are even stronger and seem to be more devastating than the 'national waves' and the global World Systemic waves themselves. There is a double-Tsunami wave structure of crises in the world economy. In addition, we show that the purchasing power shortfalls during the 2007 crisis were biggest in Japan, Italy, Denmark, France and Germany.

Our re-analysis of global cycles and national cycles as well as cycles of global convergence and divergence also revealed the existence of the 36-year Barro cycles and the 140-year Wallerstein cycles.

For the first time in the literature, we also tried to analyze in a more systematic fashion the cycles of convergence and divergence on a global level.

Keywords: Kondratieff, long waves, business cycles.

The recurrence of major world economic downturns and depressions, such as the one which began in 1929 and 2007, are linked forever with the name of the Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 181–250

Russian economist Nikolai Dmitriyevich Kondratieff (Никола́й Дми́триевич Кондра́тьев; 4 March 1892 – 17 September 1938). If the crash of 2007/2008 is but a continuation of the earlier economic major downturns in the 1970s, the 1930s, the 1890s and 1850s, then the prospects for the semi-peripheries in Europe's South and in Ireland, recently referred to in the economics profession as the 'PIIGS countries', are even grimmer. And if we manage to show convincingly that these countries, in addition to suffering a 'national' long-term downswing, are also caught in the long-term downturn of their once so successful convergence and catching-up process with the capitalist centers, then we realize how much of an economic and social *tsunami* we are now confronting in the European South.

Preamble

For some time now, economic science took up the issue of long-term time series analysis anew in the context of the 'Kondratieff cycles' of 50 to 60 years duration (see, among others Devezas 2006, 2010, 2012; Devezas and Corredine 2001; Diebolt and Escudier 2002; Goldstein 1988; based on Kondratieff 1925, 1926, 1928, 1935; on time series analysis see Diebold, Kilian and Nerlove 2008). The aim of this article, which tries to test recent massive evidence¹ on the issue of long cycles, is to re-assess the entire question of Kondratieff cycles within this larger center-periphery frame of reference. To facilitate future Kondratieff cycle research, we have made our interpretations of our data series, that is time series plots, spectral periodograms and spectral density graphs, rolling correlations and regressions freely available on the Internet together with some important EXCEL file sheets.

Recent 'mainstream' economic theory (Barro and Ursua 2008; Barro *et al.* 2013), working with its own version of the Maddison data set about real income convergence/divergence in 30+ countries in the world since the 19th century (Bolt and van Zanden 2013), without mentioning the name of Kondratieff, took up anew the issue of long economic cycles under the heading of '*consumption disasters*',² and came conclusions which at least render some support for Kondratieff hypotheses, *i.e.* there are indeed major long-run economic upheavals with a frequency of 30–40 years.

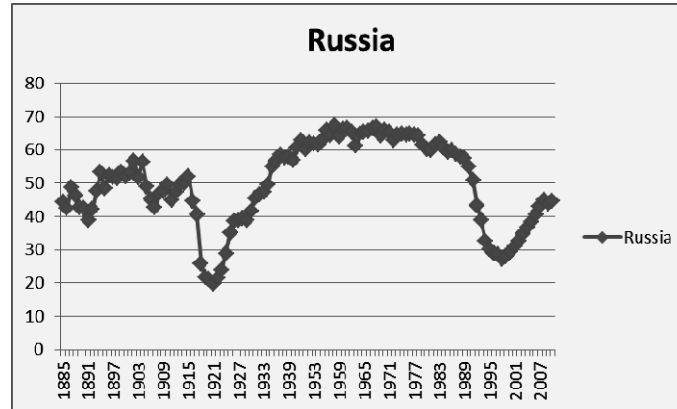
Our work aims to link the issue of long cycles with the issue of economic convergence and divergence, because the startling discovery, which one makes upon closer inspection of the trajectories of economic convergence in 31 countries with the newly available Maddison data set since the 19th century (Bolt and van Zanden 2013), is that there are indeed very strong cyclical ups and

¹ All the evidence and sources are available from https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles

² Barro made available his own, recalculated version of the Maddison data set under: <http://rbarro.com/data-sets/>

downs of **the relative convergence of these countries in relationship to the real GDP per capita at the world level and in the capitalist system's leading economies, such as the United Kingdom and the United States of America, and not just in their own 'national' growth rates and national economic cycles.** In fact, these cycles are even stronger and seem to be more devastating than the 'national waves' themselves, leading to the discovery of a **double-tsunami wave structure.**

Kondratieff was Russian, and a look at the relative position of his home country, measured by Russian/USSR constant GDP per capita in real purchasing power parity as a percentage of global average constant GDP per capita in real purchasing power parity just shows how dramatic these **long-term tsunami waves of global convergence/divergence with a duration of up to 70 or 90 years can be.** Thus, Russia fell two times within the time-span of 100 years from the comfortable position of the world's income middle class to the level of the world's lower class:



Graph 1. Former USSR/Russian constant GDP per capita in real purchasing power parity as a per cent of global average constant GDP per in real purchasing power parity. Time series from 1885 to 2010

Legend: our own compilations, based on the Maddison data sets, as documented in Bolt and van Zanden 2013. Calculated from the original data with Microsoft EXCEL 2010. The time series of real GDP per capita is expressed in constant 1990 \$ for the following countries since 1885 (1942–1948 were omitted): Argentina; Australia; Austria; Belgium; Brazil; Canada; Chile; Colombia; Denmark; England/GB/UK; Former USSR/Russia; Finland; France; Germany; Greece; Holland/Netherlands; India; Indonesia (Java before 1880); Italy; Japan; New Zealand; Norway; Peru; Portugal; Spain; Sri Lanka; Sweden; Switzerland; Uruguay; USA; Venezuela.

Source: <http://www.ggd.net/maddison/maddison-project/home.htm>

An unexpected Kondratieff revival might be happening again, this time, perhaps, via the important link between the theory of global income convergence, best captured by the works of the late Italian American world-system researcher Giovanni Arrighi and the Japanese economist Kaname Akamatsu, who lived from August 7, 1896 to December 20, 1974. Since Akamatsu's contributions appeared much earlier than Arrighi's, let us mention here Akamatsu, and we will deal later on with Arrighi's contribution. In Akamatsu's theory, there are important links between his 'flying geese' (*Gankō Keitairon*) model and Kondratieff's ideas. This 'flying geese' model was first proposed in a far-reaching and long tribute to Kondratieff's theory published internationally in 1961. The most well-known tribute to Kondratieff by Akamatsu, that is Akamatsu, 1961 (which was originally published in Japan already in 1937) specifically links the rise and decline of the global peripheries to the larger Kondratieff cycle. The very essence of the 'flying geese' and the K-cycle is that the two processes are intractably linked together, and that one cannot separate the one from the other.

Recent contributions in international social science have begun to approach these issues of the evolution of international convergence on the basis of the Maddison data since the 1870s, without, however, mentioning Akamatsu's economic framework, and without employing econometric time series analysis techniques (Rasler and Thompson 2009; Reuveny and Thompson 2008). Giovanni Arrighi also seems to have been very conscious about this problem as well, which is now hitting with the devastating force of a social tsunami his country of birth, and his world-system theory clearly distinguished between the centers, the semi-peripheries and the peripheries, and highlights the fact that some semi-peripheries rise while others stumble on their development paths (Arrighi 1995; Arrighi, Silver and Brewer 2003).

The title of this article, its style and its way of presentation are meant as a concrete tribute to medicine, and here to the path-breaking article on cancer research by Hanahan and Weinberg (2000), which received more than 10,000 quotations in world scientific literature, as documented by the Thomson Reuters *Web of Knowledge* since its publication more than a decade ago. So the theoretical apparatus will be only briefly mentioned in a section 'background', like in the medical journals, while ample space will be given to the presentation of the methodology and the 'clinical results'.

The spirit of the day in Europe is not as equally monolithic as the one existing in Russia in the 1930s, but also this time it is being maintained very uniformly that there is no alternative. This time, it is being said that for the European periphery there is no alternative but to continue to be members of the Eurozone and to be subjected to the *phlebotomy* (bloodletting) of austerity packages under the auspices of the European Commission, while in reality the dis-

covery of the organizing principles for rationalizing the complexities of the disease of stagnation and recession are being called for (in accordance with the terminology of the famous articles on cancer by Hanahan and Weinberg 2000, 2011).

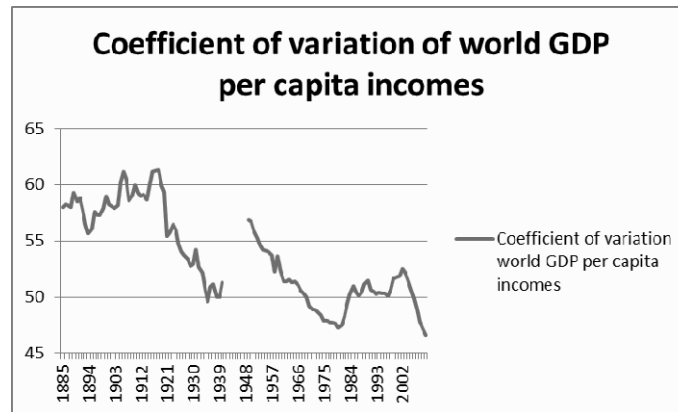
Background

Recent econometric literature, large-scale evidency by Korotayev and Grinin (2012) and Korotayev and Tsirel (2010), to the contrary, has taken a very skeptical view of the entire question of Kondratieff cycles (Diebolt 2012; Diebolt and Doliger 2006). But inspired by the recent work of Barro and associates, the author of this article proposes a new direction: to look at the totality of the countries contained in the Maddison data set, centers and peripheries alike, and to look also into the real income gaps between the centers and the peripheries in the course of the long economic cycles. And such question writing leads us back a long time in the history of economic thought to the year 1961, when the works of a Japanese follower of Kondratieff, Akamatsu, became known to a larger public in the West.

The notable trend in the reception of Kondratieff's works by Akamatsu is that he puts the 'differentiation' of the world economy into the center of his theoretical developments (Akamatsu 1961). The differentiation of the world economy leads to the rapid diffusion of new techniques to rising industrial nations, which starts with the import of new commodities by these nations. In time, techniques and capital goods are imported as well, and homogenous industries are being established. The uniformization of both industry and agriculture gave rise to the fierce and conflictive competition between Europe, the United States and Japan in the last quarter of the 19th century. When an innovation occurs in some industry in an advanced nation, investment is concentrated there, causing a rise in the trade cycle. Innovation leads to an increase in exports, and the nation's prosperity creates and increases the import of raw materials and foodstuffs. Akamatsu sees a counter-movement in other parts of the world, centered on the rising production of gold, which, according to him, leads to an increase in effective demand and further stimulates exports of the innovating nation. In that way, world production and trade expand, prices increase and a world-wide rise in the long-term trade cycle results.

However, innovations spread from the innovating nations to other nations, leading to the development of industries in those countries, with the result of a conflictive relationship with the industries of the innovating nation. Exports of the innovating nation become stagnant, and on the world level, there is a tendency towards overproduction, prices turn downwards, and the rates of growth of production and trade fall. That what later K-cycle researchers tended to call the first, rising A-phase of the cycle will be according to Akamatsu a period of differentiation in the world economic structure, while the 'falling period' (or B-phase of the cycle) will, Akamatsu argues, coincide with a pro-

cess of uniformization in the world economic structure. Graph 2 supports the contention by Akamatsu that the A-phases of long upswings in the world economy widen international inequalities, while the B-phases of long decline reduce constant real international GDP per capita purchasing power differences:



Graph 2. The coefficient of variation of constant real world GDP per capita incomes in purchasing power parity rate according to the Maddison data base (31 countries)

Legend: our own compilations, based on the Maddison data sets, as documented in Bolt and van Zanden 2013. Calculated from the original data with Microsoft EXCEL 2010.

For Akamatsu, the characteristic structure of the Center-Periphery relationship is characterized by the fact that the underdeveloped nation will export primary products and will import industrial goods for consumption. Later on, an underdeveloped nation will attempt to produce goods which were hitherto imported, first in the field of consumer goods, and later on in the area of capital goods. At the fourth stage of the process, the underdeveloped nation will attempt to export capital goods. There will be a tendency of ‘advanced’ differentiation in the world economy, however, because the capital goods industries in advanced nations will still advance further, giving rise to ‘extreme differences of comparative costs’. The wild-geese flying pattern will include three sub-patterns: the first is the sequence of imports – domestic production – exports. The second will be the sequence from consumer goods to capital goods and from crude and simple articles to complex and refined articles. The third will be the alignment from the advanced nations to backward nations according to their stages of growth.

However, there is a darker and more somber nature of these cycles as well – the condition of discrepancy will be met, Akamatsu argues, by means of imports, leading to discrepancies in the balance of payments, and the pressure

to increase exports of primary products to improve the balance. Discrepancies will also lead to a shift of production away from domestic industries in the underdeveloped country towards the export sector, leading, in the end, also to problems of excessive supply capacities in the underdeveloped country, *etc.* Arrighi, Silver and Brewer (2003) further developed these arguments, put forward by Akamatsu, and consciously link their theoretical advances also with the models implied in the works of Raymond Vernon (1966), which specifies the life cycle of a product as defined by introduction, growth, maturity, saturation, and decline.

Methodology and Data

To test the fascinating totality of such an approach is not an easy task. Our data for world industrial production growth are an extension of the ample materials, first presented by Goldstein (1988), updated by Tausch and Ghymers (2007), relying on UNIDO data on world-wide industrial production growth from the mid-1970s to the turn of the millennium, now updated by open access figures from the United States Central Intelligence Agency (CIA 2013). Our figures on major power wars were first presented by Goldstein (1988), updated by PRIO data (major power wars) until 2002 (fully documented in Tausch and Ghymers 2007). Our data for the 31 countries under scrutiny here are exclusively based on Angus Maddison's widely received research; as freely downloadable in Bolt and van Zanden (2013), for further debates see also Maddison (2003, 2007). These countries currently make up approximately 40.8 % of global population and 57.8 % of global purchasing power. Appendix 1 and 2 further highlight our freely available data. At the website Academia.edu³ readers can download the most important data and also hundreds of spectral density graphs, rolling correlations and regressions, autocorrelation analyses at the level of the World System and at the level of the 31 analyzed countries.

Our article is based on a standard IBM-SPSS 21 time series analysis of the data, and all the used methods and their algorithms are fully available to the international public.⁴ For that reason, we refrain from reproducing the mathematical formula, which interested readers might easily download from the freely available IBM internet documentation, if they are not very familiar with the mathematical formulas anyway:

- As to **correlations**, we used standard Pearson-Bravais correlation coefficients. In calculations not reported here also multivariate analyses (principal components) were used (Blalock 1972; Dziuban and Shirkey 1974; Harman 1976; and Rummel 1970). **'Rolling' regressions and correlations** are quite

³ See https://www.academia.edu/3742045/Back_ground_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles

⁴ See IBM-SPSS Statistics 20 Algorithms. at <http://www-01.ibm.com/support/docview.wss?uid=swg27021213#en>

a powerful and straightforward instrument of the analysis of time-series and became more popular in recent times in the framework of financial market trend analysis and the necessity to have easily interpretable and reliable instruments of analysis at hand (Perman and Tavera 2005; Smith and Taylor 2001; Tang 2010; Zivot and Wang 2006; furthermore: Cook 1977; Dempster 1969; Velleman and Welsch 1981).

- Throughout this work, we use 25 year (Kondratieff cycles, 2×25 years = 50 years) and 75 year periods (war cycles, 2×75 years = 150 years) for the moving time window of regression/correlation analysis. We also used shorter windows to reproduce the Barro, the Kuznets and the Juglar cycles.

- Our analyses of **autocorrelation** and **cross-correlation** are based on the standard **IBM-SPSS ACF** and **CCF algorithm**, which are based on Bartlett (1946); Box and Jenkins (1976); Cryer (1986); and Quenouville (1949) (**autocorrelation**) and Box and Jenkins (1976) (**cross-correlation**). Our graphs allow also for the inspection of longer time series. In presenting the graphs, we also took care of the better visibility of the significant results.

- The **IBM-SPSS spectral density routine**, which is based on the methodological developments, presented by Bloomfield (1976), and Fuller (1976), was performed by using the IBM-SPSS default options; the chosen window was most of the time the Tukey-Hamming window with three periods. We also tested the validity of our main results with longer windows as well. As we demonstrate however in our non-mathematical primer on spectral density analysis,⁵ longer windows seem to distort the results even of simulated time series, where we really know the length of the oscillations, and they do not really help us to discover the real periodicity of the oscillations in question, especially when we are confronted with the already mentioned ‘Devezas’ paradox of longer cycles and ‘nested’ shorter cycles. We use both the standard IBM-SPSS periodograms and the spectral density graphs, and add that standard econometric methodological literature usually maintains that the periodograms are not the best estimator of the spectrum because it is not convergent (Diebolt 2012).

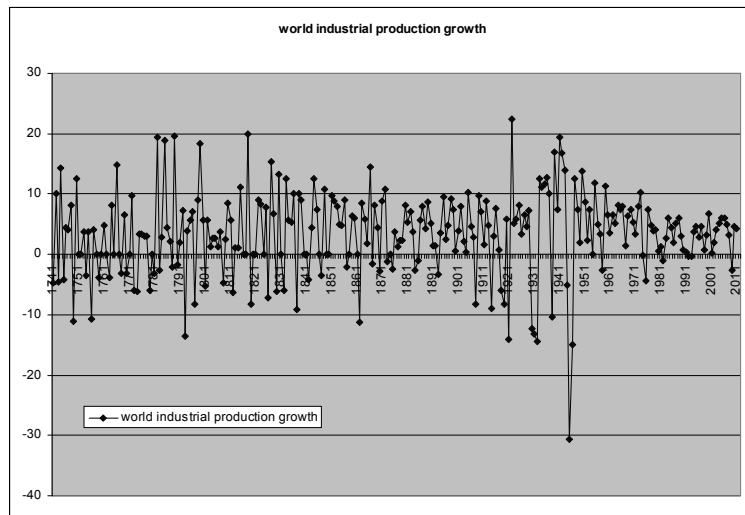
Results on the Level of World Industrial Production Growth since 1740 to 2011

Our results on the level of the world economy are a resounding ‘yes’ for the hypotheses voiced by Kondratieff, as re-analyzed by Korotayev and Grinin (2012), and Korotayev and Tsirel (2010), but with several additional qualifications and extensions. Reasons of available journal printing space do not permit us to present all the results of this project, so we concentrate on only the most important tendencies and invite the specialists among our readers to the website

⁵ Available at https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles

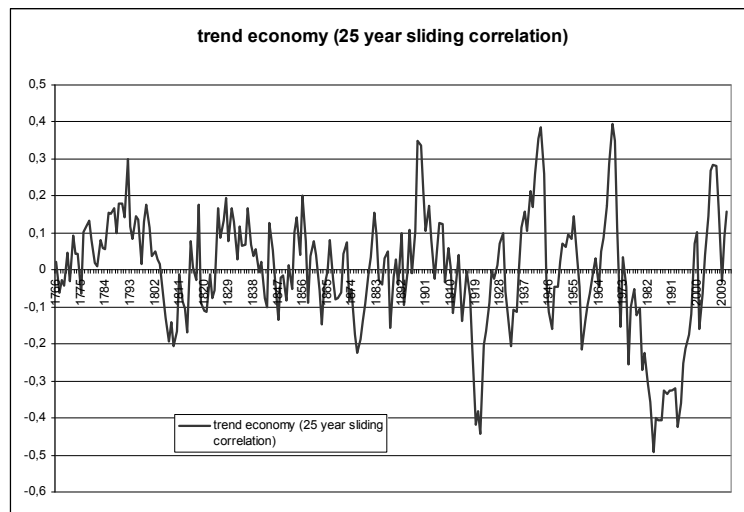
Academia.edu with all the necessary data and results. Kondratieff was right in analyzing a 54-year cycle of the real economy as well, but there are other important cycles too; some of them very well known to social science researchers, others perhaps still more to be explored.

On the level of industrial production growth in the world economy, there is – parallel to the Kondratieff cycle – a **140-year ‘logistic’ cycle**, first analyzed by Immanuel Wallerstein; and in addition, there is this new 36-year disaster cycle, correctly predicted by the neoclassical contemporary economist Robert Barro. For sure, there is also evidence – although somewhat weaker than expected – for a 22–23-year Kuznets cycle and the shorter, well-known Juglar cycles and Kitchin cycles. Graph 2 portrays the original data series from 1741 to 2011, and Graph 8 – the result of our ‘rolling correlation’ exercise.



Graph 3. World industrial production growth, 1741–2011 – the untransformed annual growth raw data

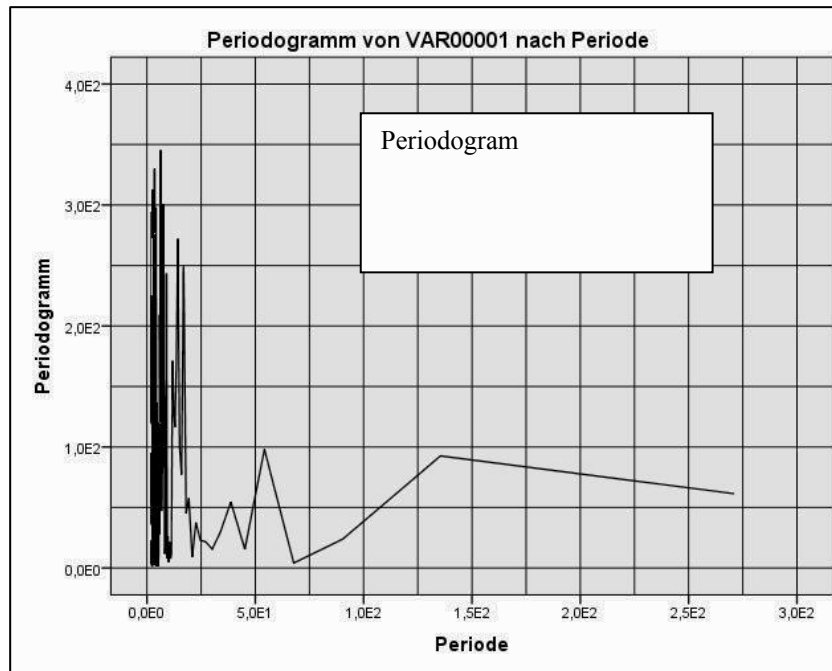
Legend: our own calculations from the data set ‘Kondratieff Cycles and War Cycles’ contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers 2007, and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.



Graph 4. The 'rolling' 25-year correlation analysis of these data reveals interesting results of the deeper underlying trends, 1741–2011.

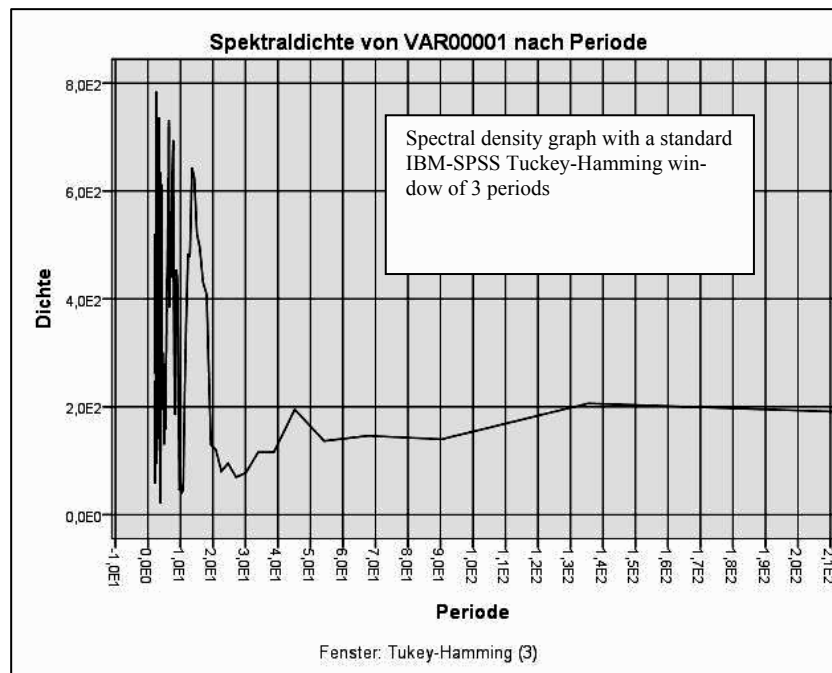
Legend: our own calculations from the data set 'Kondratieff Cycles and War Cycles' contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers 2007, and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.

Graphs 5 and 6 reproduce the main results of the spectral analysis of the cyclical movements in the original, untransformed data. The Kuznets cycle, the Barro cycle, the Kondratieff cycle and the Wallerstein logistic cycle are all confirmed in their existence. Appendix 3 mentions results, which relied on a prior 5-year moving average transformation of the original data in the tradition of the important Korotayev and Tsirel study (2010).



Graph 5. The periodogram from IBM-SPSS spectral analysis: short-term fluctuations, the Kuznets cycles, the Barro cycles, the Kondratieff cycles, and a 130–140-year cycle (Wallenstein's 'logistic cycle')

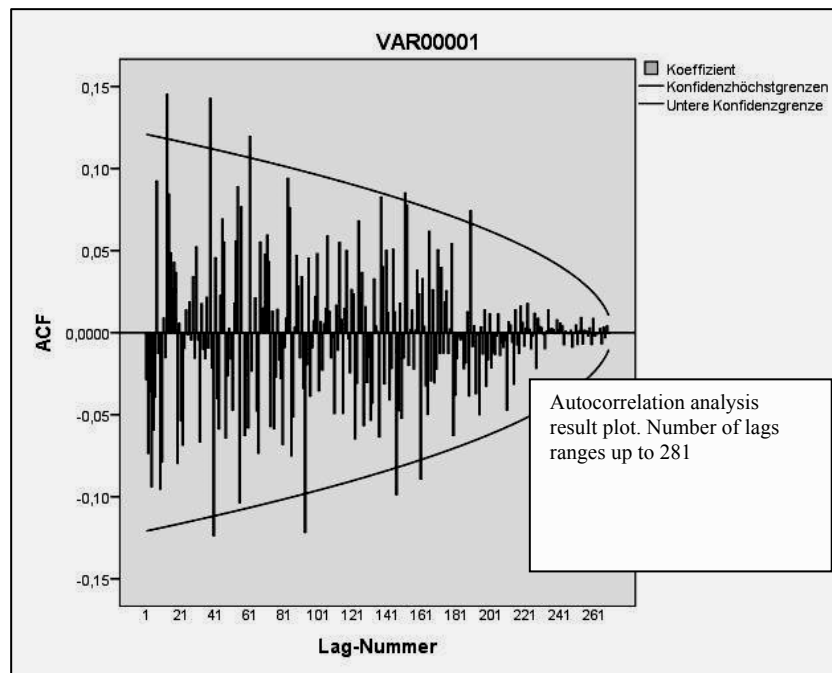
Legend: our own calculations from the data set 'Kondratieff Cycles and War Cycles' contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers 2007, and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.



Graph 6. Spectral density analysis of world industrial production growth, 1741–2011

Legend: our own calculations from the data set ‘Kondratieff Cycles and War Cycles’ contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers 2007, and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.

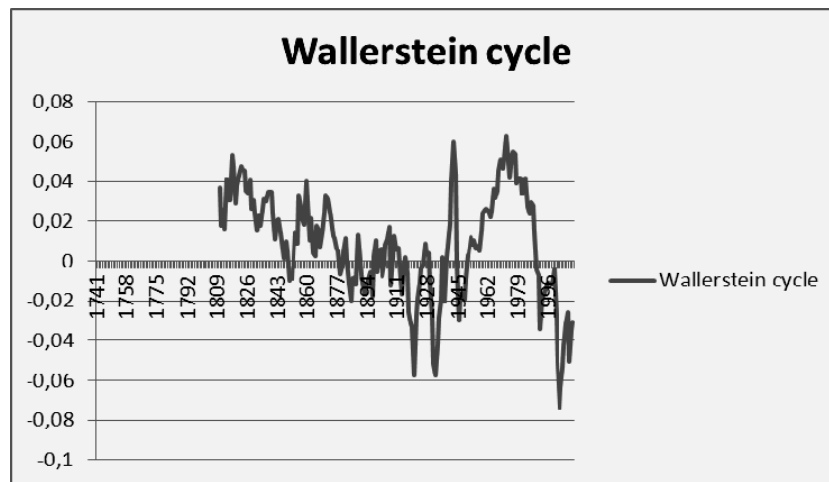
Thus, spectral density analysis of the untransformed global data indeed suggests that, on the world level, there are all the cycles at work, which have been discussed for decades now in economic research. Also autocorrelation analysis supports the claims of the K-cycle researchers:



Graph 7. Autocorrelation analysis of world industrial production growth, 1741–2011

Legend: our own calculations from the data set ‘Kondratieff Cycles and War Cycles’ contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers 2007, and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.

Graph 8 draws the attention of our readers to a type of cycle, really neglected in empirical K-wave research: the Wallerstein logistic cycle, whose shape suggests that the current crisis heralds the beginning of a trough along the oscillations of this cycle. In terms of its statistical qualities, this cycle is about equal in strength to the Kondratieff cycle. There is strong reason to believe that the Wallerstein cycle is closely connected to the issue of leadership in the international system. The period from the end of the Napoleonic Wars to the Great Depression in the 1930s was the period of the British dominance in the world economy, while the U.S. hegemony evolved as a result of World War II and seems to be declining:



Graph 8. The Wallerstein logistic cycle – 75-year rolling regressions

Legend: our own calculations from the data set 'Kondratieff Cycles and War Cycles' contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers 2007, and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.

In Appendix 3, we also document our results based on a 5-year moving averages research design, based on the original data. The 5-year moving averages design should serve to replicate the results, achieved by Korotayev and Tsirel, (2010), who also used such 5-year moving averages. Also this exercise neatly reproduces our results mentioned above. The Kuznets, Barro, Kondratieff and Wallerstein cycles re-appear in the periodogram for that research design (see also our periodogram for the periods 0–70 years with a wider spread); while there is also a confirmation of our hypothesis about the Kuznets, Barro, Kondratieff and Wallerstein cycles in the spectral density graphs under the assumption of a window (Tukey-Hamming) of three periods. In the spectral density diagram, the IBM-SPSS results suggest talking about a cycle length of 45 years for the Kondratieff cycle, but in accordance with the periodogram, the analysis of autocorrelation suggests a longer cycle. The strength of the Wallerstein cycle is again shown to be considerable.

New Evidence on Economic Cycles in 31 Countries of the World System and the Discovery of the Akamatsu Cycle

Tables 3 and 4 present the main results of our analysis of the Maddison data set. Kondratieff cycles of around 60 years duration are most clearly visible

in the periodograms for Argentina, Canada, and Russia, which are all semi-peripheries with a considerable dependency from their raw material exports.⁶

We also found evidence on the existence of longer cycles of more than 35 years in Belgium, Chile, Greece, Netherlands, India, New Zealand, Spain, and the USA while for the other countries, the spectral density analysis results reported in the work of Diebolt and Doliger (2006) could not be falsified.

Table 1. The Kondratieff cycles in the countries of the World System

Country	The length of K-cycles (years), as suggested by the Periodograms
1	2
Argentina	20 and 60
Australia	20 and 30
Austria	20
Belgium	20 and 38
Brazil	20 and 30
Canada	18 and 58
Chile	15 and 38
Colombia	20 and 30
Denmark	15 and 30
UK	15 and 30
Russia	18 and 22 and 58
Finland	25
France	18
Germany	14 and 22
Greece	15 and 25 and 40
Netherlands	20 and 40
India	25 and 40
Indonesia	20
Italy	18
Japan	15
New Zealand	20 and 40
Norway	18 and 30
Peru	20
Portugal	30
Spain	40
Sri Lanka	15
Sweden	16
Switzerland	16

⁶ These periodograms and other econometric time series tests are available from https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis._A_new_center-periphery_perspective_on_long_cycles

1	2
Uruguay	20
USA	20 and 40
Venezuela	20

Note: for the 31 nations trajectories, see https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis._A_new_center-periphery_perspective_on_long_cycles

Appendix 4 and 5 as well as the numerous other background data, presented in [academia.edu](https://www.academia.edu),⁷ highlight the Akamatsu cycles in 31 countries of the world economy since 1885.

In Table 2, we test the crucial relationships of the Akamatsu cycles and the cross correlation relationship between the Akamatsu cycle and the Kondratieff cycle.

Table 2. The length of the Akamatsu cycles and the relationship between the K-cycles and the Akamatsu cycles in 30 countries of the world

Country	The length of Akamatsu cycles (years), as suggested by the periodograms based on the original convergence data with the USA	Time series cross-correlation analysis suggests the following causality
1	2	3
Argentina	no significant result	A>K
Australia	20 and 40	A>K
Austria	no significant result	K>A
Belgium	40	K>A
Brazil	40	K>A
Canada	30	K>A
Chile	25	K>A
Colombia	60	K>A
Denmark	20 and 30	A>K
UK	40	K>A
Russia	60	K>A
Finland	30	A>K
France	40	K>A
Germany	20 and 40	K>A
Greece	40	A>K
Netherlands	40	A>K

⁷ Available at https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis._A_new_center-periphery_perspective_on_long_cycles

1	2	3
India	30 and 40	K>A
Indonesia	30 and 40	K>A
Italy	no significant result	K>A
Japan	30	K>A
New Zealand	30	K>A
Norway	20 and 30	K>A
Peru	40	K>A
Portugal	30	K>A
Spain	18	A>K
Sri Lanka	40	K>A
Sweden	20 and 30	K>A
Switzerland	25 and 40	K>A
Uruguay	20	K>A
Venezuela	no significant result	K>A

Note: for the 31 nations trajectories, see [https://www.academia.edu/3742045/ Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles](https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles)

Table 3 highlights another important consequence of our research for the study of World System dynamics. In that Table, we highlight the ‘**convergence slopes**’ of the countries of the World System with available data in terms of their GDP per capita distance, parity or superiority with the county which dominated the capitalist World System right to the time of the Great Depression, **the United Kingdom**. In the same way, we can also analyze the worst time series performances of the purchasing power of countries in relationship to that of the United Kingdom.

Table 3. The Akamatsu cycle and convergence with the United Kingdom – convergence slopes in the Kondratieff cycles, 1885–2010

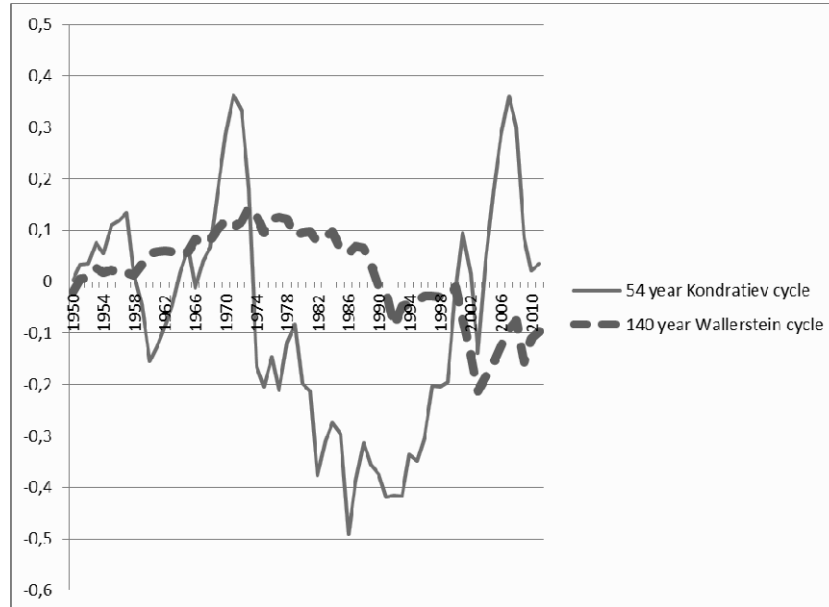
Country	Cycle 1885–1913	Cycle 1914–1932	Cycle 1933–1953	Cycle 1954–1973	Cycle 1974–1992	Cycle 1993–2010
1	2	3	4	5	6	7
Argentina	0,519	0,961	0,154	–0,003	–1,734	–0,495
Australia	–0,474	–0,055	0,814	0,502	–0,404	–0,139
Austria	0,405	1,024	0,075	1,575	0,192	–0,317
Belgium	0,009	1,527	–0,222	1,255	–0,153	–0,552
Brazil	–0,159	0,290	0,258	0,279	–0,387	–0,219
Canada	1,360	0,125	2,427	0,632	–0,494	–0,435

1	2	3	4	5	6	7
Chile	0,400	-0,073	0,412	-0,243	0,042	0,376
Colombia	-0,130	0,728	0,126	-0,099	-0,106	-0,198
Denmark	0,707	1,631	0,229	1,363	-0,108	-1,143
USSR/ Russia	0,195	0,456	0,552	0,472	-0,798	0,516
Finland	0,316	1,104	0,621	1,407	0,342	0,479
France	0,324	1,645	0,170	1,658	-0,281	-1,042
Germany	0,486	1,093	-0,847	1,468	-0,185	-1,061
Greece	-0,171	1,377	-0,878	1,767	-0,290	0,357
Holland/ Nether- lands	-0,229	2,032	-0,033	1,125	-0,615	-0,494
India	-0,021	0,014	-0,186	-0,078	0,041	0,276
Indonesia (Java be- fore 1880)	-0,054	0,190	-0,309	-0,062	0,156	-0,044
Italy	0,069	0,597	0,184	2,005	0,489	-1,376
Japan	0,163	0,432	-0,524	3,545	1,230	-1,711
New Zealand	0,693	-0,765	1,199	-0,566	-1,229	-0,393
Norway	0,171	1,066	0,847	0,845	0,773	-0,504
Peru	0,306	0,651	0,200	0,072	-1,038	0,155
Portugal	-0,096	0,472	0,078	1,410	0,560	-0,544
Spain	-0,062	0,660	-0,337	1,630	0,181	-0,187
Sri Lanka	0,050	0,058	-0,170	-0,224	0,150	0,249
Sweden	0,595	1,334	1,250	1,104	-0,639	0,245
Switzer- land	1,132	2,110	-0,239	0,887	-1,187	-1,213
Uruguay	-0,029	1,329	0,787	-1,495	-0,398	-0,219
USA	0,921	0,987	2,808	0,384	0,103	-1,007
Venezuela	-0,135	2,742	3,274	-1,510	-2,513	-0,711

Note: for the 31 nations trajectories, see https://www.academia.edu/3742045/Backround_materials_to_the_article_The_hallmarks_of_crisis_A_new_centerperiphery_perspective_on_long_cycles

New Insights into the Kondratieff Cycle Dating Game

Our research also sheds lights on the necessary reformulation of Kondratieff cycle dating schemes and the assessment of the current crisis, which began in 2007. As shown in Graph 9, there is good reason to believe that the current crisis is NOT a Kondratieff cycle low (which hit the world economy in the late 1980s, culminating in the disintegration of Communist rule in Eastern Europe and the end of the Soviet Union), but the beginning of a downswing phase of the 140-year Wallerstein cycle.



Graph 9. The 54-year Kondratieff cycle and the 140-year Wallerstein cycle since 1950

Legend: our own calculations from the data set 'Kondratieff Cycles and War Cycles' contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers (2007), and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.

Graphs 10 and 11 show that the big difference between the current crisis and the Great Depression starting in 1929 is that in 1929, ALL cycle troughs coincided, while in the crisis of 2007 until today, such an occurrence of ALL the cyclical troughs is just not the case. This is the main reason why the current

crisis is far from being the *'final crisis of capitalism'*, and why social science today can learn a lot from Kondratieff's stubborn resistance to similar theses advanced at the time of the Great Depression.

Rolling correlation windows:

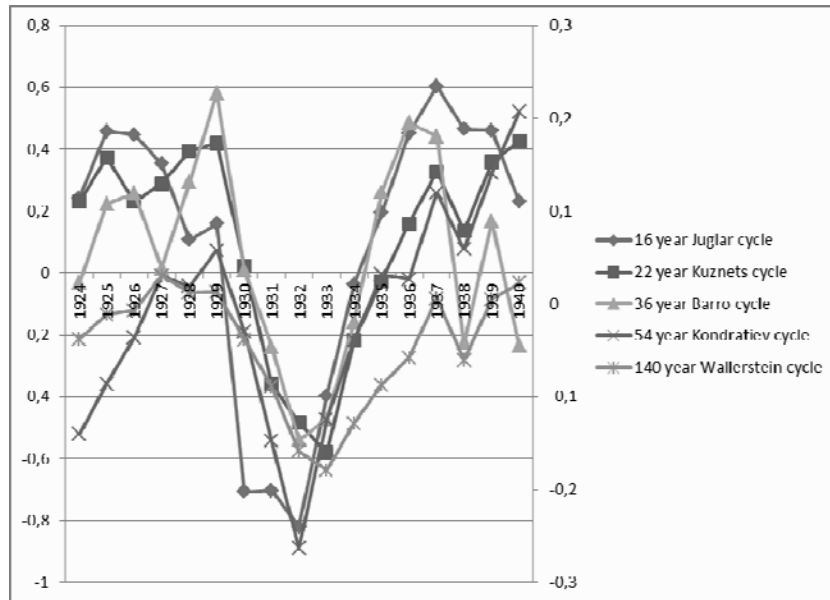
8 = 16 year Juglar cycle

11 = 22 year Kuznets cycle

18 = 36 year Barro cycle (secondary axis, right hand scale)

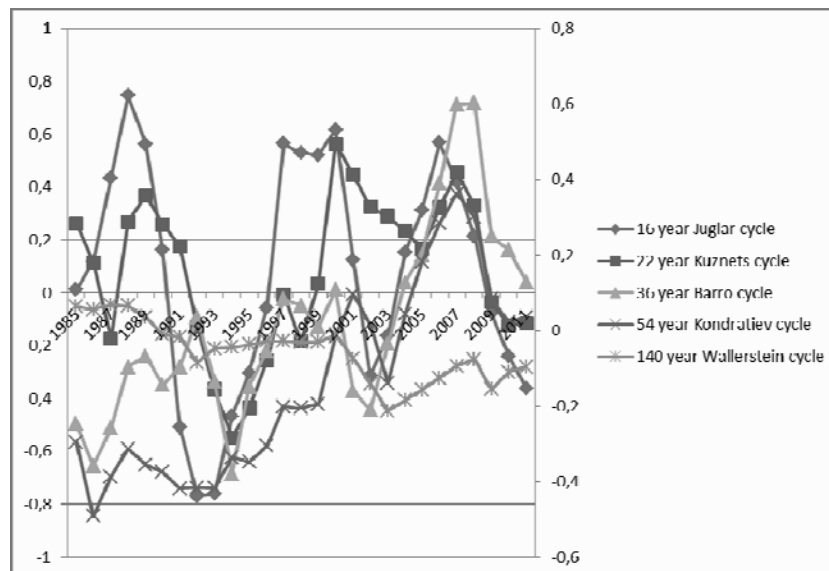
27 = 54 year Kondratieff cycle (secondary axis, right hand scale)

70 = 140 year Wallerstein cycle (secondary axis, right hand scale)



Graph 10. The unique character of the Great Depression, 1929: all cycles hit the world economy at once

Legend: our own calculations from the data set 'Kondratieff Cycles and War Cycles' contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers (2007), and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.



Graph 11. By contrast: in 2007, the world economy was NOT affected by such a unique combination of downward trends

Legend: our own calculations from the data set ‘Kondratieff Cycles and War Cycles’ contained in https://www.academia.edu/3742045/Background_materials_to_the_article_The_hallmarks_of_crisis_A_new_center-periphery_perspective_on_long_cycles. As to the documentation, see also: Tausch and Ghymers (2007), and Appendix 1 and 2 of this work. Our calculations are based on the IBM-SPSS XXI and Microsoft EXCEL 2010 statistical software.

Discussion and Conclusions

Our re-analysis of the entire issue of global cycles and national cycles as well as cycles of global convergence and divergence revealed that Kondratieff cycles exist, but that there are other types of cycles as well in the global economy, among them two cycles hitherto virtually neglected in quantitative research on the subject – the 36-year Barro cycle and the 140-year Wallerstein cycle.

For the first time in the literature, we also tried to analyze in a more systematic fashion the cycles of convergence and divergence. So, our results on the level of the world economy are to be interpreted as a resounding ‘yes’ for the hypotheses voiced by Kondratieff, but with several additional qualifications and extensions. Kondratieff was right in analyzing a 54-year cycle of the real economy as well, but there are other important cycles too; some of them very well known to social science researchers, others, perhaps, still more to be explored. On the level of industrial production growth in the world economy,

there is – parallel to the Kondratieff cycle – a 140-year ‘logistic’ cycle, first analyzed by Immanuel Wallerstein; and in addition, there is the newly discovered 36-year disaster cycle, correctly predicted by the neoclassical contemporary economist Robert Barro. For sure, there is also evidence – although somewhat weaker than expected – for a 22–23-year Kuznets cycle and the shorter, well-known Juglar cycles and Kitchin cycles. We achieved our results with the untransformed data at our disposal, but also with 5-year moving average transformations of the original data, which wielded the same results. There is strong reason to believe that the Wallerstein cycle is closely connected to the issue of leadership in the international system. The main results of our analysis of the Maddison data set indicate that Kondratieff cycles of around 60 years duration are most clearly visible in Argentina, Canada, and Russia. We also found evidence on the existence of longer cycles of more than 35 years in Belgium, Chile, Greece, Netherlands, India, New Zealand, Spain, and USA; while for the other countries of the Maddison data set, the spectral density analysis results reported in Diebolt and Doliger (2006) could not be falsified.

In this essay, we also tested the crucial relationship of the Akamatsu cycles of convergence and the cross correlation relationship between the Akamatsu cycle and the Kondratieff cycle. Our research also sheds lights on the necessary reformulation of Kondratieff cycle dating schemes and the assessment of the current crisis, which began in 2007. There is good reason to believe that the current crisis is NOT a Kondratieff cycle low (which hit the world economy in the late 1980s, culminating in the disintegration of Communist rule in Eastern Europe and the end of the Soviet Union), but the beginning of a downswing phase of the 140-year Wallerstein cycle.

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Appendix 1. Data for World System Cycles: Industrial Production, War, Defense Pacts

One can find sources and updates for world level data (1495–2013) at <http://www.hichemkaroui.com/?p=2383>; for the period after 1998 at <http://www.ereport.ru/en/stat.php?razdel=country&count=world&table=ipecia&time=2>.

Table. Industrial production growth rate, % (based on U.S. CIA World Factbook)

Year	Value
1998	0.5
1999	3.2
2000	6.8
2001	0.2
2002	1.9
2003	4.1
2004	5.1
2005	6.0
2006	6.0
2007	5.0
2008	3.2
2009	-2.7
2010	4.6
2011	4.5

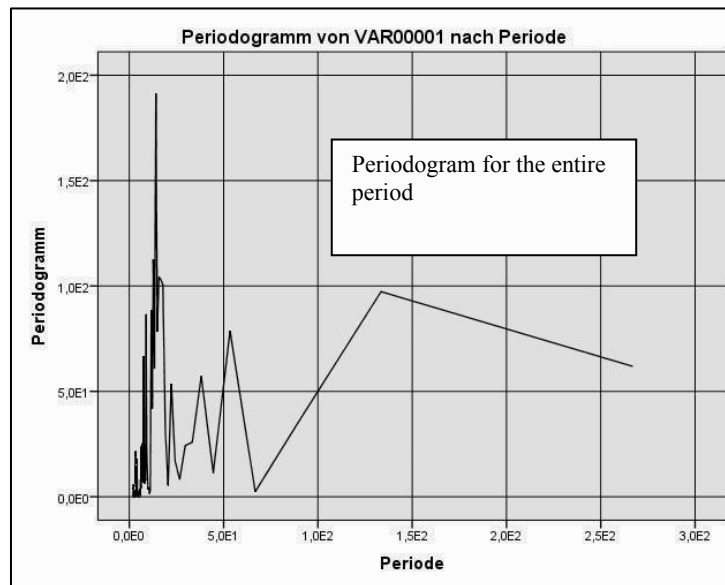
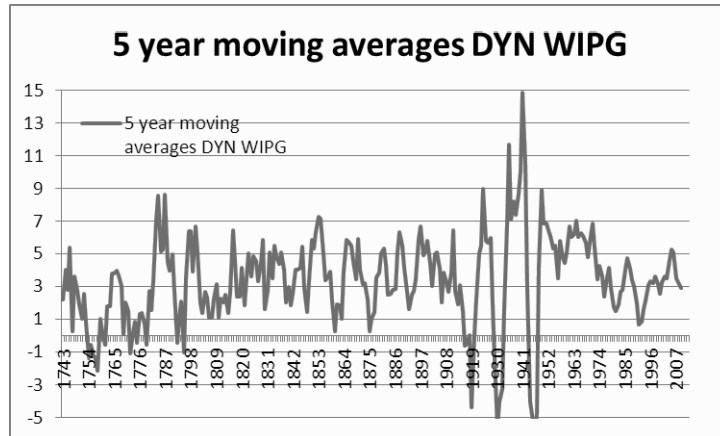
Appendix 2. Data for the War Cycle 1495 – Today

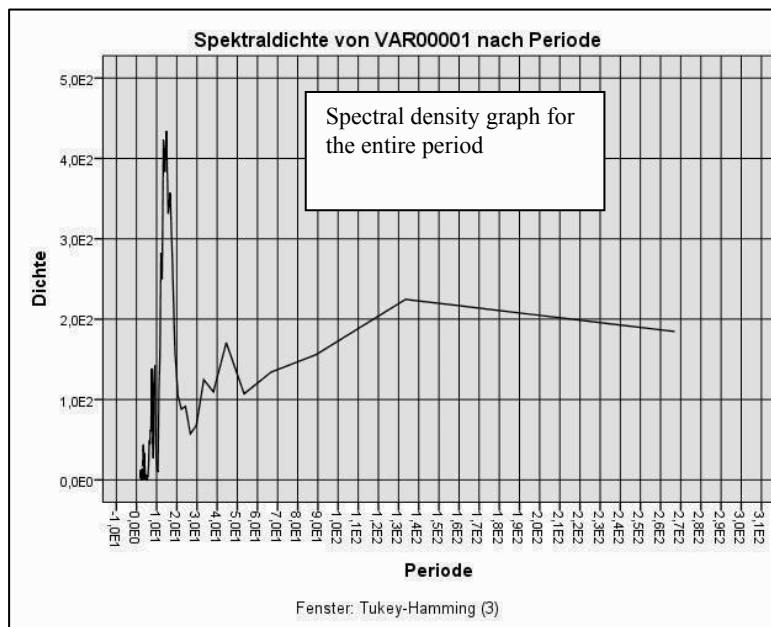
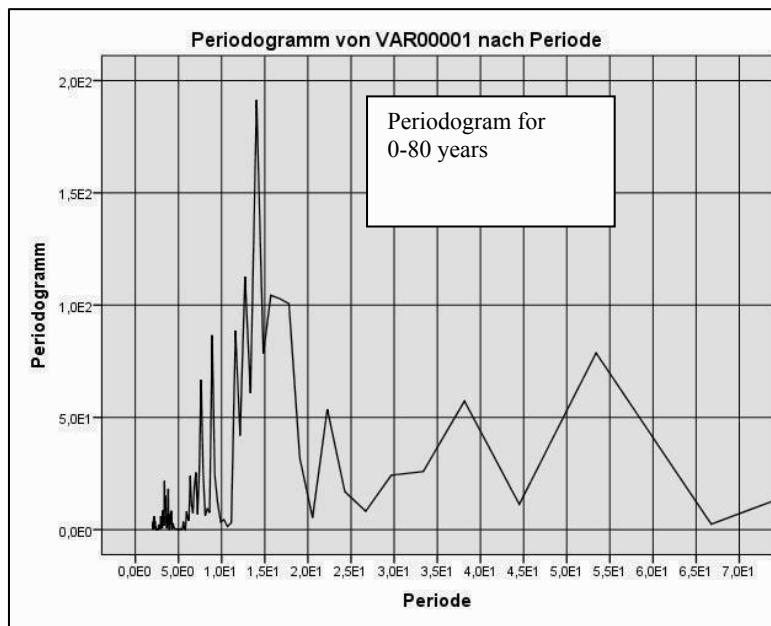
The great question, already raised by Joshua Goldstein, is whether wars correspond as well to such a pattern. Allowing for changes in global battle technology, which greatly increased military and non-military battle fatalities, we performed a transformation of the original data, based on the 10th root of annual battle fatalities from major power wars. The 130 to 160 years cycle of major power wars seems to be confirmed again, with shorter cycles in between.

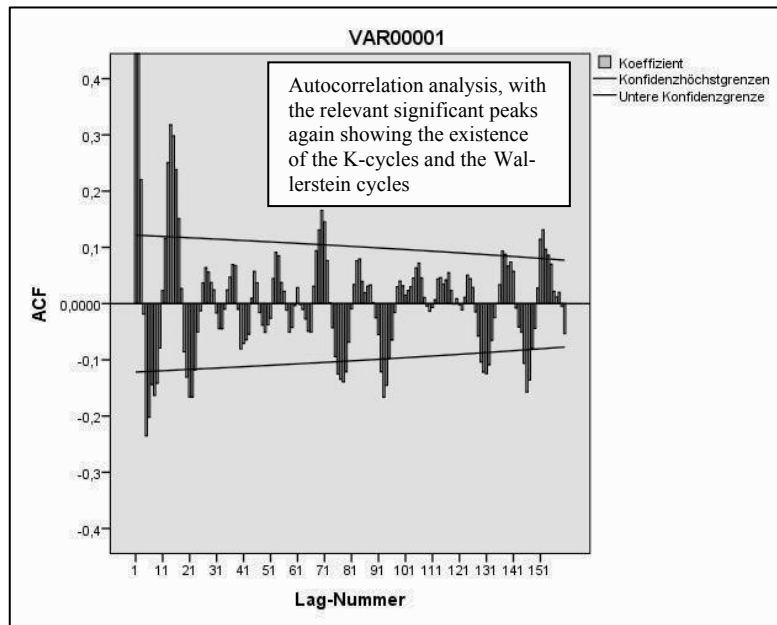
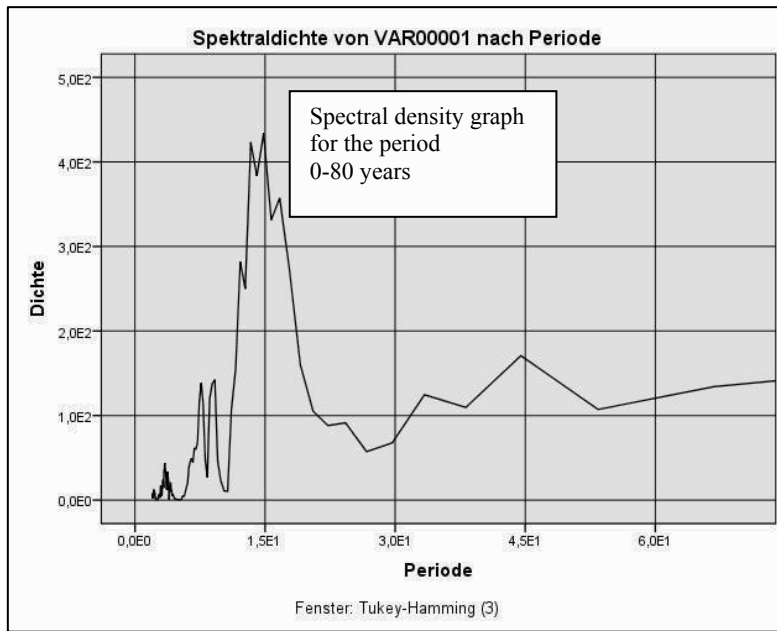
For the war data since 1495 see Goldstein (1988) for the period until 1975; and PRIO Oslo (http://www.prio.no/page/CSCW_research_detail/Programme_detail_CSCW/9649/45656.htm) for the period after 1975. See also <http://www.hichemkaroui.com/?p=2383>.

Appendix 3. Replicating Korotayev and Tsirel's World System Analysis of Global Industrial Production Growth

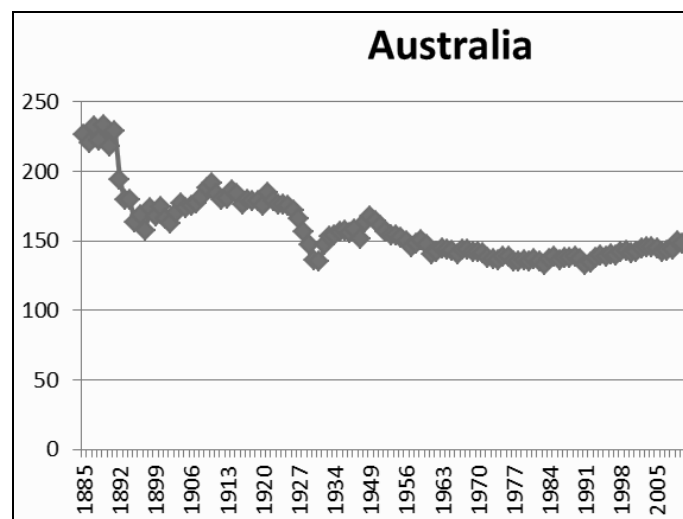
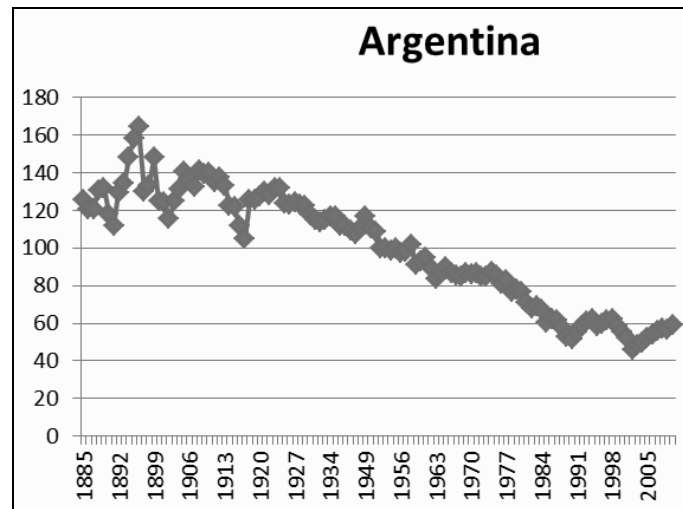
Korotayev and associates recently used a 5-year moving averages procedure. On a world level, we get the following graph of world industrial production growth (DYN WIPG):

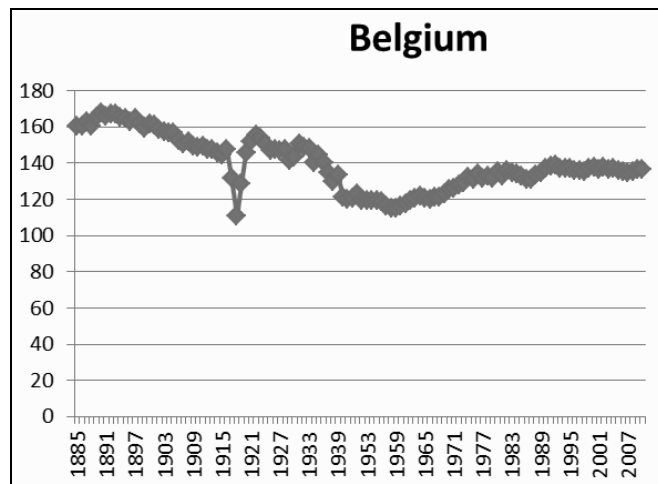
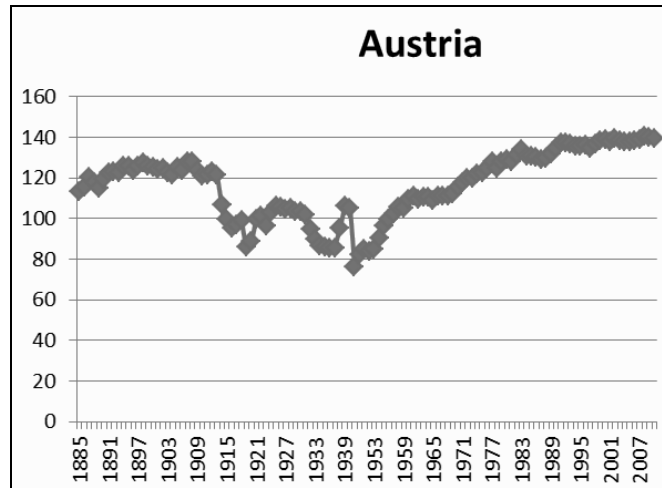


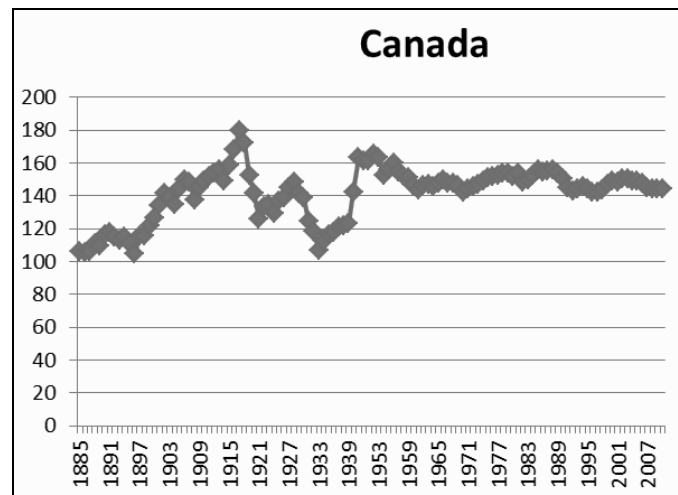
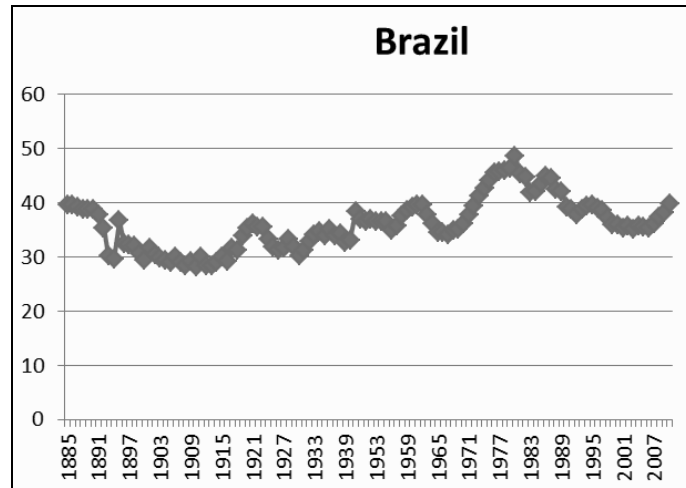


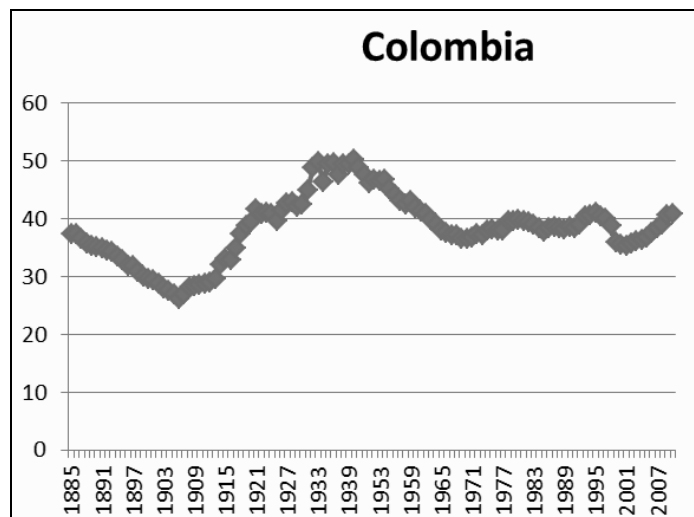
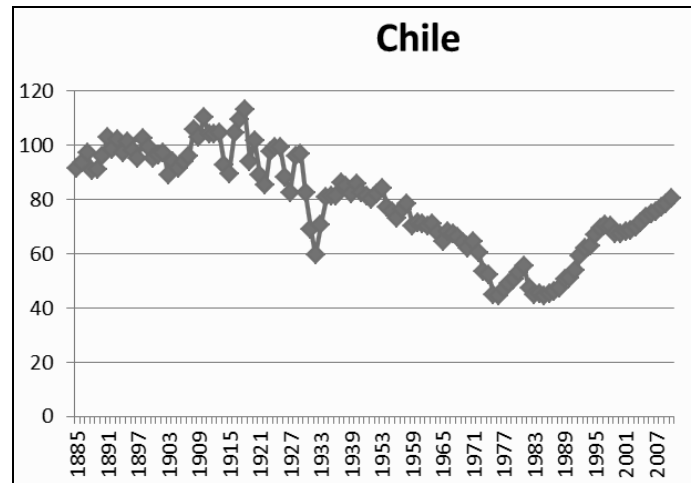


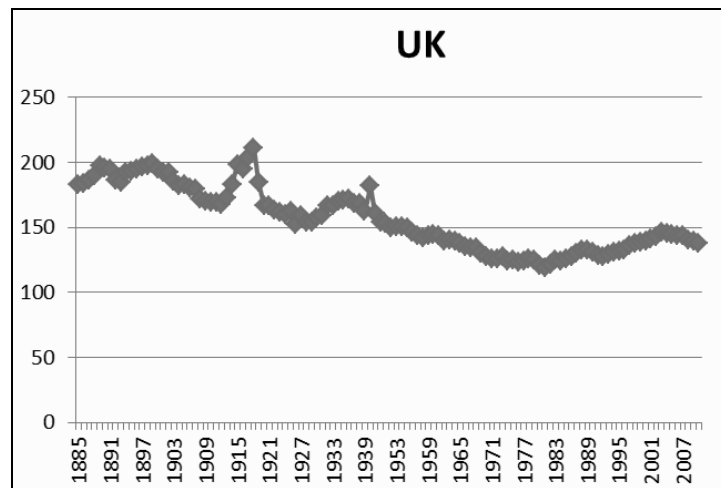
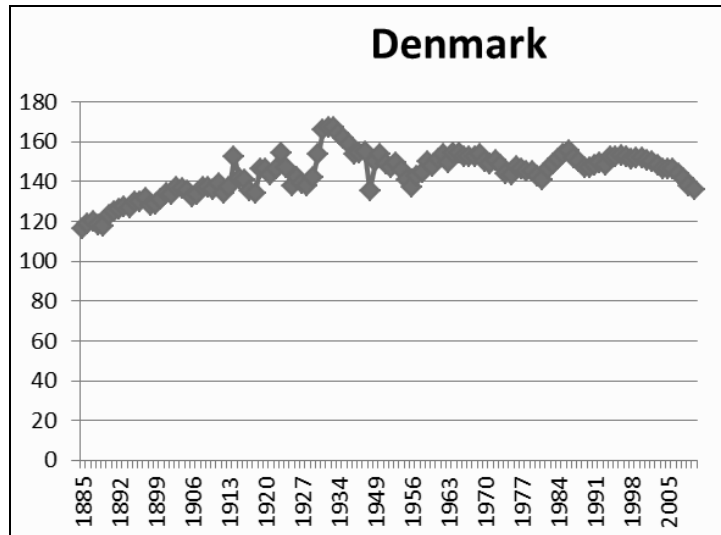
Appendix 4. The Akamatsu Cycles Compared: Country GDP Per Capita in Real Purchasing Power Parity as a Percentage of the Global Average for 31 Countries in the World System since 1880

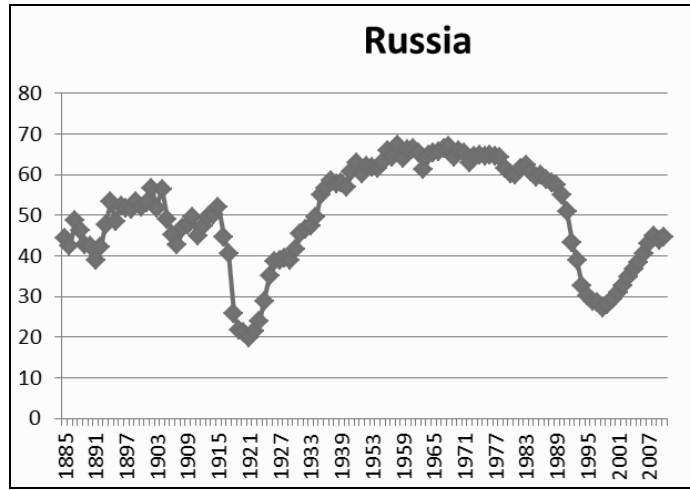


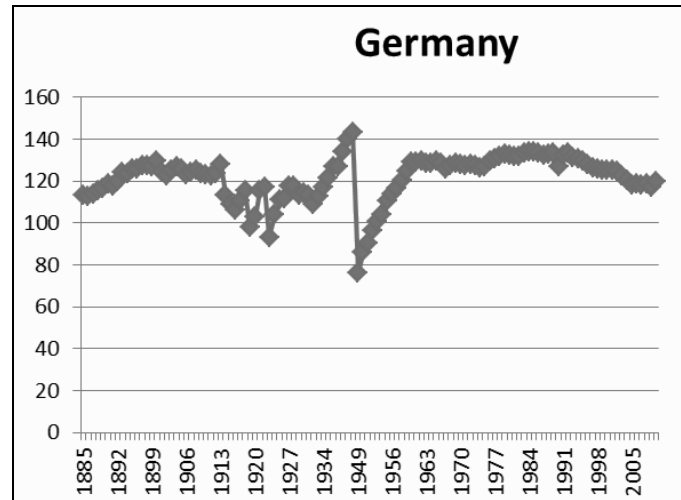
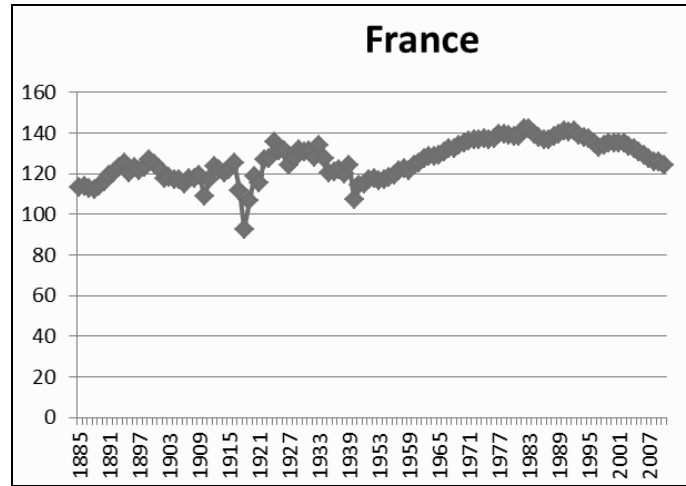


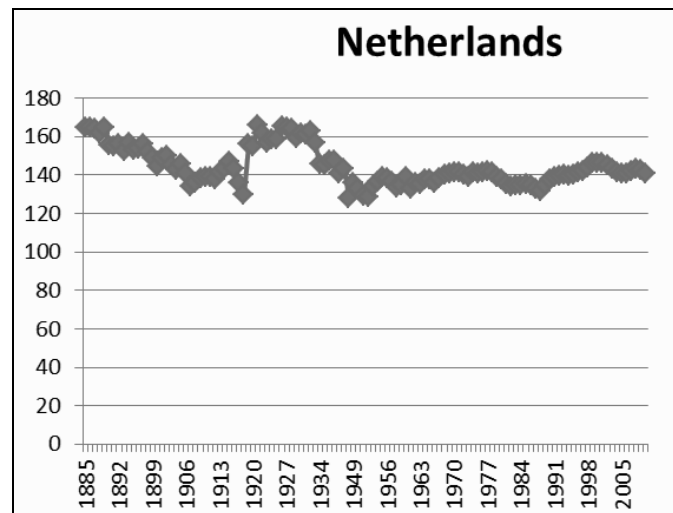
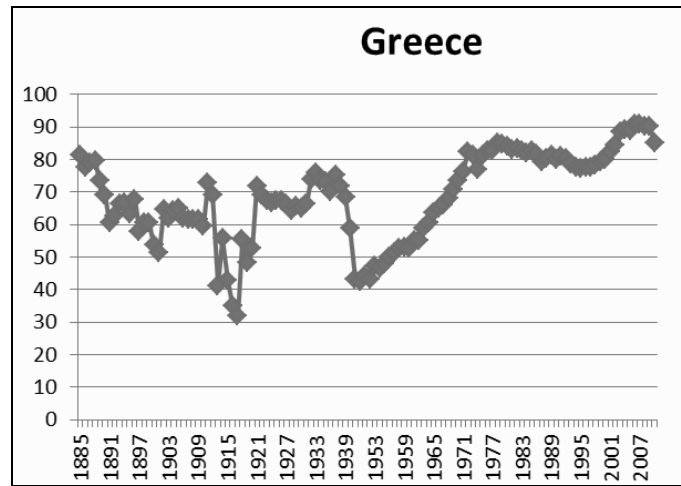


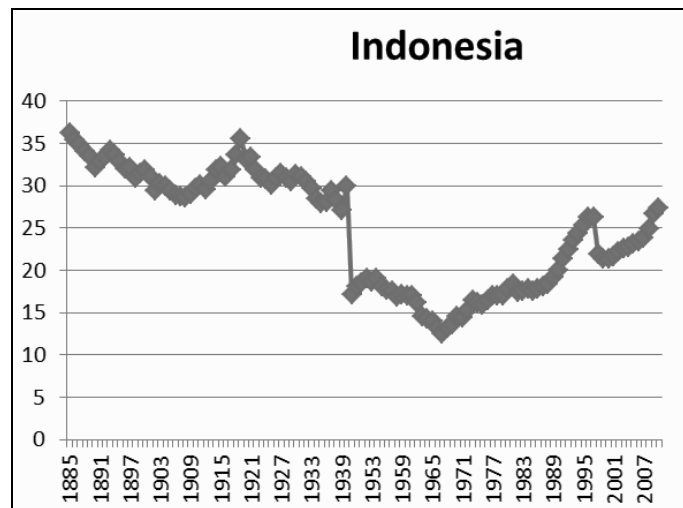
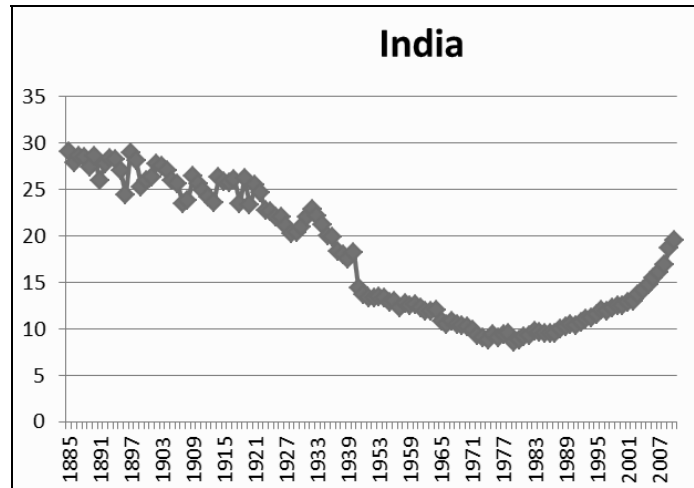


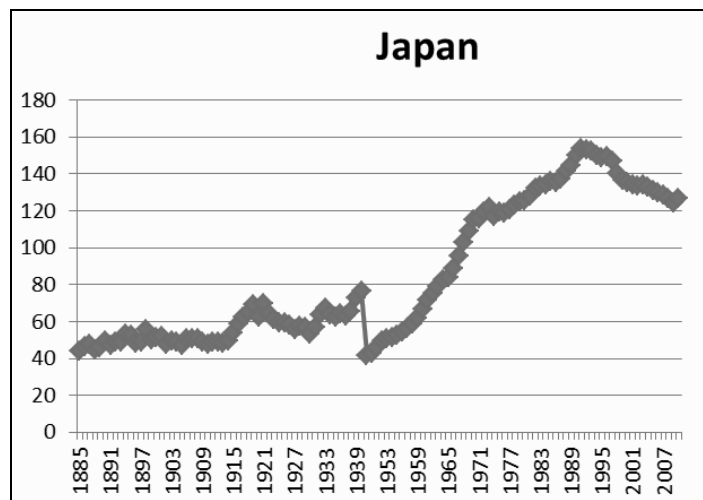
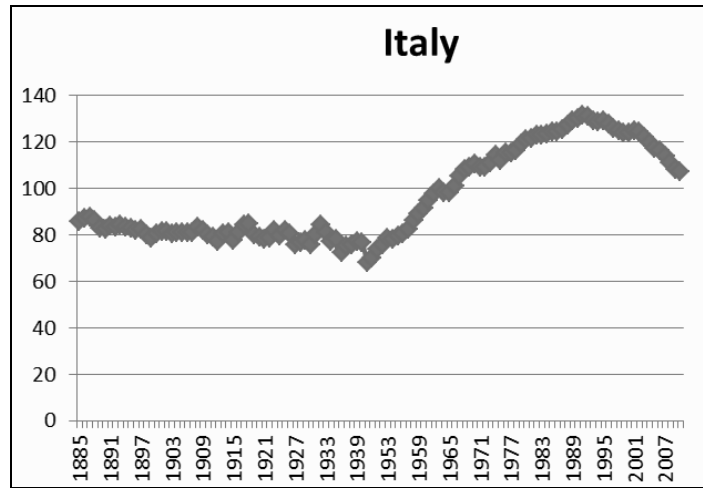


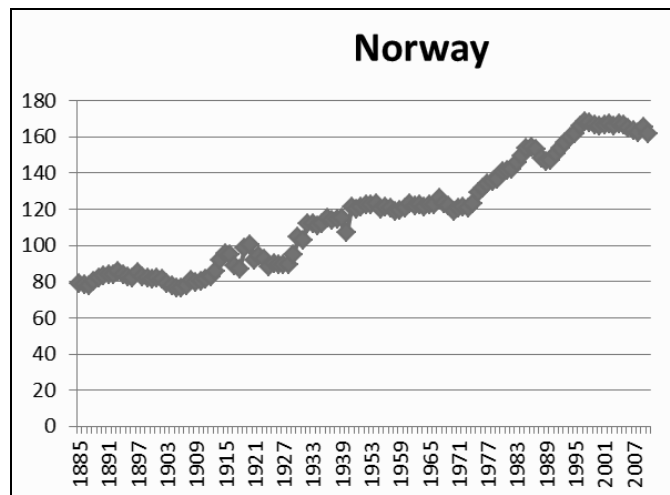
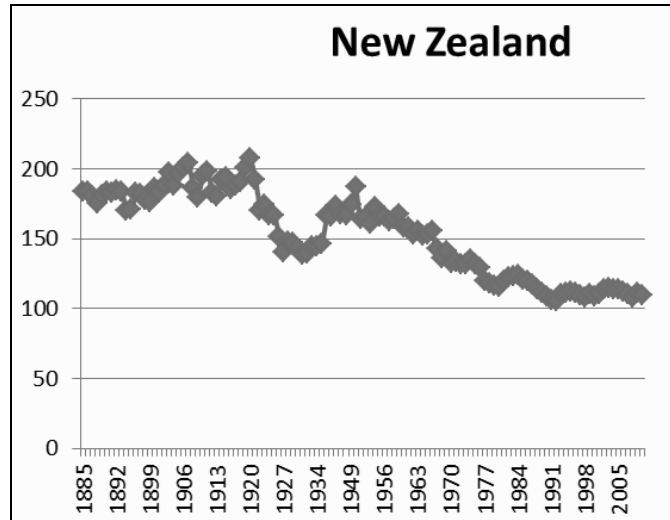


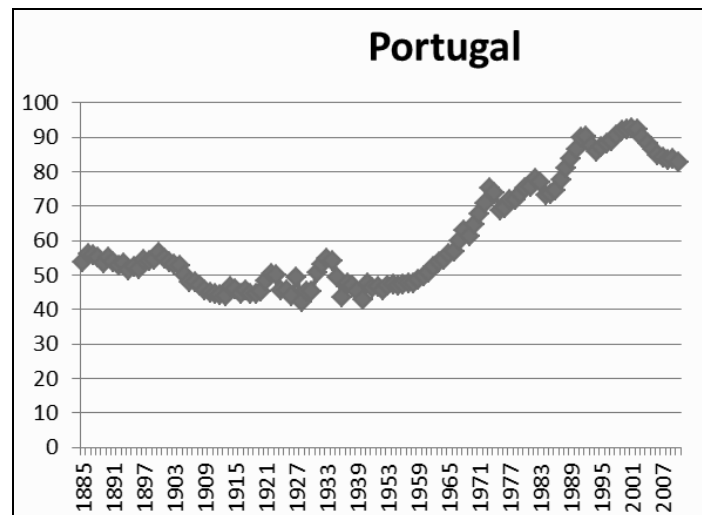
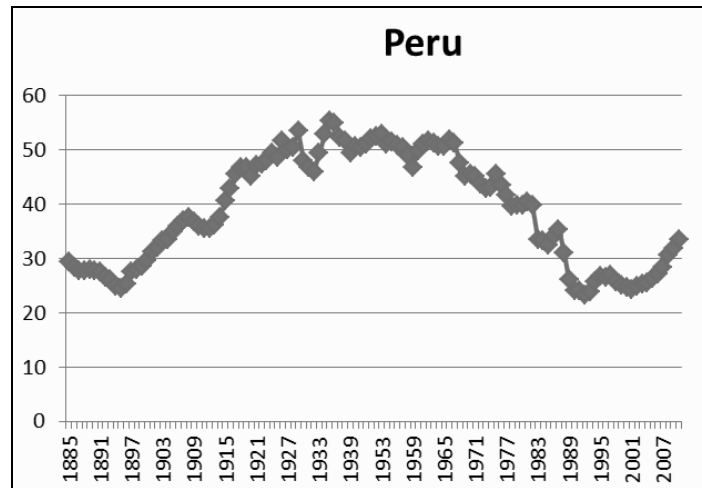


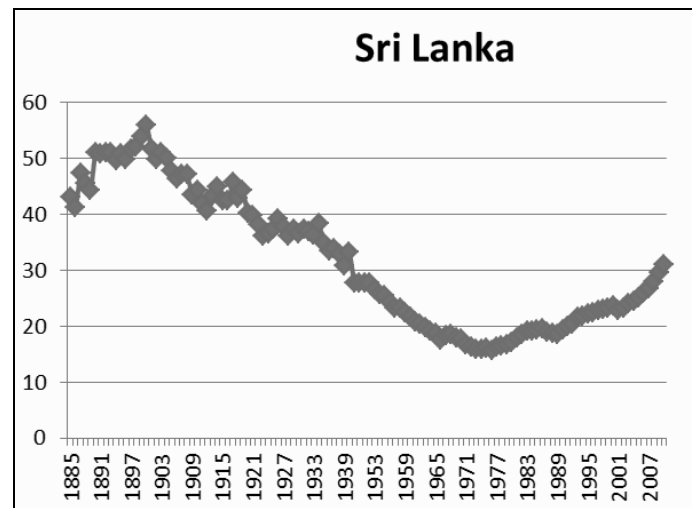
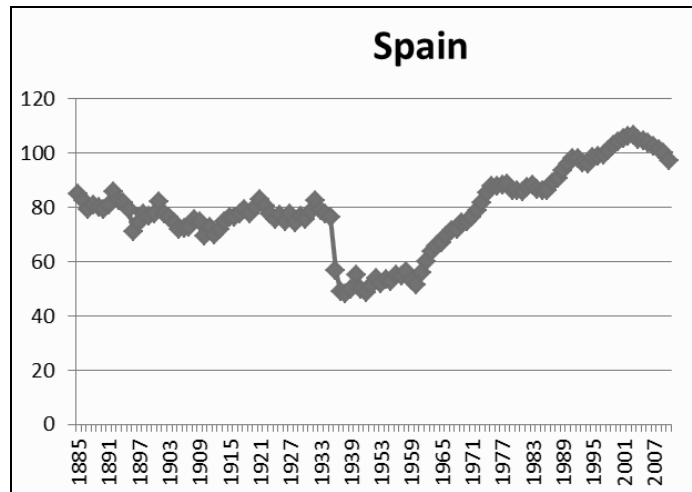


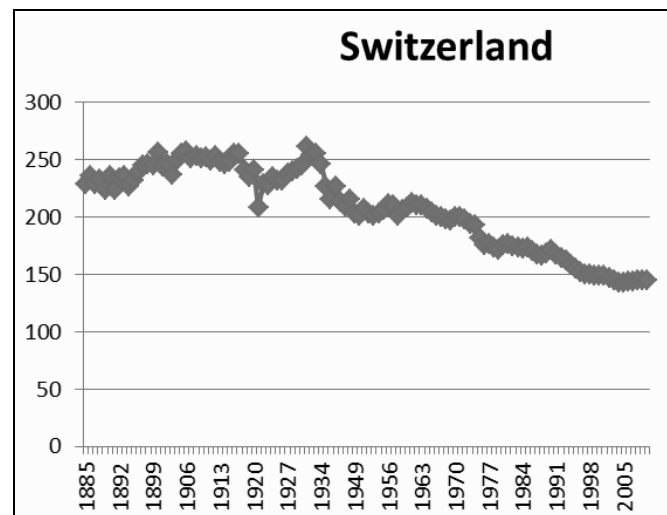
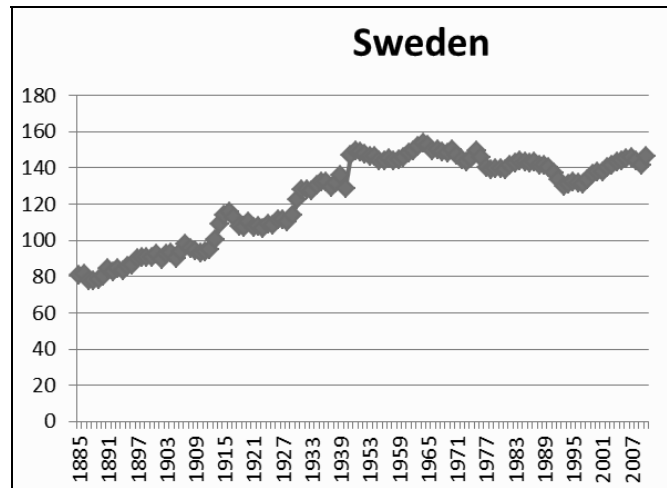


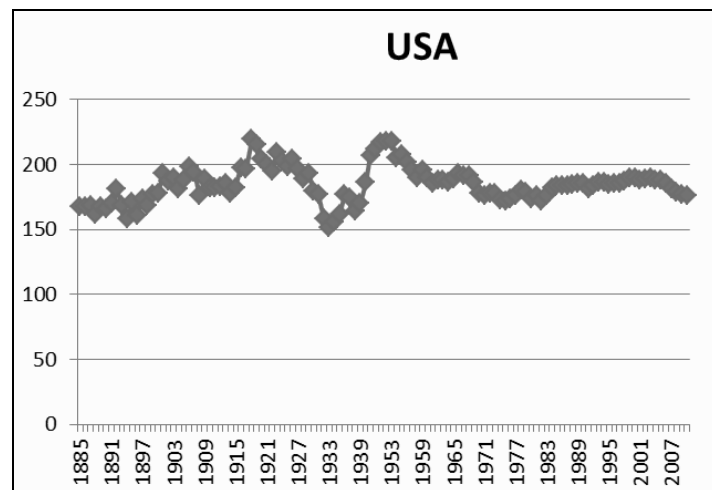
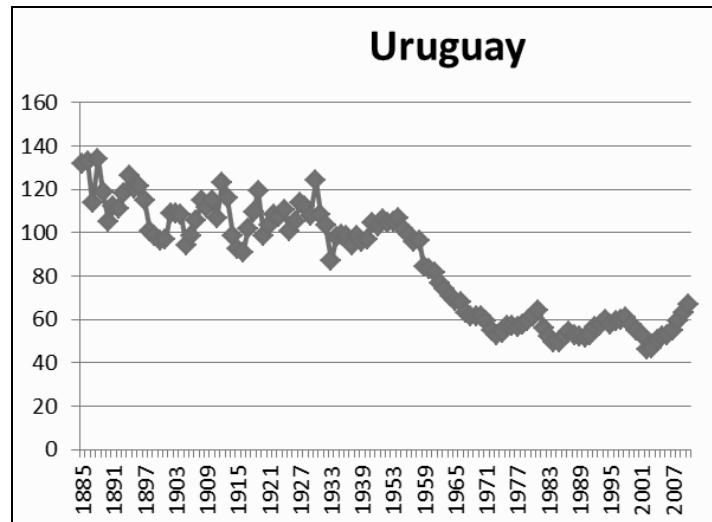


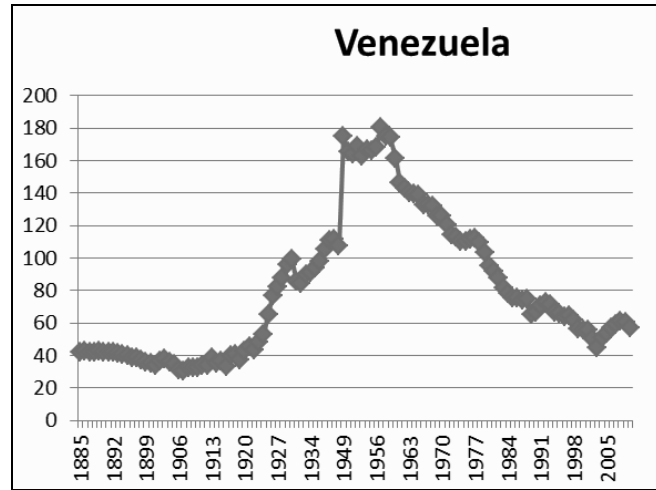






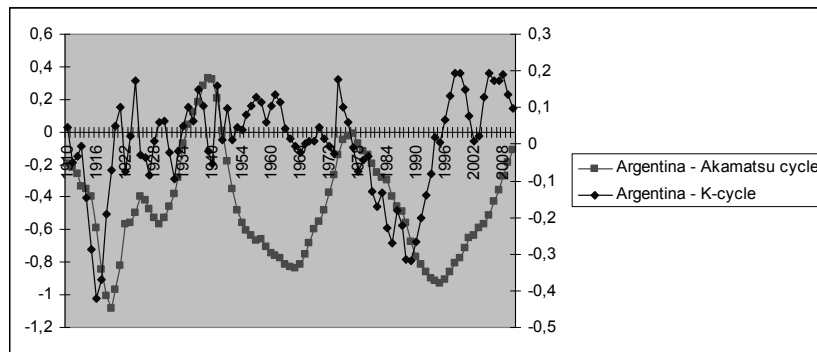


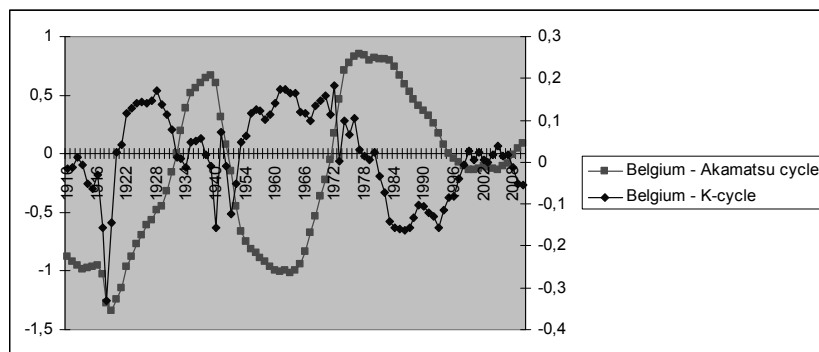
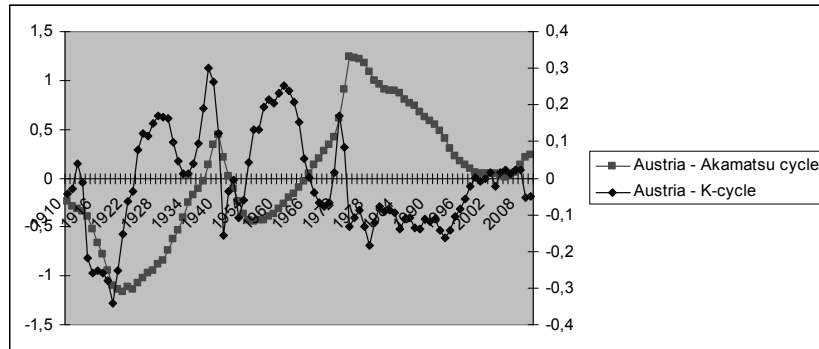
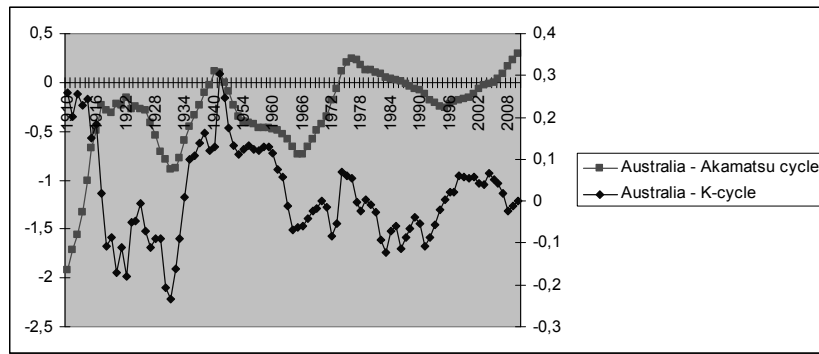


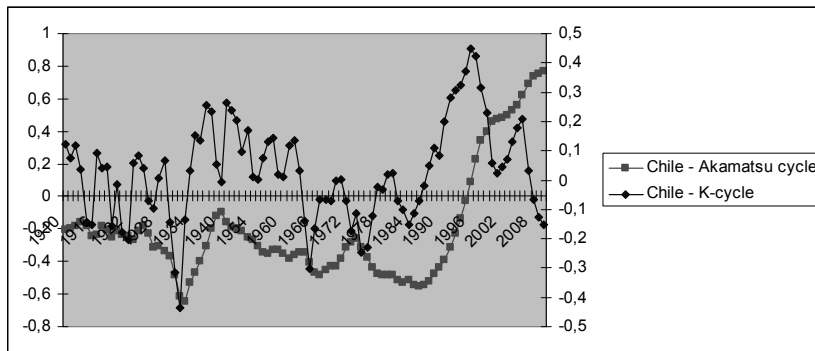
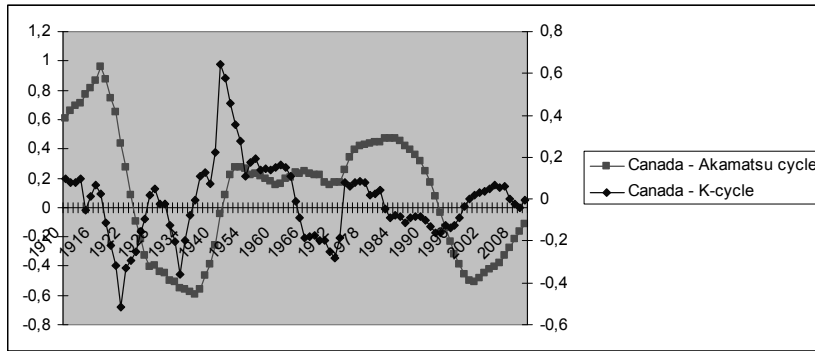
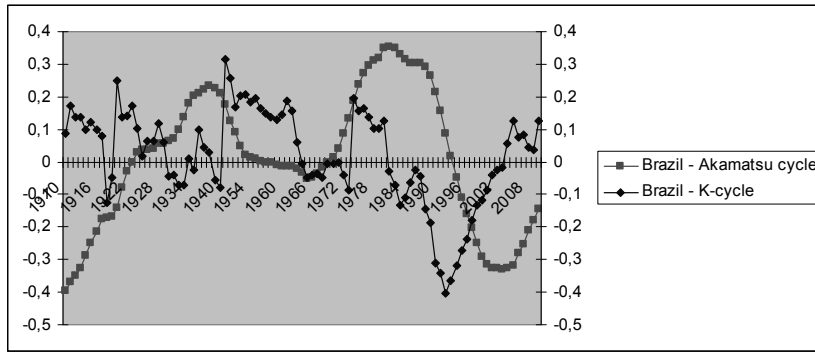


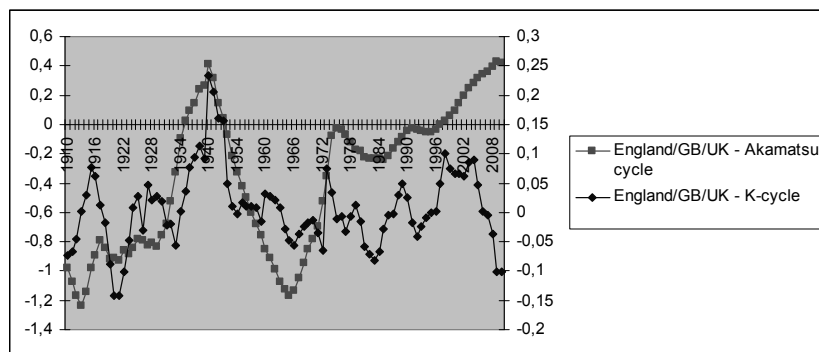
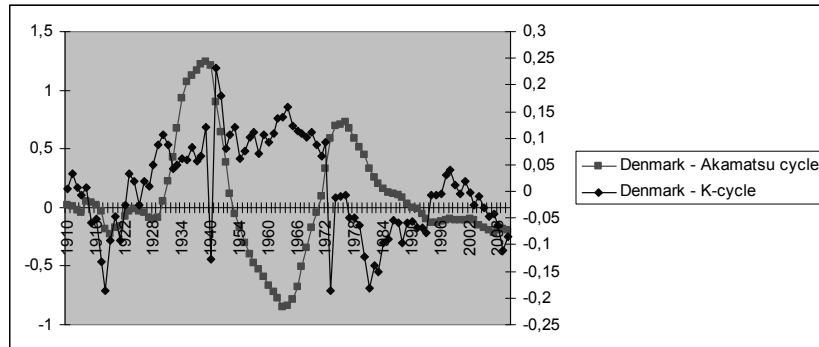
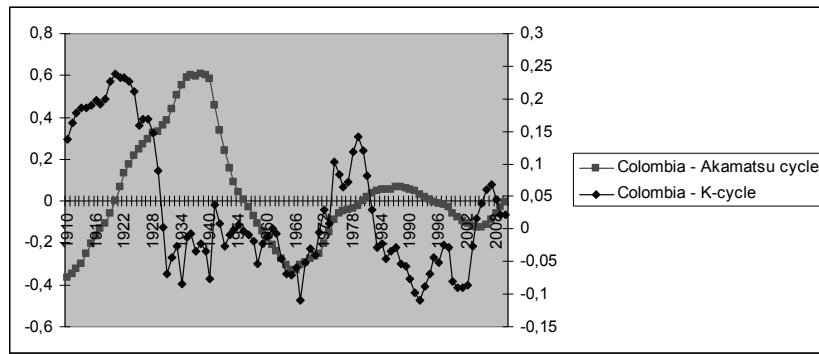
Appendix 5. Rolling Regressions – 25-Year Rolling Regression Slopes

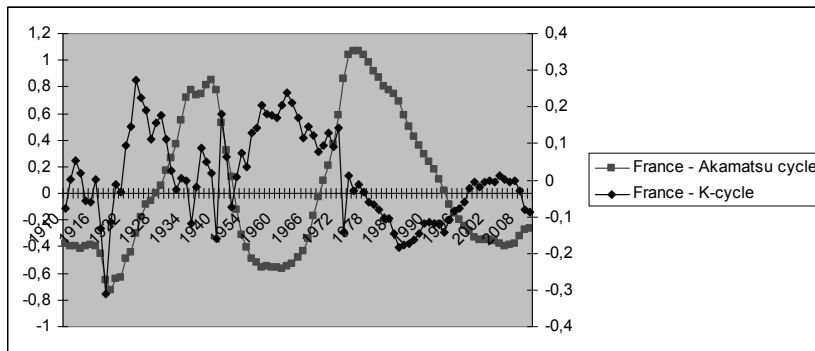
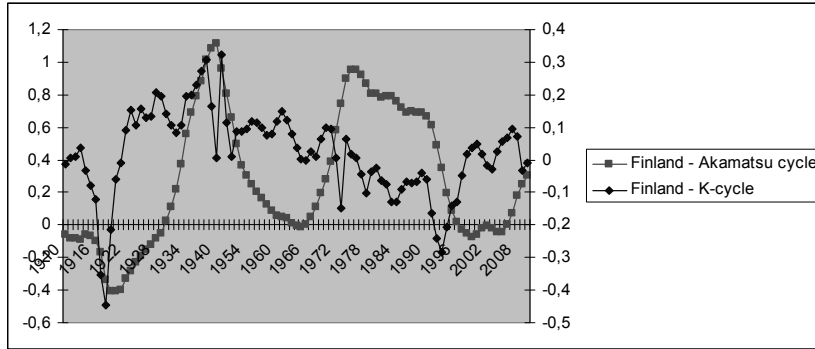
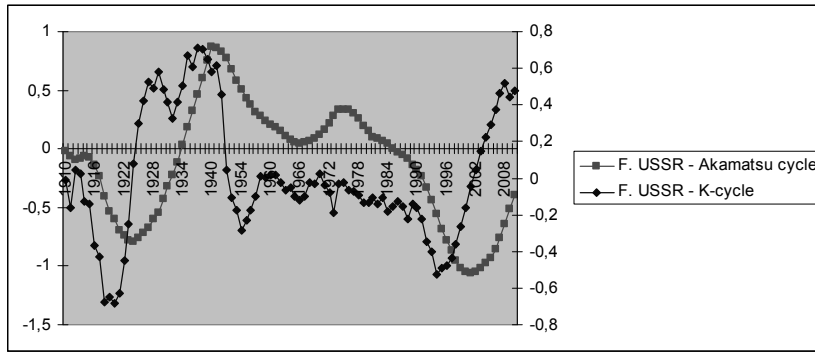
Akamatsu cycle (cycle of income convergence with the capitalist center, the USA; left hand scale); Kondratieff cycles (right hand scale).

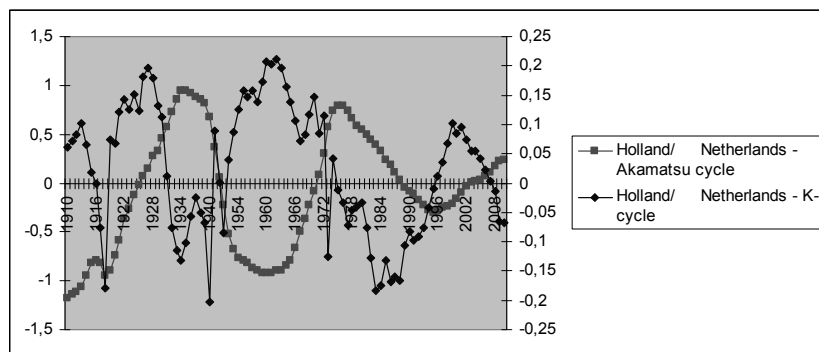
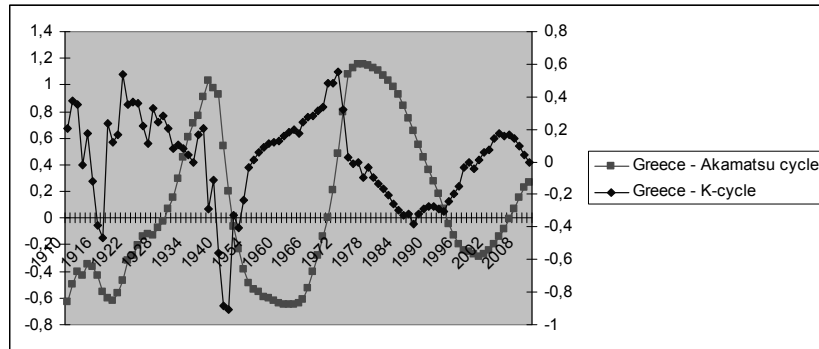
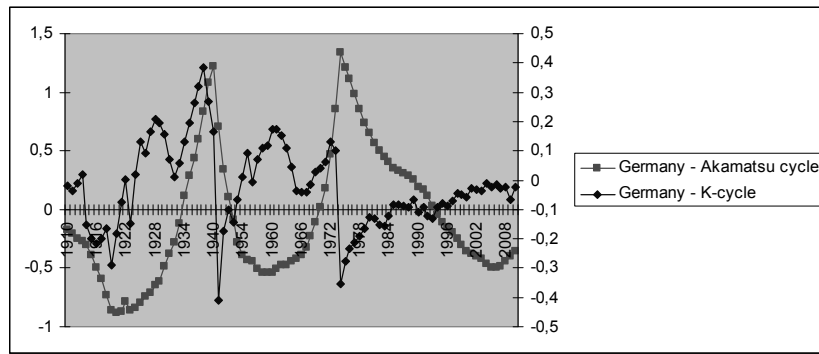


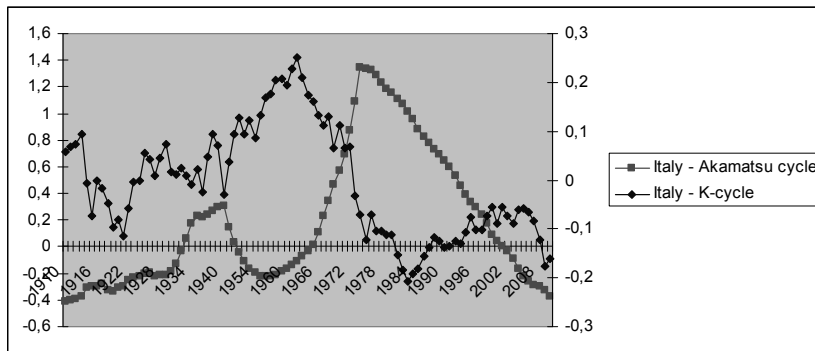
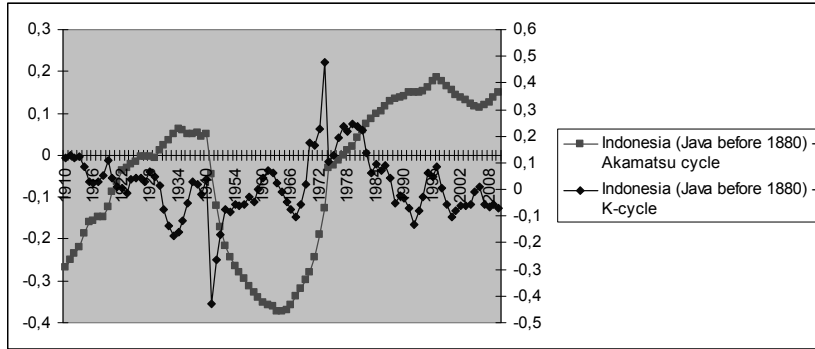
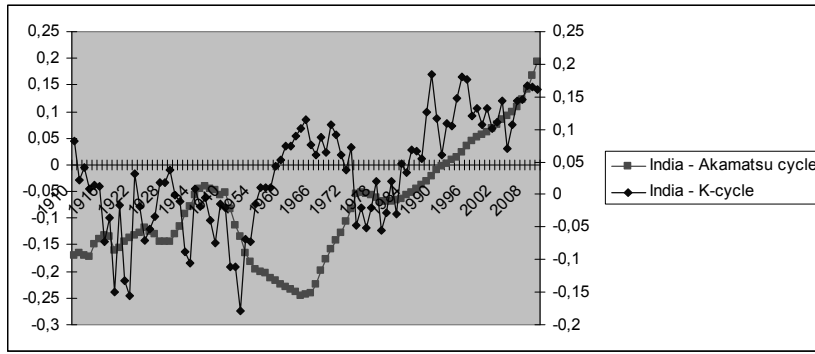


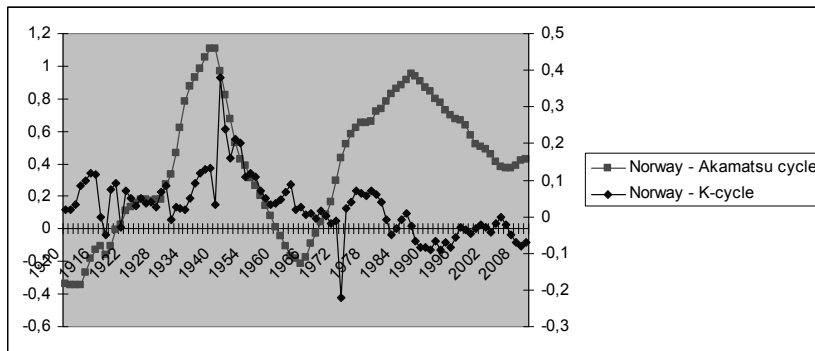
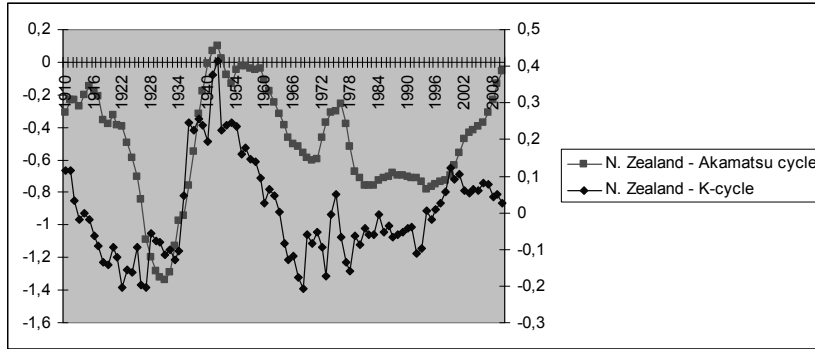
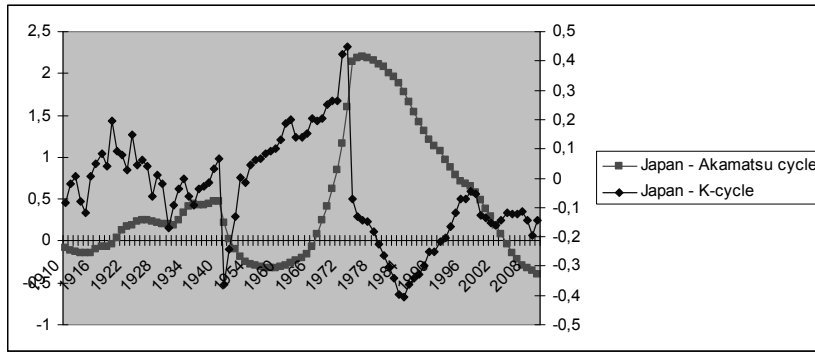


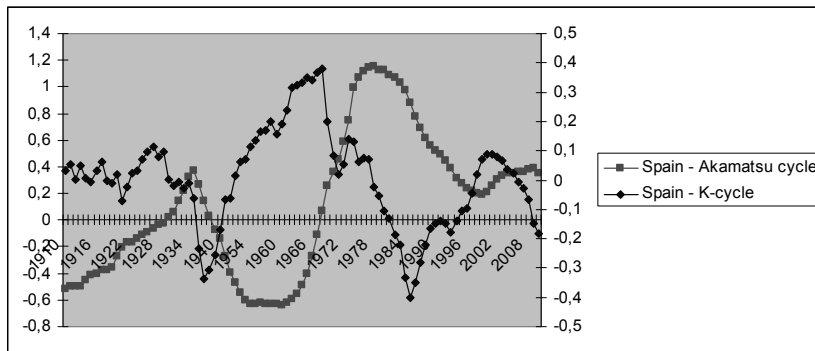
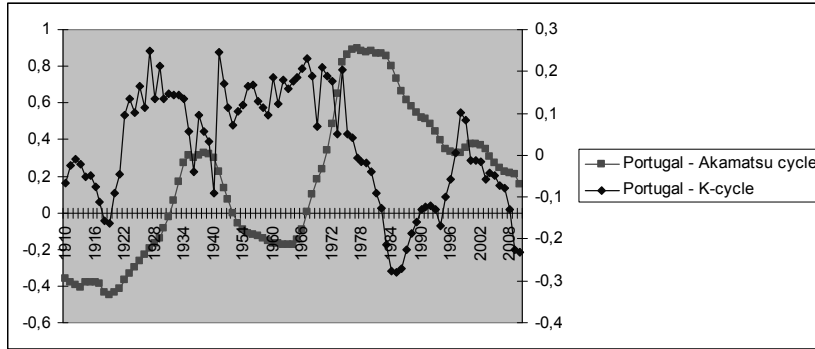
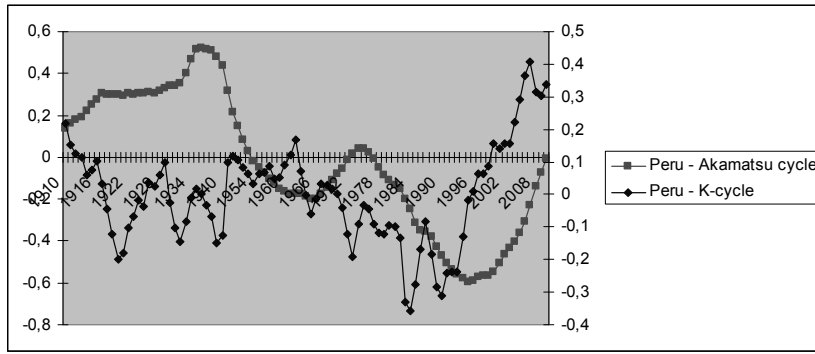


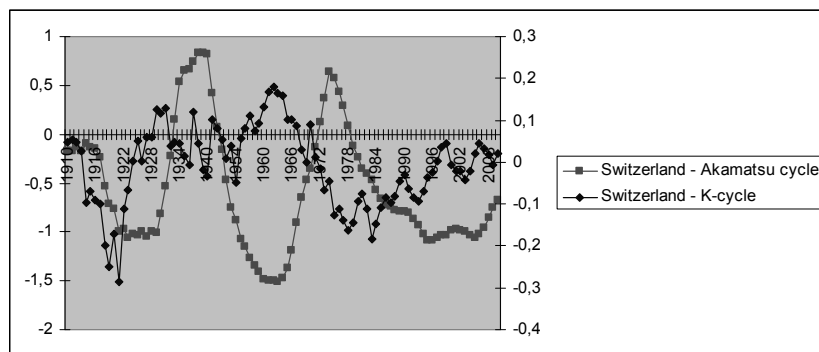
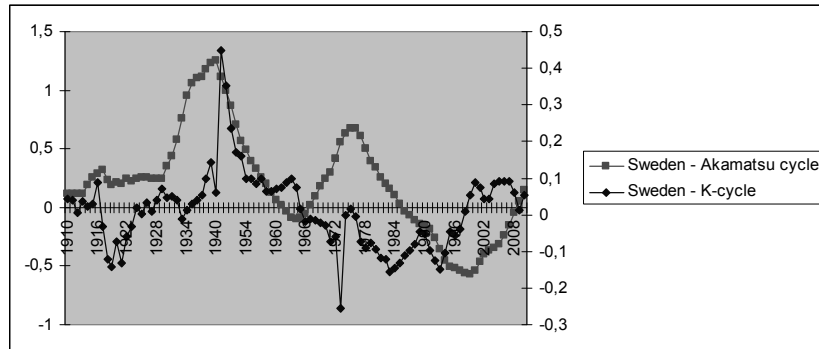
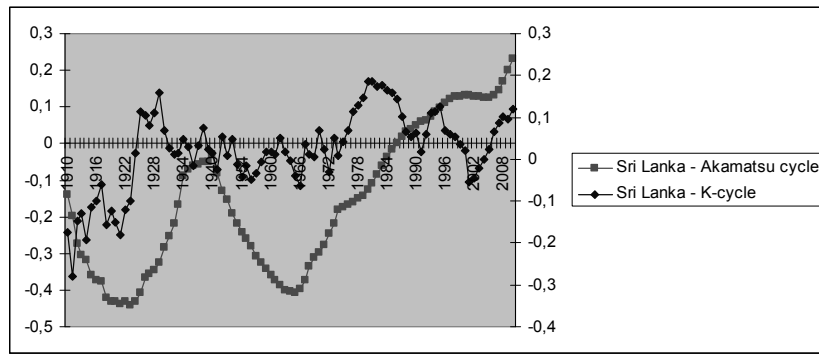


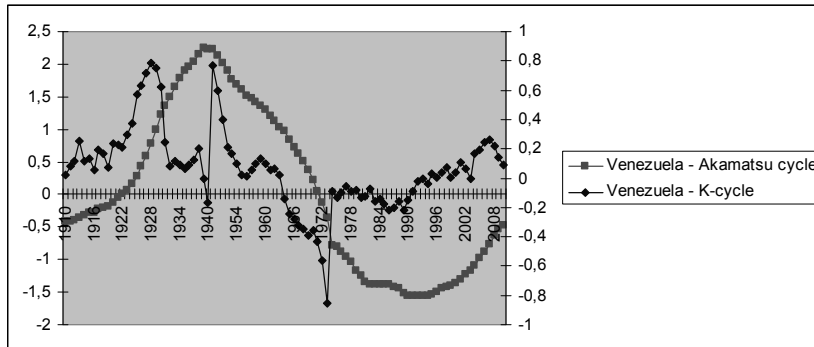
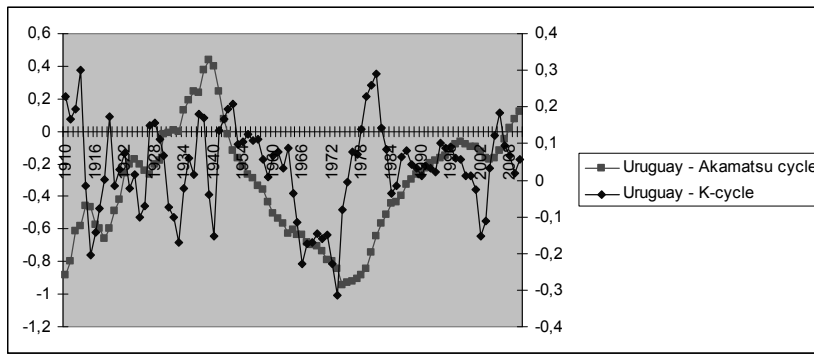




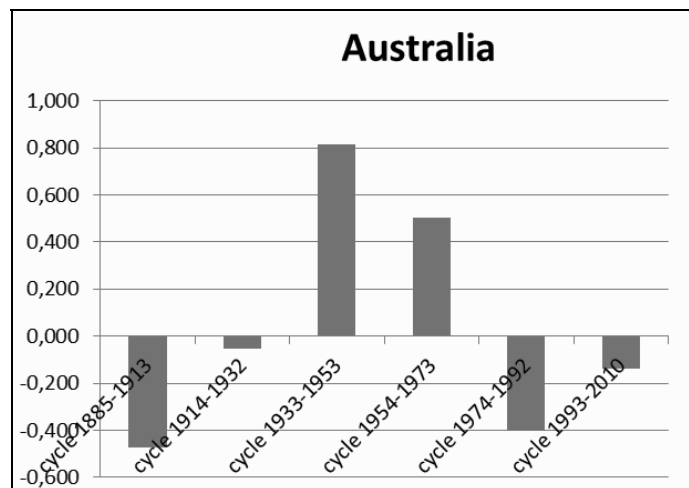
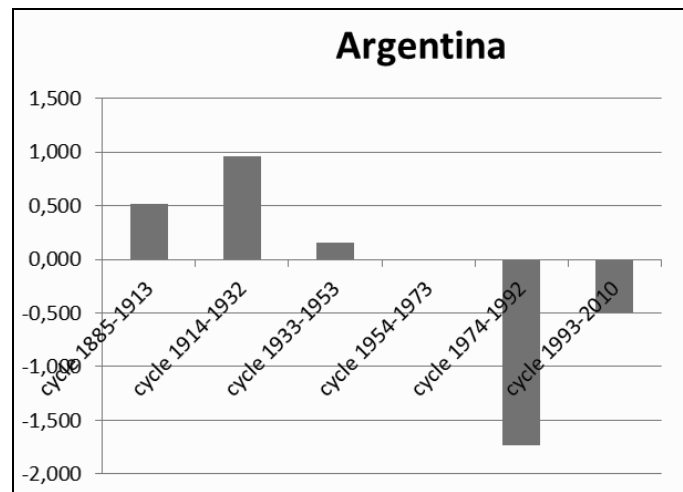


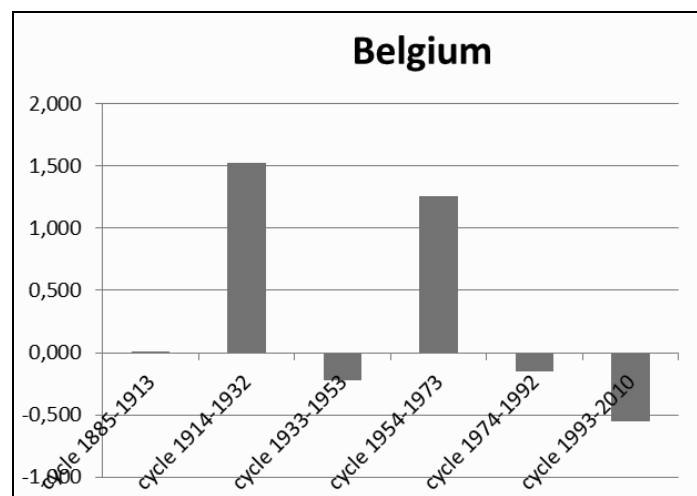
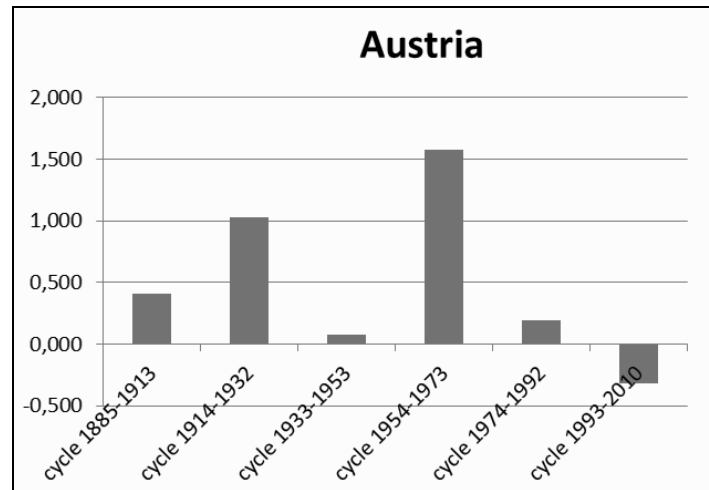


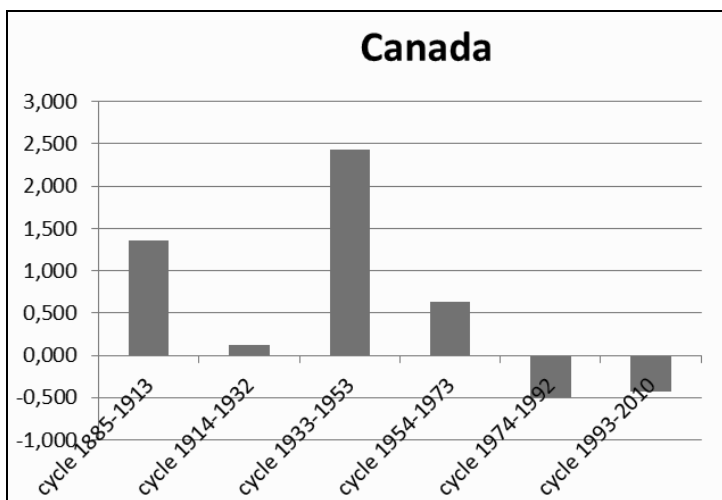
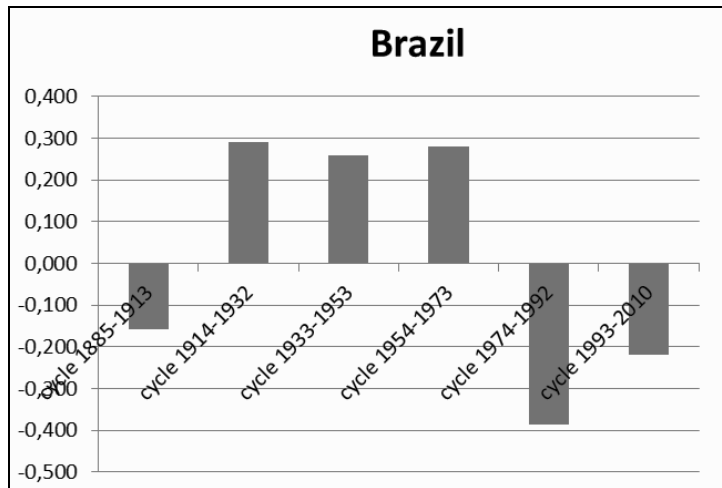


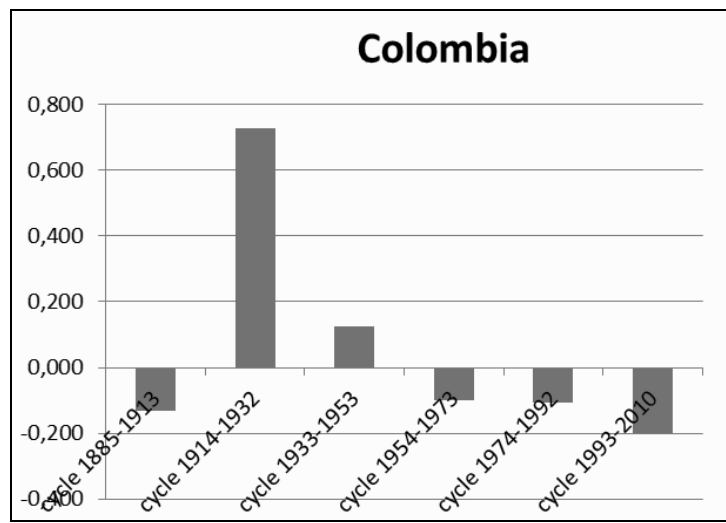
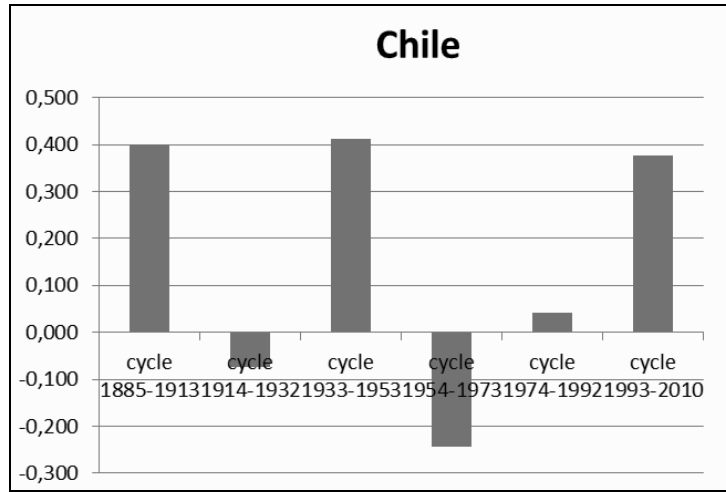


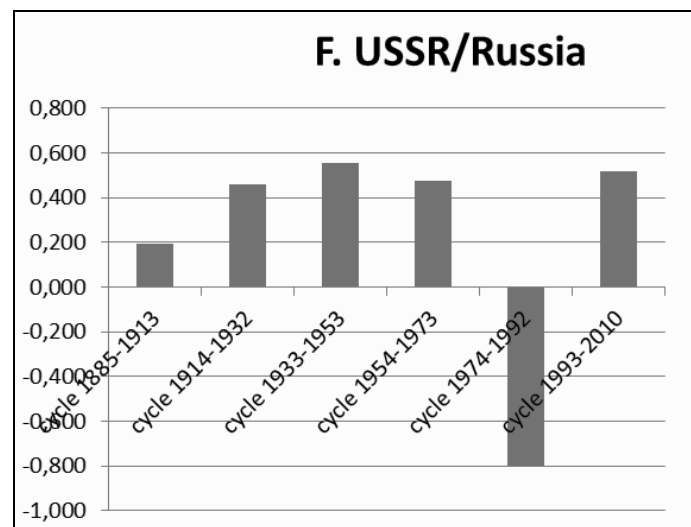
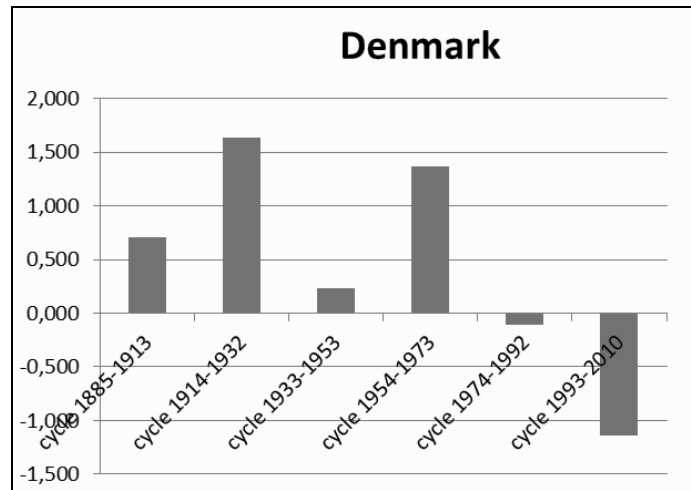
Appendix 6. Linear Time-Series Convergence Regression Slopes of the Countries of the World System in Comparison with the GDP Per Capita of the United Kingdom

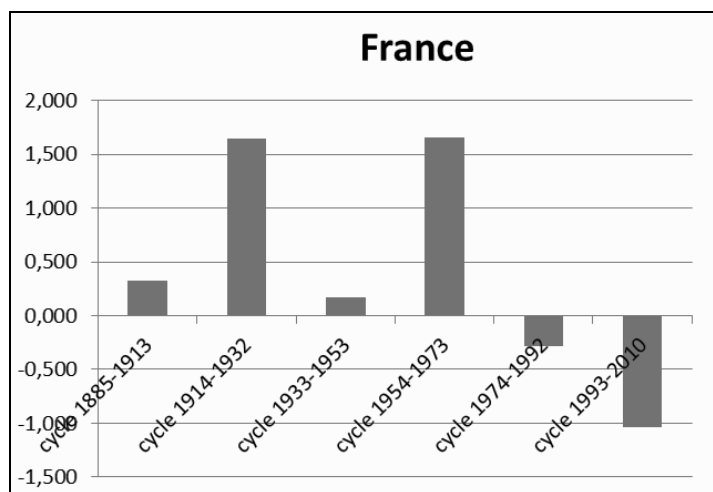
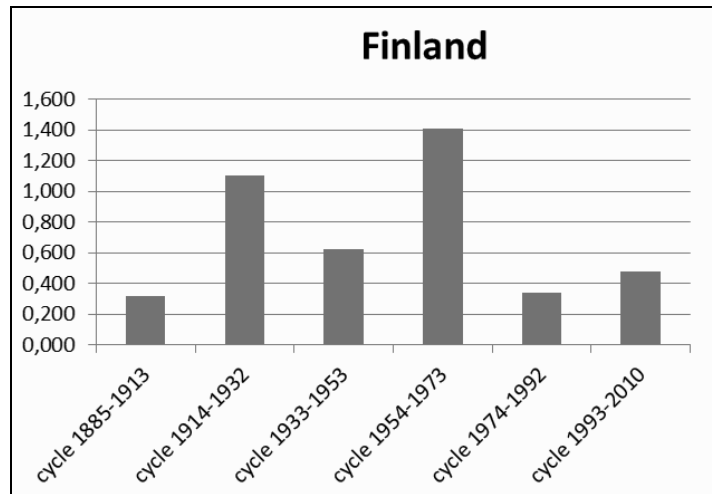


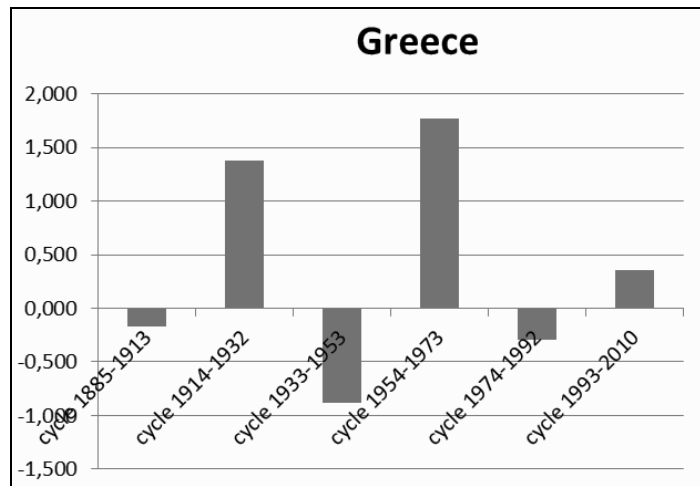
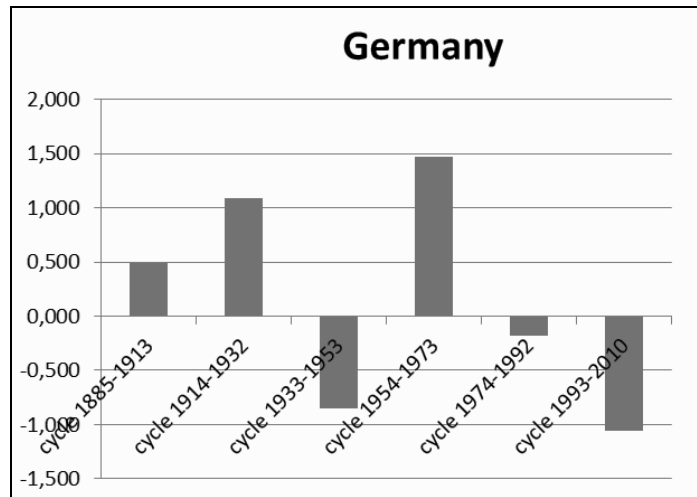


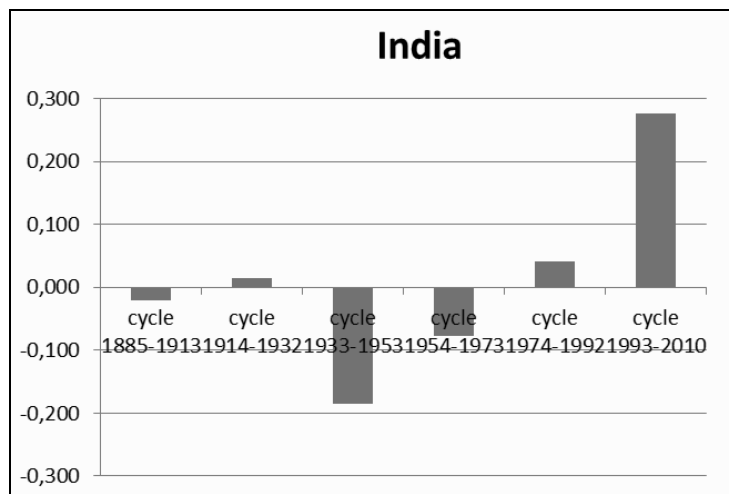
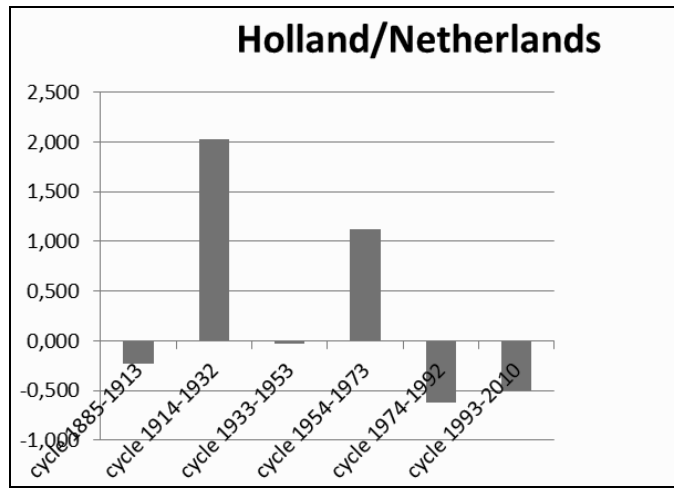


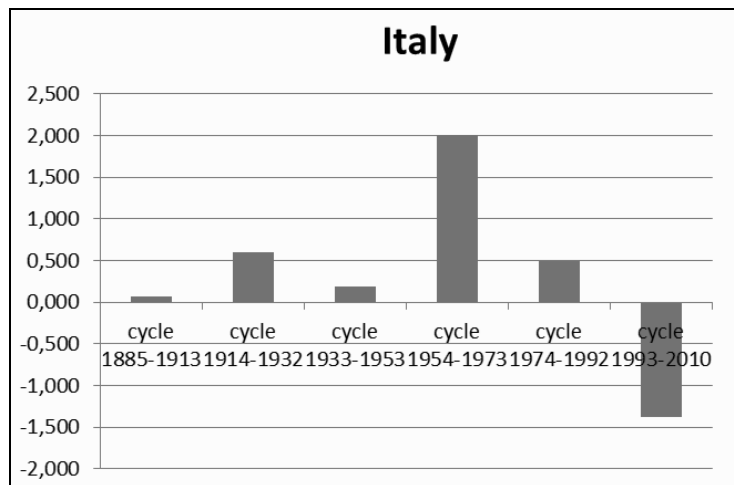
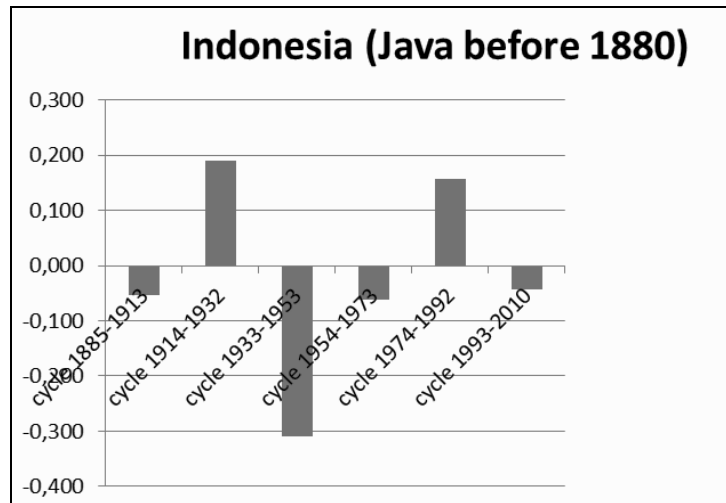


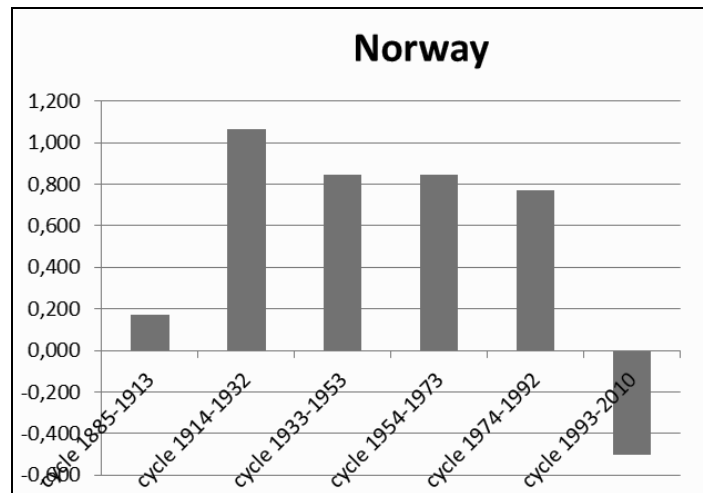
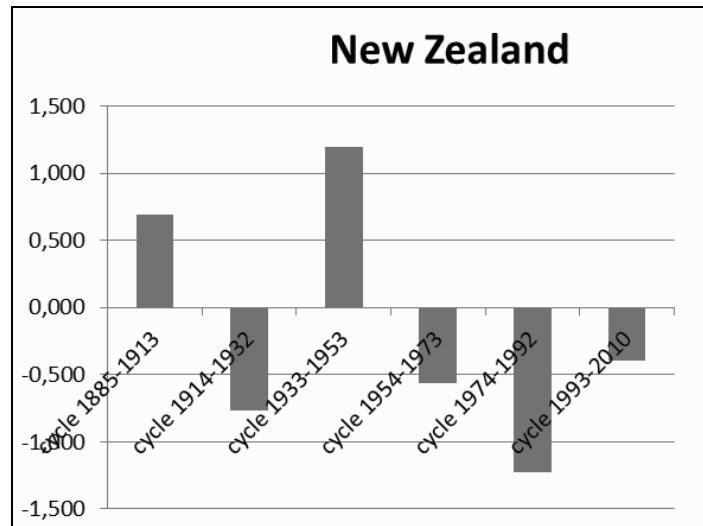


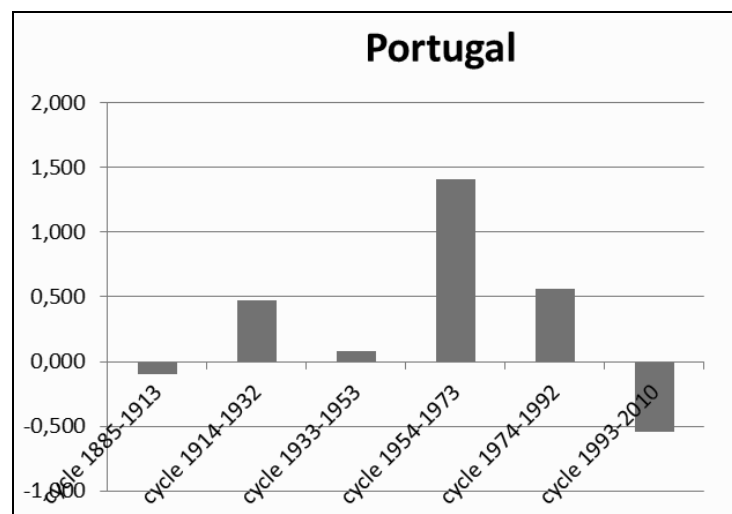
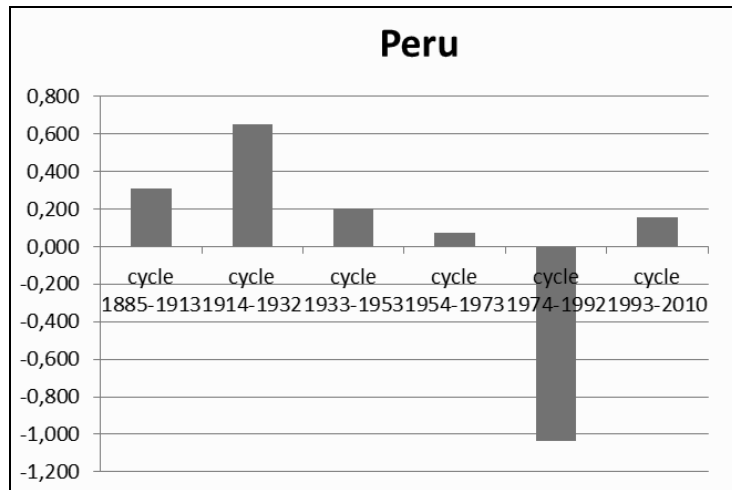


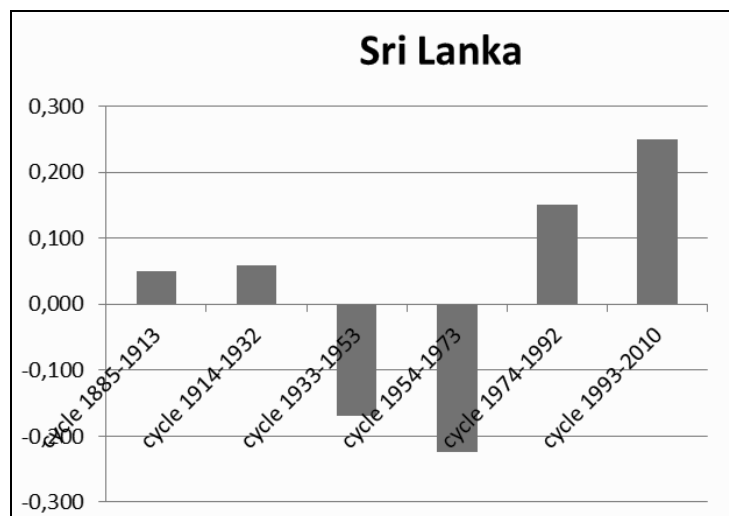
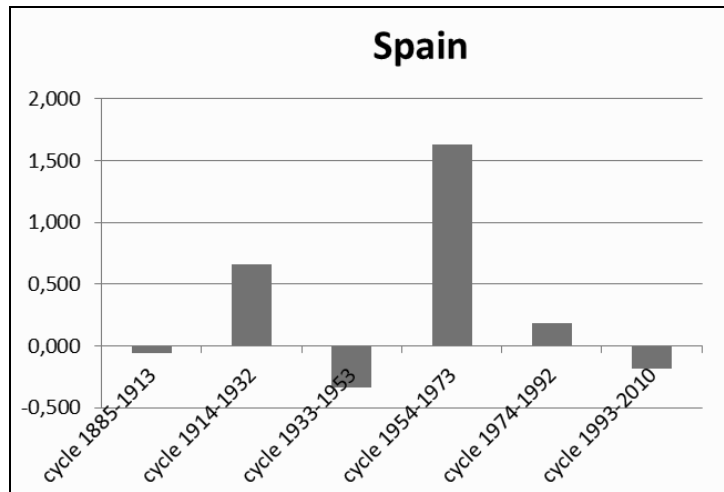


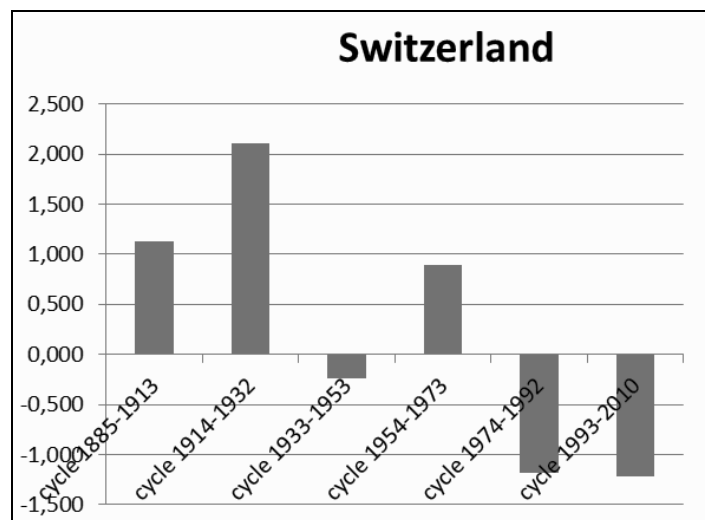
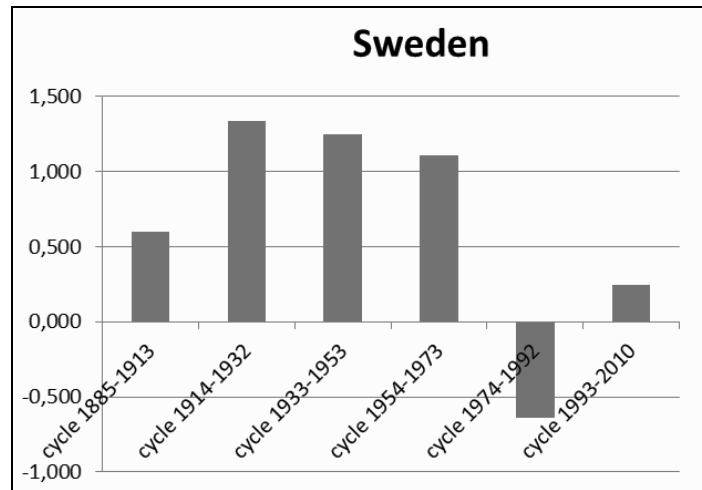


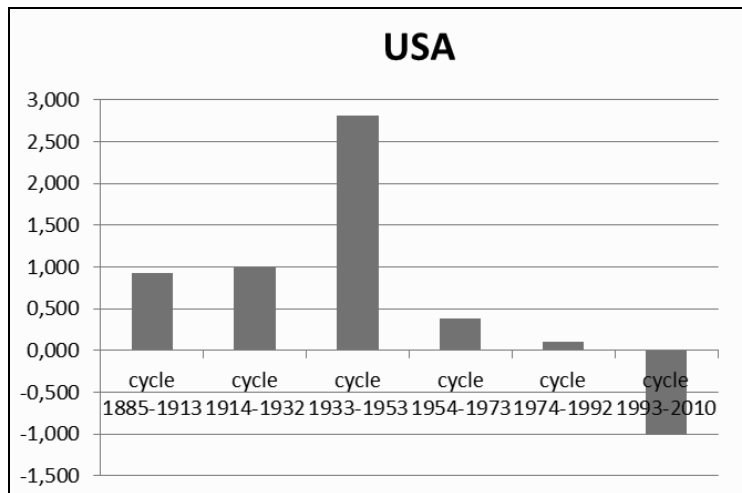
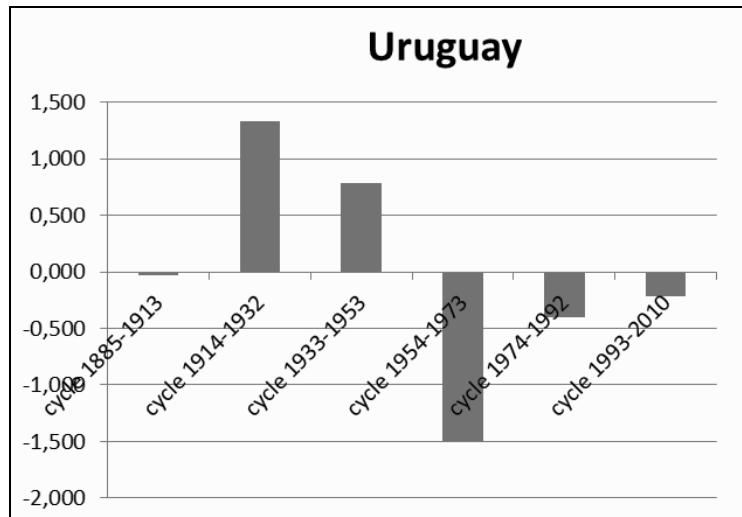


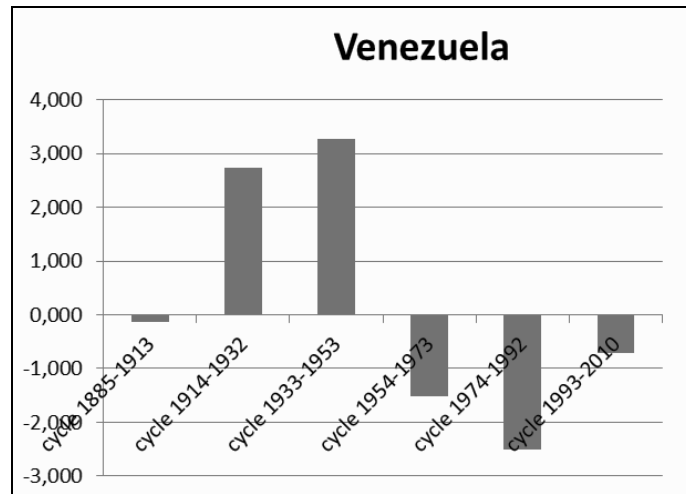












6

Long Waves in American Politics. Part One: Takeoff Presidencies

Brian J. L. Berry and Denis J. Dean

Abstract

Relationships between long waves and cyclicalities in American politics are explored. Particular attention is paid to 'takeoff presidencies', as modeled by Edward Jayne. These presidencies occurred in the decade following a long-wave trough and brought with them visions of liberty that have negated the preceding vision. The question is raised as to whether the Obama presidency, occurring in the same long wave phase as previous takeoff presidencies will bring yet another redefinition of liberty to America.

Keywords: *Kondratieff, cycles, takeoff presidencies, Jayne, longwave clock, federalism, transcendentalism, progressivism, alienationism, Obama.*

Introduction

The reelection of Barack Obama to the U.S. presidency in 2012 was hailed by his supporters as signaling 'the irreversible triumph of a new, 21st century America: multiracial, multi-ethnic, global outlook and moving beyond centuries of racial, sexual, marital and religious tradition' (Fineman 2012), heralding movement toward a European-style green welfare state secured by both legislative and executive action. Coming at the end of a deflationary depression marked by intense social turmoil and political polarization, Obama's election is not the first to have involved the reshaping of the social contract at the beginning of the takeoff phase of a Kondratieff wave, however. Edward Jayne (2005) hypothesizes that American culture has been marked by four earlier takeoff stages in which authors and intellectuals moved quickly from nonspecific dissatisfaction with declining growth to shared righteousness against established orthodoxy, radical politics and to the sense that the social contract deserves to be revised.

The primary purpose of this paper is to provide more information about these four takeoff stages, to place them in their proper location on the long wave, and to propose the closer look at the Obama case that will be addressed in Part Two of the discussion, a separate paper. Other radical shifts in America's politics occurred in different long wave phases and are better documented

Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 251–264

(Berry, Harpham, and Elliott 1995, 1998). For example, exemplifying left-right shifts precipitated by stagflation crises, Ronald Reagan was elected in 1980 on a platform that rejected the premises of the New Deal and Great Society and that called for a return from statism to an individualistic, innovative, risk-taking model of governance, restricting the growth of government via tax reductions and deregulation. In earlier long waves the same phase was occupied by fiscal conservative James Monroe, Ulysses Grant and Calvin Coolidge.

Leftward shifts after deflationary depressions and rightward shifts after stagflation crises are among the alternations between public purpose (the desire to better society) and private interest (the desire to better oneself), described by Arthur M. Schlesinger, Jr. (1986) as fundamental to American two-party politics, although Schlesinger did not place them in their long wave location. Public action, Schlesinger said, is impelled by the vision of America as a nation of destiny and piles up a lot of change in short order. But sustained public action frequently produces less than is promised. Disillusion and an era of individualism follow. But in such an era not everyone succeeds. Some segments of the population fall behind in the acquisition race. People weary of materialism begin to look beyond themselves. Each public/private cycle, Schlesinger believed, lasts a generation. 'Each swing of the cycle produced Presidents responsive to the national mood, some against their own inclination', he wrote (*Ibid.*: 32).

Generational timing has been confirmed by later cyclical analyses (Merrill III, Grofman and Brunell 2008), with a suggestion that there are accompanying changes in social values, progressive stages followed by stages that are cosmopolitan and conservative stages by the parochial (Namenwirth 1973), with each accompanied by a particular type of presidency. Takeoff stage presidencies are progressive, and the first step is to properly locate them on the long wave clock.

The Long-Wave Clock

The long wave clock runs and average of $55.8 \approx 56$ years from trough to trough, repeating the cycle of deflation, reflation, inflation, disinflation and deflation shown in Fig. 1. Mode-locked within each long wave are three 18.6-year Kuznets investment cycles and six 9.3-year business cycles, as shown in Fig. 2.

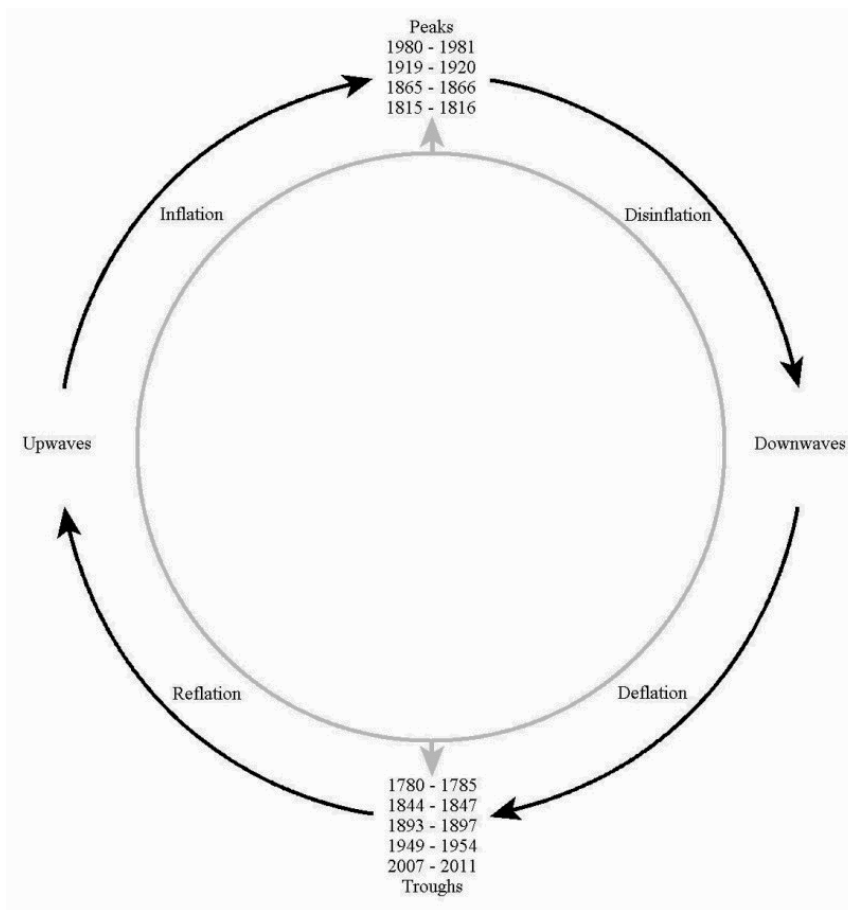


Fig. 1. Timing of long-wave peaks, troughs and inflation waves in the last two centuries

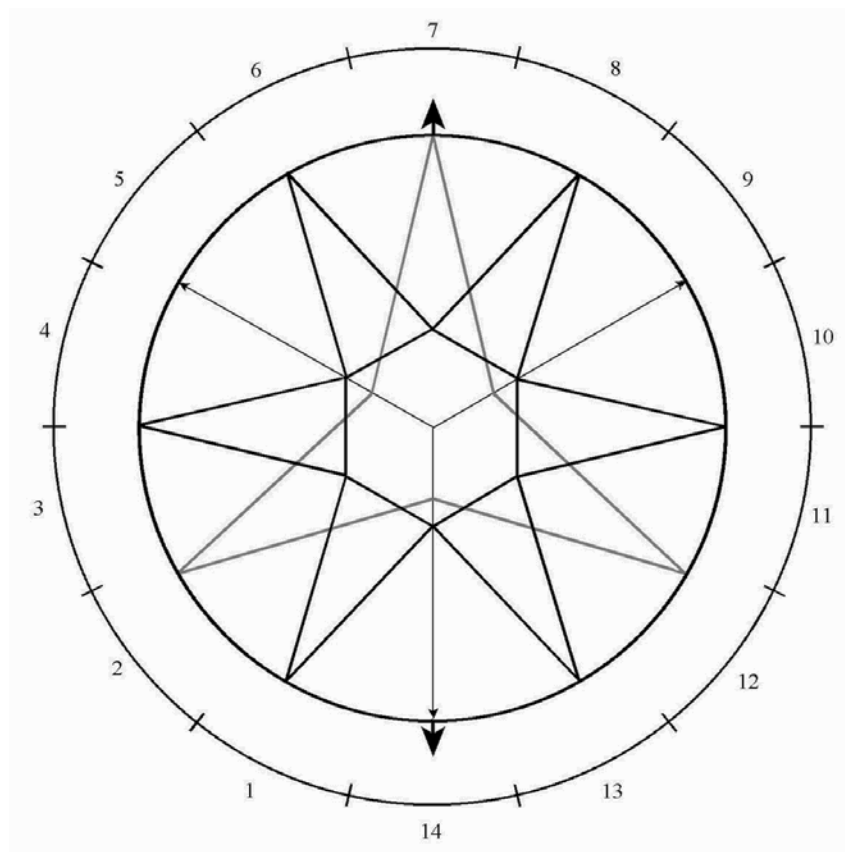


Fig. 2. Fourteen presidential terms occupy each long-wave

Upwave and Downwave Presidencies

What has been overlooked in the previous literature, and which provides a key to what follows, is that each long wave also encompasses 14 4-year American presidential terms. These also appear in Fig. 2. There are seven 'upwave' presidential terms, numbered 1 to 7 in Fig. 2 and detailed in Table 1. Seven 'downwave' presidential terms are numbered 8 to 14 and are documented in Table 2.

Table 1. Upwave Presidencies

Deflationary Depression			Inflationary Spiral			
1. Continental Congress, 1785–1789	2. George Washington, 1789–1793	3. George Washington, 1793–1797	4. John Adams, 1797– 1801	5. Thomas Jefferson, 1801– 1805	6. Thomas Jefferson, 1805– 1809	7. James Madison, 1809– 1813
1. William Henry Harrison / John Tyler, 1841–1845	2. James Knox Polk, 1845– 1849	3. Zachary Taylor / Millard Fillmore, 1849– 1853	4. Franklin Pierce, 1853–1857	5. James Buchanan, 1857– 1861	6. Abraham Lincoln, 1861– 1865	7. Andrew Johnson, 1865– 1869
1. William McKinley, 1897– 1901	2. Theodore Roosevelt, 1901–1905	3. Theodore Roosevelt, 1905–1909	4. William Howard Taft, 1909–1913	5. Woodrow Wilson, 1913– 1917	6. Woodrow Wilson, 1917– 1921	7. Warren Gamaliel Harding / Calvin Coolidge, 1921– 1925
1. Dwight David Eisenhower, 1953–1957	2. Dwight David Eisenhow- er, 1957– 1961	3. John Fitz- gerald Kennedy / Lyndon Baines Johnson, 1961–1965	4. Lyndon Baines Johnson, 1965–1969	5. Richard Milhous Nixon, 1969– 1973	6. Richard Milhous Nixon / Gerald Rudolph Ford, 1973– 1977	7. James Earl Carter, Jr., 1977– 1981
1. Barack Hussein Obama, 2009–2013	2. Barack Hussein Obama, 2013–2016					

Table 2. Downwave Presidencies

Inflationary Spiral			Deflationary Depression			
8. James Madison, 1813–1817	9. James Monroe, 1817–1821	10. James Monroe, 1821–1825	11. John Quincy Adams, 1825–1829	12. Andrew Jackson, 1829–1833	13. Andrew Jackson, 1833–1837	14. Martin Van Buren, 1833–1841
8. Ulysses Simpson Grant, 1869–1873	9. Ulysses Simpson Grant, 1873–1877	10. Rutherford Birchard Hayes, 1877–1881	11. James Abram Garfield / Chester Alan Arthur, 1881–1885	12. Grover Cleveland, 1885–1889	13. Benjamin Harrison, 1889–1893	14. Grover Cleveland, 1893–1897
8. Calvin Coolidge, 1925–1929	9. Herbert Clark Hoover, 1929–1933	10. Franklin Delano Roosevelt, 1933–1937	11. Franklin Delano Roosevelt, 1937–1941	12. Franklin Delano Roosevelt, 1941–1945	13. Franklin Delano Roosevelt / Harry S. Truman, 1945–1949	14. Harry S. Truman, 1949–1953
8. Ronald Wilson Reagan, 1981–1985	9. Ronald Wilson Reagan, 1985–1989	10. George Herbert Walker Bush, 1989–1993	11. William Jefferson Clinton, 1993–1997	12. William Jefferson Clinton, 1997–2001	13. George Walker Bush, 2001–2005	14. George Walker Bush, 2005–2009

In previous work we speculated about the long wave rhythms embedded in American politics, especially on the downwave, but did not tie them explicitly to presidential terms (Berry, Kim and Baker 2001; Berry and Dean 2012). Inflationary spirals, we said, elicit a response that leads to the election of fiscal conservatives who struggle to bring inflation under control and to restart the economy. Monroe, Grant, Coolidge and Reagan all were presidents who presided over the ensuing techno-economic revolutions, the Era of Good Feelings 1816–1825, the Gilded Age 1865–1884, the Roaring Twenties 1921–1929, and the IT Revolution 1981–1990 (Berry, Kim and Kim 1993). But rapid technological change produces new winners and casts aside old losers. Inequality increases – urban-rural after 1815, North-South after 1865, metropolitan-nonmetropolitan after 1921, high-tech/low-tech after 1981 (Berry, Harpham,

and Elliot 1998 103–104), resulting in reformist reactions (Jacksonian Democracy that created the distributive state, Cleveland's Early Reform that introduced regulatory state, Roosevelt's New Deal that established the redistributive state and the more recent Clinton reforms). Such reforms are overwhelmed as disinflation turns to deflation, however, and economic crises (the Panic of 1837, the Panic of 1893, the Crisis of 1950 and the market crash of 2007), are followed by deep depressions with accompanying tough wars (the Mexican war of 1846–1847, the Spanish-American War of 1897–1898, the Korean War of 1950–1954...).

It is in the aftermath of war and deflationary depression that Jayne's model takes over, providing a key to understanding the early upwave dynamics exemplified by the presidencies of Washington, Polk, T. Roosevelt, Eisenhower, and, perhaps, Obama.

The Takeoff Stages: Jayne's Model

Jayne's model centers on what he terms 'American Kondratieff takeoff stages', each which achieved critical mass in the American culture in tight clusters of major publications. Four stages are described, termed the Federalist, Transcendental, Progressive and Alienationist, forming alternative pairs, the Federalist and Progressive where the presidency and dominant culture are aligned, and the Transcendental and Alienationist, where presidential actions that contributed to economic recovery diverged from a self-indulgent cultural frontier. We reproduce his argument, taking advantage of his invitation to make use of his materials so long as the use is not for material gain.

The Federalist Stage

The first takeoff stage, the Federalist was initiated by radical activism during the American Revolution, to which there was a conservative response focused on the attempt to create a strong central government to replace the British monarchy.

Critical mass was achieved in the three years that encompassed the publication of John Adams's *A Defense of Government of the United States* (1787), the *American Constitution* and the *Proceeding of the Constitutional Convention* (1787), *The Federalist Papers* and the 1789 *Bill of Rights and Judiciary Act*. Tom Paine's *The Rights of Man* was published in 1791–1792 in England.

Implementation took the steady hand of founding father George Washington, and his refusal to be king of a new monarchy. Washington presided over the drafting of the U.S. Constitution and oversaw the creation of a strong well-financed national government. His vision was of a powerful nation built on republican lines using federal power, but in which the citizens had certain inalienable rights. The role of the government was seen as one preserving liberty, improving infrastructure, opening western lands, founding a permanent capital and promoting the spirit of nationalism. This view shaped the new state, but also embodied compromises on the slavery question that festered until it became the central national issue in the next long-wave.

The Transcendental Stage

The second or Transcendental Stage introduced America, according to Jayne, a creed of radical individualism inspired by the early nineteenth century romantic idealism of Kant, Coleridge, and Carlyle, which spearheaded and gave theoretical respectability to the public reaction against the eighteenth century Enlightenment led by such figures as Voltaire, Rousseau, Montesquieu, and Hume. In the United States this reaction both justified and necessitated a major departure from the Federalist perspective, since it featured heightened consciousness presumably superior to the relatively narrow rights and obligations established by the federal government. By most accounts, the Federalists' worst transgression was that they had created the United States based on a compromise at the Constitutional Convention that permitted slavery. This was rejected by the Transcendentalists, for whom liberty consisted of intellectual freedom devoid of such compromises, not merely the freedom to do as one pleases as guaranteed by law.

Critical mass was achieved in six peak years encompassed by Emerson's *Representative Men* (1850), Hawthorne's *The Scarlet Letter* (1850), *The House of Seven Gables* (1851), and *The Blithedale Romance* (1852), Melville's *Mardi* (1849), *Redburn* (1849), *White Jacket* (1850), *Moby Dick* (1851), *Pierre* (1852), and *Benito Cereno* (1855), Thoreau's *Week on the Concord and Merrimack* (1849), *Civil Disobedience* (1849), and *Walden* (1854), Whitman's *Leaves of Grass* (1855), Stowe's *Uncle Tom's Cabin* (1852), and Parkman's *Oregon Trail* (1849), and *Conspiracy of Pontiac* (1851) as the antislavery movement increased in strength and North-South conflict increased over whether new lands should be slaveholding or free.

The takeoff presidency was that of James Polk, whose fundamental belief in Manifest Destiny led, through both war and negotiation, to the creation of a coast-to-coast nation where yeoman farmers could go West and settle new lands. He also reformed the civil service, reestablished an independent Treasury System, and expanded the power of the presidency, especially with the respect to making war. But he was also a slaveholder, which led to increasing abolitionist criticism, but he only served one term and it was during his successors' presidencies that the North-South conflict escalated into the Civil War.

The Progressive Stage

The third or Progressive Stage, according to Jayne, reached its height in the culture with London's *The Sea Wolf* (1904) and *The War of the Classes* (1905), Steffen's *The Shame of Cities* (1904), De Leon's *Socialist Reconstruction of Society* (1905), Santayana's *Life of Reason* (1905), William James's *Pragmatism* (1907), *A Pluralistic Universe* (1909), *The Meaning of Truth* (1909), *Some Problems of Philosophy* (1911), and *Essays in Radical Empiricism* (1912), Dewey's *How We Think* (1909), Adam's *Education of Henry Adams* (1907), Bierce's *The Devil's Dictionary* (1911), Mencken's *The Philosophy of Friedrich Nietzsche* (1908), Twain's *The Mysterious Stranger* (ms completed in 1908),

Sinclair's *The Jungle* (1906), Dreiser's *Sister Carrie* (reissued in 1907), and *Jenny Gerhardt* (1911), Stein's *Three Lives* (1909), Wharton's *Ethan Frome* (1911), Pound's *Personae* (1909), and T. S. Eliot's *The Love Song of J. Alfred Prufrock* (written between 1910 and 1911).

The scope embraced aestheticism, muckraking, radicalism and institutional reform. The gold standard, women's suffrage, the graduated tax income, anti-trust legislation, minimum wage laws, the eight-hour working day, child labor laws, farm loans, government corruption, and the popular election of senators were only a few of the social and political issues that consumed public attention. Radical politics came to the fore, promoted by such figures as De Leon, Debs, and Haywood, respectively of the Socialist Labor Party, Socialist Party, and the IWW, and in a sequence that accelerated over a decade from theory to anarchist labor practices. From the beginning of the pragmatism of James, Pierce, Dewey, and Santayana emphasized what seemed to be an intellectual freedom that could readily be invoked to challenge bourgeois assumptions. Novelists such as Dreiser, Lewis, Anderson, Dos Passos, Fitzgerald, Wolfe, and Faulkner told the stories of characters whose willingness to challenge these assumptions brought them into trouble with society at large, while poets such as Pound, Eliot, Stevens, Williams, Moore, and E. E. Cummings combined willingness with the use of avant-garde poetic technique to violate bourgeois aesthetic expectations.

Epitomizing the stage was Theodore Roosevelt. The classical progressive, he initiated civil service reform. An 'advocate' of universal expansion, he revised the Monroe Doctrine to allow the USA to 'exercise its international policy power'. At home, his 'Square Deal' programs included trust busting and regulation of business, plus a commitment to environmental conservation. Like Washington but unlike Polk, he epitomized the ethos of his times.

The Alienationist Stage

The fourth and most recent take off stage Jayne characterizes as 'alienationist', expressed in the years encompassed by Nabokov's *Lolita* (1958), and *Pale Fire* (1962), Bellow's *Henderson the Rain King* (1959), and *Herzog* (1964), Mailer's *Advertisements for Myself* (1959) and *The Presidential Papers of Norman Mailer* (1963), Updike's *The Poorhouse Fair* (1959), *Rabbit Run* (1960), and *The Centaur* (1963), O'Connor's *The Violent Bear It Away* (1960), and *Everything that Rises Must Converge* (1964), Vonnegut's *The Sirens of Titan* (1959), *Mother Night* (1961), and *Cat's Cradle* (1963), Barth's *The End of the Road* (1958), and *The Sot-Weed Factor* (1960), Roth's *Goodbye Columbus* (1959) and *Letting Go* (1962), Baldwin's *Nobody Knows My Name* (1961), *Another Country* (1962), and *The Fire Next Time* (1963), Burroughs's *Naked Lunch* (1959), Heller's *Catch-22* (1961), Kesey's *One Flew Over the Cuckoo's Nest* (1962), Pynchon's *V* (1963), and Selby's *Last Exit to Brooklyn* (1964).

Alienationists first asserted themselves during the fifties and early sixties as existential outsiders isolated from society, later as radical activists vehement-

ly opposed to the misuse of power by the federal government. Intellectuals stirred public opinion with a fresh willingness to challenge received values. Fiction was dominated by entirely new voices explicitly or implicitly in the first-person singular. Investigative reporting became popular, as well as the 'New Journalism'. Poetry was hyper-personalized by the confessional, Black Mountain, San Francisco, New York, and deep image schools, while poets who had already established their reputations simply reinvented themselves, as did major novelists. Drugs became popular, and rock music was invented as well as psychedelic art and light shows. The sense of alienation brought freedom to the edge of social irresponsibility and sometimes over it. Meanwhile, a radical perspective was mounting that obliged political activism in response to the issues of Vietnam and militant black nationalism. As controversy escalated, individual expression was displaced by social protest too divisive to provide a safe vehicle for permanent literary insight: literary and intellectual productivity almost entirely came to a halt between 1964 and 1969 unless it stretched its connection with overt political activism.

As in the second takeoff stage, when Polk succeeded in creating a coast-to-coast nation while out of sympathy of the transcendentalism of his time, non-alienationist Dwight D. Eisenhower introduced initiatives that transformed the nation. Internationally, he led the U.S. battle against communist expansion, engaged in overseas interventions, and promoted nuclear deterrence. At home, he initiated a variety of programs that fundamentally changed the nation: the Interstate Highway System, the Defense Advanced Research Projects Agency (DARPA) which created the internet, NASA which began the space program, NDEA which began federal involvement in education, and the Atomic Energy Act which promoted the peaceful use of atomic power. He also oversaw the Civil Rights Acts of 1957 and 1960 that protected the right to vote, desegregated the armed forces, and used Federal Troops to enforce desegregation of public schools.

Important Alternations

The common denominator of these takeoff periods, Jayne argues, was a commitment to liberty. In the culture at large the objective dedication to political rights emphasized by the Federalists was supported by a subjective commitment to Transcendentalist morality, then by the Progressive effort to reform social and cultural institutions, and finally by a new level of subjectively principled rebellion through what seemed a rejection of all social constraints. In other words, the guarantee of political liberties demanded by the Federalists was followed a half century later by the Transcendentalist pursuit of spiritual liberation, then half a century later by the Progressive pursuit of social, political, and economic reform, and finally, after yet another half century, by Alienationists' willingness to challenge the orthodox respectability dominant in American society after World War II.

The alternations are important. Whereas both the Federalist and Progressive takeoff stages featured the pursuit of attainable social and political modifications, the Alienationist and Transcendentalist takeoff stages put more emphasis upon the pursuit of individual freedom among those able and willing to confront authority. Jayne sees that two-century dialectic as being foretold by Hegel in his *Introduction to the Philosophy of History*, where it was argued that the entire history of the Western civilization has rested upon a 'progress of the consciousness of freedom'. Reflecting the dialectic, the Washington and Roosevelt presidencies were attuned to the dominant cultural movements of their times, but those of Polk and Eisenhower were not.

The difference is one of belief *versus* myth. Each new takeoff stage brought to the fore a unique vision of liberty that negated the version preceding it by rejecting it as an *ignis fatuus*, a limited objective whose exclusive pursuit prevents the attainment of genuine liberty. The Federalist perspective was energized by the belief that maximum individual rights can be at least provisionally attained by a disinterested central government organized on a constitutional basis. The Transcendental perspective substituted the myth declared by Thoreau in his famous manifesto, *Civil Disobedience*, that genuine individual freedom must be imposed by individuals who are willing and able to oppose immoral government intervention. The Progressive perspective then substituted the belief that genuine freedom necessarily depends on institutional reform based on pragmatic need. And finally the Alienationist perspective settled upon, perhaps, the most extravagant myth: that since our freedoms are necessarily curtailed by government supportive of an immoral power structure, radical disobedience becomes a permanent obligation simply to prevent the excessive misuse of government authority.

The Presidency and the Long-Wave Clock

Thus, Jayne argues that American intellectual history has been marked by takeoff transformations occurring a half-century apart at the beginning of an economic long wave, each of which has been dominated by the same dialectic pursuit of freedom. He acknowledges Marx's contention that the intellectual compulsion primarily was the product of motives linked to the economic base, adding that he believes that intellectual change is organized sequentially through the agency of the Kondratieff long wave. This long-wave structuring also characterizes American political history as set down in Fig. 3. As the figure shows, four defining types of presidencies – conservative, liberal, 'takeoff' and cosmopolitan – each occupy specific locations on the long-wave clock. Takeoff presidents are elected in presidential term 2, at the beginning of an upwave. Cosmopolitan presidents are elected in presidential term 6, as an upwave approaches its end. Conservatives are elected in presidential term 9, at the beginning of a downwave. Liberals are elected in presidential term 12, as the downwave sags towards the trough. What defines each presidential type is the types of long-wave crises that precede them. These are also located on the

clock in Fig. 3. Deflationary depression precedes takeoff (progressive) presidencies. Cosmopolitans take over after a midpoint crisis. Stagflation crises lead to the election of conservative presidents, and after a primary trough liberals take over.

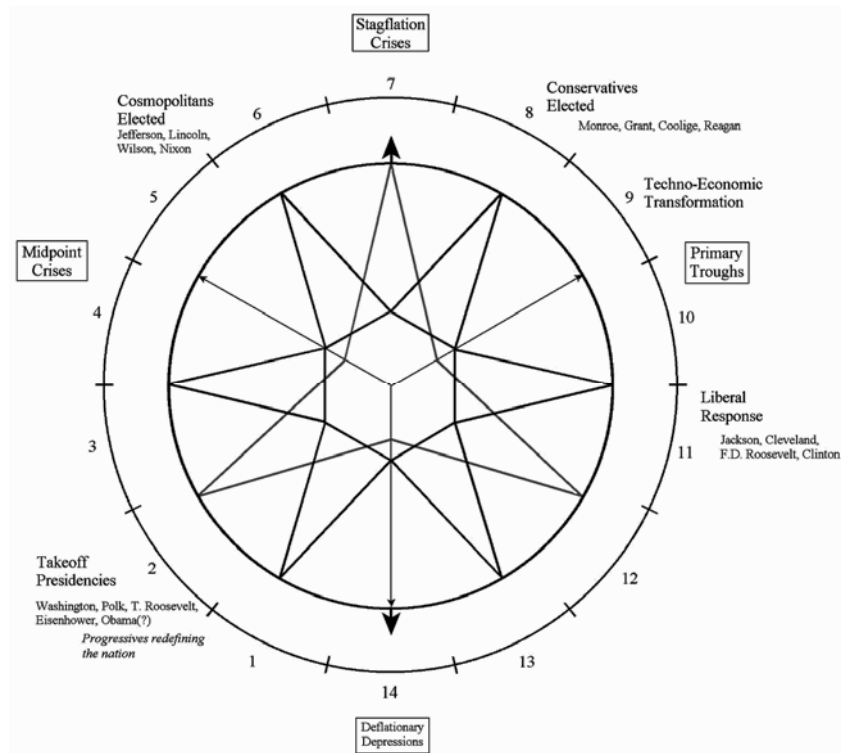


Fig. 3. The presidency and the long-wave clock

Obama Takeoff Presidency

The essential feature of the takeoff stage is that it is the long wave stage in which progressive presidents redefine the nation, either in lockstep with or in tension with a new emergent cultural paradigm. Barack Obama was reelected, like other progressives, in presidential term 2, in the aftermath of a deflationary depression and at the dialectic stage in which the presidency should be in tune with an emergent new cultural paradigm. We therefore conclude by asking what evidence might support these expectations.

Obama was elected via aggressive cultural identity and lifestyle politics that captured the imaginations of the nation's growing demographic and social groups – the young, minorities, millennials, and women – creating an emergent

Democratic majority that many have thought will prevail over declining core Republican constituencies – traditional nuclear families, evangelicals, *etc.* Obama's majority leaders have been characterized as the 'millennial gentry' who epitomize a socially liberal, east and west coast big city, ethnically diverse culture concerned with economic inequality, poverty, environmental threats and the second amendment. Their vision is one of a European-style welfare state, with national health guarantees ('Obamacare'), steep income taxation that raises the tax rates for 'the rich', expanded redistribution on grounds of 'fairness', and massive expansion of the regulatory powers of the federal government to constrain financial markets and to counter imagined personal and environmental threats, all combined with massive deficit spending – a set of initiatives that critics call 'watermelon' – green on the outside but with a red interior – producing and maintaining a permanently depressed underprivileged class firmly dependent upon welfare handed out by gentry progressives. Faced with the inability of conventional monetary instruments to ease the economy out of depression, Obama's central bank has turned to 'quantitative easing' – buying financial assets from commercial banks and other private institutions with newly created money in order to inject a pre-determined quantity of money into the economy. This easing increases the excess reserves of the banks, and raises the prices of the financial assets bought, which lowers their yield, but also introduces the possibility of massive inflationary pressures, which in previous up-waves have originated in the takeoff stages as the economy reflate and have brought takeoff transitions to an end. Whether Obama is achieving his goals or whether opposition to his policies is crafting an alternative fifth takeoff will be the subject of a follow-on essay as the Republican majority takes over in the aftermath of a devastating Obama defeat in the midterms elections of 2014.

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Long Waves in American Politics. Part Two: The Obama Question

Euel Elliott and Brian J. L. Berry

Abstract

Barack Obama, committed to ideas of social justice, has attempted to transform the United States into a European-style welfare state via taxation, regulation and legislation, in particular the Affordable Care Act ('Obamacare'), a medical insurance system that de facto is nationalizing one-sixth of the nation's economy. But a slowing economy, mounting unemployment, and increasingly powerful central bureaucracy caught up in spying and other scandals and a disastrous launch of Obamacare are producing a rising tide of resistance and a reaffirmation of individual rights guaranteed by the Constitution. If Obama prevails he will be hailed as another take-off president. If his initiatives are overwhelmed by opposition forces, the effect will restore and strengthen constitutional guarantees that are currently under attack.

Keywords: *long waves, take-off presidents, Jayne, Obama, progressivism, millennials.*

In the preceding essay in this volume Brian J. L. Berry and Denis J. Dean asked whether the election of Barack Obama in 2008 by a new multiracial, multi-ethnic coalition amidst a deflationary depression signaled the arrival of a fifth 'take-off' president, committed to revision of the social contract by creation of a European-style welfare state, withdrawn from world leadership and with significantly diminished military power. The progressive left had been waiting for this moment for several decades. The 'modern liberal' or progressive governance model that envisioned an increasingly active role for the federal government had its origins in the presidencies of Theodore Roosevelt and Woodrow Wilson, but it was only with the advent of the Great Depression in 1929 and the election of Franklin Roosevelt in 1932 that modern liberalism began to see its full expression with the massive expansion of the redistributive and regulatory state. The modern liberal-progressive agenda was further advanced under the presidency of Lyndon Johnson, who brought to fruition a vast expansion of the welfare state, introducing Medicare and Medicaid and the War on Poverty as his Great Society initiatives. Following Johnson, liberal failures produced an increasingly jaundiced view of government, however. The seemingly end-

Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 265–275

less and unwinnable Vietnam War, the social unrest in the cities, and the sense that the United States had lost its way – all contributed, as did the low economic growth and rising inflation, that culminated in the 1979–1981 stagflation crisis.

The reaction came in the election of Ronald Reagan in 1980 over a hapless Jimmy Carter ushered an era of conservative dominance in which the parameters of government action were reset. The private sector became the driving force, and even the election of Democrat Bill Clinton in 1992 could not alter that fact. Indeed, much of Clinton's success was his acceptance of the importance of free markets.

The eight years of the George W. Bush administration, beset by the wars that followed 9–11, left conservatives disillusioned and provided a new opportunity for the left. The election of Barack Obama brought a hard-edged leftism to the Executive Office that had not been seen since the New Deal. Some pointed to the transformative intent, 'Obama is aiming at achieving a new set of socioeconomic rights, whether through law or through policy' (Sunstein 2013). Others were not so sanguine, 'Thanks to the 44th President of the United States, Barack Obama, America will now join Egypt, Persia, Rome, Greece, Nazi Germany, Britain and the rest of the many countries that have risen to power only to be reduced to ruins thanks to their ignorance with regard to its enemies and the hubris to deny such ignorance exists' (Baker and Peters 2013). 'For four years, President Obama counted on fellow Democrats to rally to his side in a series of epic battles with Republicans over the direction of the country. But now, deep into his sixth year in office, Mr. Obama finds himself frustrated by members of his own party weary of his leadership and increasingly willing to defy him' (Baker and Peters 2013). We, therefore, ask again: Is the Obama presidency a 'take-off' presidency as E. Jayne¹ has defined it? Did the election of Barack Obama in 2008 and his reelection by a comfortable margin in the Electoral College in 2012 foretell the beginning of a new progressive era? Or is his dramatic reversal in the elections of 2014 a better bellwether? The long-wave timing points to a take-off. Such an era would involve an expansion of the welfare state and a surge in the role of the federal government in many areas of public policy, transforming a nation built on the principles of federalism into one with a quasi-unitary form of government. But if Obama's initiatives are ultimately rejected as inconsistent with the fundamental beliefs that underpin American society, as appears to have occurred in 2014, we should ask 'What is the alternative?' There is an increasing belief that the alternative does not reside in a Republican party split 'between conservatives who want to limit government and extremists who oppose governing' (Fournier 2013a). Rather, commentators point to the emerging beliefs of the rising generation of 'millenni-

¹ The essay by E. Jayne (1991) is available at <http://www.edwardjayne.com>

als' – those born since the 1981–1982 stagflation crisis – and the prospect of a Millennial Revolution (Fournier 2013b). Thus, in what follows we explore the nature of Obama's progressive thrust, the countervailing forces that appear to be overwhelming his quasi-socialist initiatives while simultaneously destroying the Republican party opposition, and the nature of the Millennial alternative that may come closer than Obama or the Republicans to a Jayne long-wave transformation.

A New Social Democracy?

What is

at stake is the new, more ambitious, social-democratic brand of American liberalism... Precisely when the GOP was returning to a more constitutionalist conservatism committed to reforming, restructuring and reining in the welfare state... Obama offered a transformational liberalism designed to expand the role of government, enlarge the welfare state and create yet more new entitlements... The centerpiece of this vision is Obamacare, the most sweeping social reform in the past half-century, affecting one-sixth of the economy and directly touching the most vital area of life of every citizen (Krauthammer 2013).

There certainly are good reasons to believe that Obama's initiatives presage a new progressive era. Just a cursory examination of the electoral and demographic landscape would suggest this is the case. An attractive and eloquent African American, Barack Obama, was elected and reelected President by comfortable majorities. The outcome of the 2012 election, in particular, left many observers pondering the very real possibility that such a large percentage of Americans has come to rely upon government assistance that a permanent welfare state dependency has arrived. If that had been the case, the future of limited government and traditional constitutionalism would have been bleak. Once a welfare state is established it is virtually impossible to trim, much less replace or fundamentally reform. As the welfare state becomes a permanent fixture of the political landscape it reshapes the terms of debate and slowly transforms the political culture, which in turn creates even greater opportunities for the expansion of government.

But the 2014 elections, in which the Democrats suffered a major defeat, suggest that the USA has reached a political tipping point. The electorate that elected Barack Obama in 2008 and reelected him in 2012 is a far different electorate from that which elected and reelected Ronald Reagan in 1980 and 1984. Non-minority voters were 85 percent of the electorate in 1980. By 2012, they were only about 72 percent. Immigration, both legal and illegal, and higher birth rates among Hispanics have changed the electoral landscape profoundly. It is not inconceivable that unless the Republican Party begins attracting substantially greater support among Hispanics, it will be impossible for the party to

win elections. Although Republican policy stances on various social issues such as support for the traditional family and for religious values seem to appeal to Hispanics, the truth is that the Republican Party is viewed as unwelcoming by the Hispanics as well as other minorities. In the case of Hispanics, their voting preferences are driven primarily by economic concerns and ultimately the Democratic Party seems to be the natural home for this group, except when the economy is bad and they express their displeasure by staying home rather than voting, as occurred in 2014.

When one also recognizes that African-Americans are likely to remain overwhelmingly Democratic and that the slow unraveling of traditional American values provides endless opportunities for the Democrats to lock in the support of women as well as those who are part of the vast government clientele relying upon public assistance, combined with the support of the lesbian, gay, bisexual, and transgender vote, it is easy to conclude that the Democratic Party is extraordinarily well positioned to dominate American politics at the presidential level for the next several decades. Among women, who not that many decades ago voted Republican, majorities have inclined toward the Democrats in the last seven elections, and among young unmarried and professional women Republicans are typically viewed with anathema. A party that appeals to traditional notions of sexual morality and is viewed as the 'religious party' has little appeal to those whose lifestyle leads to sexual promiscuity, having children outside of marriage, and involvement in homosexual relationships. Particularly given the fact many of these women have fewer socioeconomic opportunities, they are an easy target for a Democratic party eager to expand their base by appealing to ever-expanding government initiatives and supporting either explicitly or implicitly what a few years ago would be far outside the mainstream cultural arrangements. A party that has been in existence for 180 years and has shown an endless capacity to reinvent itself has been extraordinarily successful in building its modern foundation upon social welfare, presenting itself as the guarantor of the maintenance and expansion of the progressive therapeutic state. Building on this new foundation its most probable candidate in the 2016 election is a woman, Hilary Clinton, who is likely if elected to further reinforce the Democratic Party's emergent dominance among the electorate.

But Will Obama Be Transformative?

It is therefore surprising that the verdict on whether Barack Obama will pilot a 'take-off' to a new progressive era is unresolved. This is in spite of his comfortable reelection in 2012 in a campaign that appeared to confirm his aggressive left-progressive agenda by demonizing the Republican opposition. President Obama surely was not a candidate for reelection whose policy agenda was lacking. His second term agenda included the successful implementation of the Patient Pro-

tection and Affordable Care Act ('Obamacare'), a green climate change agenda, immigration reform, gun control, a withdrawal from international leadership, significant cutbacks in the armed forces, and a continuing assault on inequality. Yet many of the domestic initiatives are mired in controversy and may not be successfully implemented.

President Obama's greatest domestic achievement, 'Obamacare', has evolved in ways that do not bode well for Obama or progressivism. Earlier progressive achievements such as Social Security, Medicare, or Civil Rights laws, while initially opposed by many conservatives, were ultimately accepted. That has not been the case with Obamacare, where the opposition by the general public as measured in public opinion polls, the efforts of organized interests, or the continual efforts by Republicans in Congress to defund the Act, has increased amidst a disastrous launch in which computer websites did not work and promises proved to be hollow.

While a detailed analysis of the problem with ACA implementation is far beyond the purpose of this essay, it is nonetheless worth discussing the broad evolution of the rollout because it highlights broader issues of competence and corruption that have afflicted other parts of the Obama agenda. A critical component of the ACA requires individuals, through the so-called 'individual mandate', to purchase insurance. This was to be done through insurance exchanges operated either by the states or by the federal government. Fourteen states ended up operating exchanges, most of them Democratic liberal states where political leadership was enthusiastic about the implementation of health care reform. The rest refused to set up their own exchanges, defaulting to an arrangement whereby the federal government would operate the exchange.

On October 1, 2013, the health exchanges were to 'go live'. Individuals were to be able to go online, find a qualified insurance plan that suits them, and purchase that plan with coverage to begin effective January 1, 2014. Alas, it would be an understatement to say things did not go well. Technical issues with the websites, both federal and state, produced massive failure resulting in only a small number of individuals able to sign-up for insurance. The negative publicity was disastrous and Obamacare became a laughingstock and the butt of jokes on late night television.

Although many of the technical aspects of the website were later fixed, the initial exposure by the public to the website, either through direct experience or second hand, was calamitous from the standpoint of maintaining credibility. But the website was not the only, or even most important, factor. By November of 2013, it became clear that millions of citizens in the so-called individual market were about to lose their insurance because the plans did not meet the minimum coverage requirements set by the ACA. This, compiled with the assurances repeated on multiple occasions by Obama from 2009 to 2012 that 'if

you like your plan you can keep it', was exposed as the words of someone badly misinformed (at best) or a liar (at worst).

More than any other federal government initiative in memory, the early implementation of the ACA has served to remind Americans of the limited competence of government, and indeed incompetence, in seeking to carry out a complete transformation of one sixth of the U.S. economy. The cavalier attitude of the President and his advisors toward Obamacare implementation along with willingness to use executive powers to attack opponents of the administration has resulted in mounting distrust: the Gallup Poll indicated that more than 20 percent of the American respondents believed that the federal government was the greatest threat to their liberties. It may be one of the great ironies of American politics that one of the most audacious governmental initiatives since the passage of Medicare and Medicaid in the 1960s now appears to be resulting in a generational shift in attitudes toward government similar to what happened in the late 1970s. The seeds of political change appear to have been sown.

Of course, it is possible that in spite of the massive opposition seen in the election of 2014, a determined administration allied with left-progressive activist elements will grind their way to a successful outcome over the next few years. The Obama administration is hoping that their hoped-for results will eventually become reality. Combined with financial services reform providing sweeping new regulatory powers to the federal government, new labor initiatives designed to increase union membership, and climate change regulations introduced by executive order after the failure to enact 'cap and trade' legislation, successful implementation of Obamacare would effectively rewrite the social contract, confirm Obama's take-off status, and reinforce our understanding of the long wave take-off relationship.

Yet conservative and libertarian opposition seems to not only have stemmed but also begun to reverse the left-liberal progressive wave. An ascendant Tea Party Movement has energized the Republican base, contributing to the Republican takeover of the U.S. House of Representatives in 2010 and of the Senate in 2014. The politics of midterm elections and the federalist system of governance have emerged as important roadblocks to an Obama take-off presidency. The Republican Party now holds a significant advantage in the House of Representatives, and the Senate, and this is likely to have extremely dire consequences for Obama's progressive agenda. Republicans plan to use their position of strength in both Houses to set the terms of debate on a crucial range of issues, especially the budget and Obamacare. Any repeal of Obamacare would be vetoed by the President, but the Republicans would be in a position to negotiate major changes.

The mid-term election cycle is only one component of the broader political dynamics at work in 2014 and beyond, however. The second component is the politics of the states. Republicans currently hold more than 30 governorships

across the country, and control many state legislatures. This strength in the states puts Republicans in a position to drive state-controlled policy agendas and to hamper the Obamacare implementation process. Republican-led states have been moving in conservative directions on other issues. In January 2013 the State of Michigan adopted right-to-work legislation. Other Republican-led states such as Wisconsin and Ohio have moved to limit union negotiating power, again running counter to Obama's new social contract objectives. The result is a polarization between Republican and Democratic states that has been described by some scholars as 'fragmented federalism' (Bowling and Pickerill 2013). This polarization makes it difficult to implement the kind of left-liberal progressive agenda envisioned by President Obama without creating massively destabilizing centrifugal forces within the political system. A similar regional destabilization followed President Polk's take-off presidency. Focusing on the slavery question, it led to the attempted secession of the southern states and to the Civil War.

The federal judiciary also has presented a vigorous challenge. Recent decisions establishing that the right to bear arms is an individual right have energized conservative and libertarian forces. Perhaps, the most vitriol from the Left has been directed at a 2010 Supreme Court decision (Citizens United) that allowed groups greater freedom to organize for political action. Framed by conservatives and libertarians as a fundamental issue of free speech and by opponents as a decision that opened the floodgates of money into the political process, the reaction of the Obama administration has been to attack Tea Party and related groups that sought to take advantage of the ruling, making use of agencies such as the Internal Revenue Service to attempt to negate the consequences. The Supreme Court also has issued a series of conservative affirmative action and civil rights rulings that have placed constraints around the progressive agenda.

Another reason to believe the nation may not witness a progressive restructuring is an accumulating set of Washington scandals. We describe them as Benghazi, the Associated Press story, and the IRS Tea Party story. Benghazi revolves around questions of what the Administration knew in the hours just prior to and following the murder of the U.S. Ambassador to Libya, who was killed in the early morning hours of September 12, 2012. There are questions as to why efforts were not made to rescue the Americans, what President Obama was doing in the White House while the attack was underway, and why there was an apparent effort to mislead the public and Congress about the event. The AP scandal involves the U.S. Justice Department monitoring of phone calls by Associated Press reporters, seen as a threat to journalistic freedom and an independent press. Finally, the IRS story, one with possibly the greatest potential for political damage, involves ideological and partisan bias of the Internal Revenue Service in targeting conservative groups, denying them tax exempt

status and carrying out aggressive audits. Involvement of the IRS calls into question the integrity of one of the key bureaucratic agents in the implementation of Obamacare. The IRS, under current law, is responsible for implementing numerous aspects of the new health care system. Should the scandal generate increased distrust of the federal government, not only will the implementation of Obamacare be made all the more difficult, a sufficient level of distrust to the federal government may be created that any left-progressive agenda will find itself under attack by those who advocate a much more modest federal presence and reassertion of the federalism principle.

It is tempting to think of these scandals simply as exogenous shocks that sometimes perturb the political balance of power. However, the events seem to represent something deeper and more profound than errors made by overly enthusiastic aides, as has been claimed. The IRS controversy may reflect a crisis of the progressive state, borne of a deep antipathy within a liberal governing elite toward those with a broadly conservative political and cultural outlook. Such an attitude, while surely not universal, is now shared by a sufficient number of progressives, including members of Congress and many within the White House, and has become a fundamental threat to the premises of the American Constitution.

Ultimately the connection between the scandals and the theme of this essay is simple. If the scandals come to be viewed by the public as ‘politics as usual’, then their effect will likely be minimal, at least in the long run. But if they serve to reinforce and deepen what is already a growing antipathy toward Washington elites and the still-vague sense that the federal government is becoming more and more an obstacle to ‘life, liberty and the pursuit of happiness’, a progressive take-off will be contested by an invigorated return to fundamental constitutional principles. Public opinion polls already register a sense of concern among the general public, consistent with this countervailing move. Some public opinion data suggest that the political system could be approaching a ‘pre-revolutionary’ moment. Recent surveys show that only a very small percentage of citizens now believe that government has the consent of the governed. This statement, taken from the U.S. Declaration of Independence, was acknowledged to be true by only 22 percent of respondents in one survey. While the numbers are higher for Democrats than for Independents or Republicans, this low percentage is striking. Earlier polls have shown similar results, another poll taken in 2012 found that 58 percent of respondents felt that an ‘overly powerful’ government is a bigger danger than a weak one, and 51 percent viewed the federal government as a threat to their rights.

Prospective Generational Change?

These beliefs appear to be particularly strong in the millennial generation – the 95 million Americans born between the last stagflation crisis and the most re-

cent deflationary depression, roughly from 1980 to 2007. As a commentator in *The Atlantic* notes (Fournier 2013b):

1. Millennials, in general, are fiercely committed to community service.
2. They don't see politics or government as a way to improve their communities, their country, or the world.
3. So the best and brightest are rejecting public service as a career Path. Just as Baby Boomers are retiring from government and Politics, Washington faces a rising-generation 'brain drain'.
4. The only way Millennials might engage Washington is if they first radically change it.

There is a growing belief that Millennials will produce a radical reconstruction of civil institutions and government, since they have little faith in traditional politics and government in a world polarized by the present two-party system. Predicting 'the beginning of the end for Washington' commentators see one of two results: that the Millennials either opt out of Washington, or that they might engineer a regime change that replaces the current two-party dysfunction (Fournier 2013a).

This suggests three possibilities, each of which points to a radically different future: (1) the establishment of an enduring left-liberal or progressive coalition, the initial stages of which have been put into place by the Obama election and re-election, that is an Obama take-off; (2) a Republican-conservative resurrection over the course of the next one or two election cycles that would result in a return to a limited government, constitutionalist regime; or (3) fractured relations between the national government and the states that drive a Millennial reconstitution in a different form, a profound regime shift. The first two scenarios assume that possible regime shifts occur within the framework of 'normal politics'. The third scenario assumes something quite different: a set of centrifugal forces that lead to a violent lurch toward a fundamentally different system characterized by increased decentralization of power and a dramatic shrinkage of national government authority.

Overview

We thus return to our initial question, will Barack Obama become the fifth take-off present in U.S. history? As we noted in the preceding essay in this issue of this yearbook (Berry and Dean 2015), he was elected via aggressive cultural identity and lifestyle politics and arrived in Washington with a vision of a European-style welfare state with a national health program, steep income taxation that raised tax rates for richer Americans, expanded redistribution of income on grounds of fairness, and a massive expansion of the regulatory powers of the federal government to constrain financial markets and to counter imagined personal and environmental threats, combined with deficit spending and

the maintenance of a permanently depressed underprivileged class dependent upon the federal government and willing to reelect progressives to ensure that welfare redistributions remain and are enhanced. But what is emerging instead is a 'fractured federalism' that may limit his take-off achievements amidst a rising generation that may prefer a more profound restructuring of the political system.

The situation is not unlike James Polk's presidency and its consequences. Polk's belief in 'Manifest Destiny' did lead to a coast-to-coast nation where yeoman farmers could settle new lands. He also reformed the civil service, created a new Treasury System, and expanded the power of the presidency, but as a slave owner he was ambivalent about that fundamental social issue. Following his exit from the presidency in 1849, the U.S. political system became increasingly fragmented and enfeebled. Pressures revolving around the preeminent question of slavery come to the fore, with abolitionist elements and southern sympathizers taking increasingly polarized positions. These divisions also were manifested in the increased factional tensions within the parties, and particularly the Whig Party, which was torn between its Northern antislavery elements and those sympathetic to, or at least ambivalent about, the question. By 1856 these divisions led to the Whig Party's destruction and the Republican Party rising in its place. The Democratic Party did not avoid its own divisions, but they proved not to be as deep and toxic as with the opposition. The consequences for the nation were dire: two political parties, neither of which were able to address effectively the issue that was leading to secession and civil war. The polarization that was playing itself out on the national stage was replicated in the states: the political 'middle' in American politics, at every level, had come undone. Polk was a take-off president not as an immediately transformative policy maker, but because his actions precipitated growing conflict that ended in the Civil War.

We believe that Obama's initiatives will have a similar effect. What his actions have done is to raise the profound issues of the role of government in our lives and what the relative balance between government, the individual and civil society should be. Tensions between the ideals of a comprehensive social welfare state and the principles of republicanism, limited government and the primacy of the individual may well be coming to a head. Our sense is that both parties have reached, or will soon reach, a point of political and moral exhaustion with neither capturing, even in a remote way, the real concerns of voters. As the long-wave clock moves toward another stagflation crisis within the next two decades, it may well be that the Millennial generation will lead us toward a new, more libertarian order that is consistent with important Republican principles, but one leavened with a deeper social conscience that has been desperately waiting for the right movement for several decades.

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8

Long Waves of Political Contestation

Jonas Van Vossole

Abstract

This paper develops a wave theory of political contestation, and places the current economic and political turmoil in a historical perspective. Based on legitimacy, it serves as an alternative to the waves of democratization of Samuel Huntington (1991). The theoretical framework is based on two main theories: the theory of long waves in political economics and the theory about state-legitimacy and fiscal crisis. In the first section, this paper gives a short overview of the different economic dynamics which over time have been incorporated in long wave theories, predominantly based on the works of Kondratieff (1979) and Schumpeter (1939), and puts the current economic situation in this perspective. The second part analyzes the general interdependency between long waves and politics, and the original criticisms of the endogenous model by Trotsky (1923). The third section considers long waves theories in politics, in particular Samuel Huntington's theory, and discusses the main criticisms of his theory. The fourth section analyzes the influence of the long wave upswing and downturn on state-legitimacy, and is based on the work of O'Connor (2001) and Habermas (1975). The fifth section combines the long wave's concept with legitimacy and protest against a long wave theory of political contestation and gives the first elements of some empirical evidence, comparing the political contestation in the thirties and today. The sixth section draws conclusions and takes a look on the need for further research.

Keywords: *crisis, long-wave theory, waves of contestation, Kondratieff, Habermas, Huntington.*

Introduction

The combination between democracy and capitalism is by definition an inherently unstable form of organization of a society (Marx 1852; Przeworski and Limongi 1993). The recent economic crisis and the recent political upheaval in

Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 276–296

both the Arab world and the core of the capitalist world system have resurrected that idea. The systemic character of the Great Recession also brought back some attention to the concept of long waves in economics. This paper is an attempt to bring these elements together and build a theoretical framework around the unstable combination of capitalist economy and its political superstructure.

The theoretical framework is based on two main theories: the theory of long waves in the evolution of capitalist development and the theory of the crisis of legitimacy linked to the economic crisis, which was originally conceived for understanding the interplay with normal business cycles. The long waves serve as a framework to explain long-term instability of the capitalist economy, the legitimacy-theory as a framework to understand the transfer mechanism between that instability and the political contestation movements.

The mainstream theory that comes closest to the approach of this kind is the theory of waves of democratization by Samuel Huntington (1991). However, there are conceptual and methodological problems with this approach. The theoretical framework developed in this paper also tries to answer these shortcomings basing this alternative theory on legitimation and contestation.

The first section of this paper gives a general overview of the different economic dynamics which over time have been incorporated in long wave theory in an attempt to explain the instability of the historical development of capitalism, and puts the current economic situation in this perspective. The second section starts from the criticism on the endogenous character of many long cycle theories and opens its interactive relation with politics. The third section takes a look into long cycle's theories, in particular the 'third wave' of Huntington and addresses its shortcomings. The fourth section brings in the interplay of upswing and downturn of the long wave with the theory of legitimation crisis by Habermas and the fiscal crisis by O'Connor. The fifth section draws a long wave theory of political contestation and tries to find first empirical evidence. The sixth section draws conclusions and takes a look on the need for further research.

Introduction to Long Waves in World Economics

This article is written from the perspective that a long wave approach is crucial to understand current political developments, not in a deterministic sense, but as a perspective of society which allows to interconnect different long-term developments within the capitalist system with other dimensions of society. This paper does not attempt to give a full overview of all theories treating K-waves, but merely draws some examples, in order to show the relevancy

these long waves can have for the creation and reproduction of institutions in a capitalist society, in particular democracy.

Historically, before the development of the capitalist world system, periods of economic crisis and scarcity were primarily linked with temporal scarcities of vital elements for the reproduction of those socioeconomic systems. In classic economic terms, we could call them scarcities of production factors others than capital. Shortages of labor, human beings, following human disasters such as wars and diseases, and of raw materials/land, natural resources, following natural disasters such as draughts, earthquakes and floods were the basis of economic crisis situations. Shortages of capital usually did not cause crisis situations, because it played no vital role in the reproduction of societies.

This only changes slowly with the ascendance of capitalism, as the capital becomes a vital element in the organization of society, and the capital accumulation process becomes central to the reproduction of the existing society. The idea of K-waves already has existed since early patterns of different paces of capitalist development came to appear. The price level, on which Kondratieff based his waves, in the earliest stages of capitalism, however, was determined much more by agricultural and raw material prices than by industrial prices, thus having a determinant effect on long wave patterns. Only after 1940 did the increasing weight of industry in total world production in the primary and secondary sectors put an end to the downward trend in the price level during periods of basic sector surplus (Van Duijn 1982, cited by Vayrynen 1983).

As the most renown pioneer of long wave patterns in the capitalist world system, Kondratieff was hardly the first observing these long wave patterns (Van Duijn 1982). Inspired by the work of Jacob van Gelderen (1913), he based his 1926 work *The Long Waves in Economic Life* (Kondratieff 1979) on empirical observations of long waves in world economics, based on price fluctuations (Delbeke 1981). Since Kondratieff, other authors have found similar wave patterns in growth and investments and different theories have emerged to explain them and to analyze their interaction with different elements of human behavior and evolutions of society.

Generally, long-wave theories can be divided into exogenous and endogenous models. Exogenous models explain the economic waves on the basis of causal factors that are essentially exogenous to the economic cycle, in particular phenomena such as major wars, discoveries of new markets and new sources of raw materials.

Endogenous models explain them through the factors that are totally endogenous to the capital accumulation process itself; that is to say their availability of capital, and the manner, the technology how it is applied. These perspectives imply that an economic upswing contains seeds of its own destruc-

tion, while every downturn gives rise, automatically, to remedial action that leads to a new upswing (Vayrynen 1983).

Kondratieff himself emphasized the discontinuity in the production and duration of long-term fixed capital as the most powerful driving force of the long wave (Delbeke 1981). Three elements would produce those wave-like patterns: short term supply and demand, the expansion and contraction of volumes of production on the base of existing capital equipment, and changes in capital stock (Day 1976). Kondratieff's starting point originated probably in Karl Marx's conjuncture theory (Delbeke 1981), applying them on a longer time-frame. Marx's theory, explained in *Capital* (Volume 3), observed business cycles, repeating themselves each decade, based on the material wearing out, replacement and expansion of the mass of means of production in the form of machines lasting an average of ten years (Day 1976). As the waves Kondratieff observed in price statistics were much longer than that of Marx's decade-long business cycles based on the wearing out of machinery, Kondratieff related them in a very comparable mechanism to the reproduction of the most durable and costly forms of fixed capital, such as canals, railways, buildings and the periodical technological renovations of industry which attend the rising wave of a long cycle, which would have a wearing-out time of around fifty years (Day 1976).

The implication is that the long cycle is, as much as the normal business cycle, a consequence of the internal dynamics of capitalism itself. Within these cycles Kondratieff distinguished four phases: prosperity, recession, depression, recovery¹ (Kondratieff cited by Delbeke 1981), linked to four phases of capital accumulation: accelerated capital accumulation, overaccumulation, decelerated accumulation, underinvestment (Mandel 1976; Delbeke 1981), which have a profound impact on the organization of society. A rising wave presupposes a lengthy period of savings concentrated in the hands of investors and profit opportunities sufficiently attractive to start a new wave of durable investment. This fact thus also implies reduced consumption and lower growth in the period before the upswing and requires institutions able to reproduce social inequalities and to legitimize them. Over time, the rising wave will cause the interest rate to rise, as available capital becomes scarce, and investment and consumption would then be curtailed, causing the upswing motor of investment and consumption to sputter and transforming into a declining wave (Day 1976). In the depression phase, the capital is unable to find enough productive opportunities for investment, causing a devaluation of capital (Mandel 1976; cited by Delbeke 1981: 251). This is followed again by higher rates of savings and the

¹ Interestingly, Kondratieff linked the long wave with gold production.

discovery of cost-cutting innovations (Day 1976), which enables the process to restart.

Others, such as Schumpeter (1939), emphasized the importance of clusters of innovation and technological changes as the base for the long waves. The disappearance of profit and together with the change from monopolistic to competitive markets would be the turning point of long waves, which would lead to the periods of creative destruction (Schumpeter 1976: 81–86), eliminating the inefficient sectors of the economy during the depression phase. At this stage, the economy will be dominated by cost-cutting rationalizing management. This contrasts with the start of a new wave which is characterized by entrepreneurship, instead of management, and stimulates innovative action and technological renewal (Delbeke 1981). Organizational, managerial and social changes play a major role as preconditions for the emergence and spread of technological innovations (Schumpeter 1939; Vayrynen 1983). Mensch (1979) gave Schumpeter's technology-driven theory an empirical base. Incorporation of new industrial sectors and new markets in the capitalist system were crucial during the upswings of 1825, 1886, 1935. The effect on longtime growth of the economy as a consequence of these technological revolutions would however be limited in time. Growing saturation of the new markets, leads to the need of export of surpluses and provokes competition between countries, which eventually leads to the complete saturation of demand of the world economy's leading sectors. The only fundamental solution would be a renewal of the economy, through a new aggressive innovation policy (Delbeke 1981). This means that within the endogenous model 'innovations do not happen, they are made to happen' (*Ibid.*), but also that radically different innovative ideas generally must wait for next upswing (Forrester in Delbeke 1981). On the basis of the observations, it may be concluded that innovation life cycles, infrastructural investments, the dynamics of new industrial branches and the long waves of economic development are associated with one another (Van Duijn 1982: 129–144 in Vayrynen 1983). Each Kondratieff upturn can be linked to a set of technological innovations such as railroads or the automobile suburban complex [Block 1981; Harvey 2010]).

Although the role of capital has gained predominance for explaining wave-patterns, I want to emphasize that, in my opinion, this can never be seen apart from the rest of the organization of society, which explains why long waves in economics can never be interpreted in a deterministic sense. Other production factors, for example, have a dialectical relation with the capital accumulation process; and thus with K-waves. Labor and land, for example, stay heavily attached to the patterns of development within the capitalist world economy. According to Rostow (1978 in Delbeke 1981), for example, long waves provoke

changes in the profitability of producing food and raw materials; growing population and rising real income during the upswing create an increasing pressure on the supply of food. In the same way, developing industrialization creates a pressure on the available supply of raw materials (Delbeke 1981: 9–10). (Further reading Jason Moore.)

Within the labor market, competitive pressures within industry become stronger during the downturn. Labour-saving and material-saving technical changes become increasingly important for competitiveness of production. This leads to the growth of capital intensity of production (Freeman 1979; cited by Delbeke 1981). The interdependence between labor market, technology and capital intensity make it very difficult to distinguish unemployment as a result of production innovation from unemployment because of saturation of demand (Delbeke 1981), but from a non-deterministic perspective on long waves in capitalism, they can be both part of the same mechanism.

The same is true for the superstructure of capitalist society and its institutions. Long term developments of capitalism have formed, reformed and deformed the institutions of reproduction of the capitalist society. This is also the case for democracy, as an institution for governing political relations between citizens and the capitalist state. Today's political turmoil and the declining legitimacy of existing democratic institutions as a consequence of the economic depression and its interaction with long waves is the object of study of this paper.

RELATIONS WITH POLITICS

Kondratieff's initial endogenous theory has been criticized by Trotsky (1923) from the beginning, using a dialectic materialist perspective on the relation between economics and society in contrast to Kondratieff. His main critique was that Kondratieff's model was too schematic and deterministic. He emphasized the importance of the dialectical relationship between economics and politics. Although he recognized the existence of patterns of long periods of capitalist development, he emphasized the influence of elements which were the part of the political superstructure of the capitalist society. These made the turning points of Kondratieff's wave rather unpredictable, which made Trotsky conclude that their periodicity had never been fixed (Trotsky 1923). 'Significant external factors of this superstructural order or external conditions, are wars and revolutions, which determine the character and alteration of expansive, stagnating or declining epochs of capitalist development' (*Ibid.*: 9; also cited by Day 1976; Vayrynen 1983).

Polemizing with Kondratieff, Trotsky stated that long cycles did not 'grow out of the internal dynamics of the capitalist process as such, but out of

the conditions in which [the accumulation process] finds itself ... out of the opening up of new continents, colonies and markets for capitalist activity, or out of the military and revolutionary shocks which cross its path' (Trotsky 1923; Day 1976: 78). Superstructural events hinder the free or semi-free interplay of economic forces. Trotsky sought to demonstrate that 'external conditions' and the relative autonomy of 'superstructural' phenomena precluded any automatic periodicity of long cycles (Day 1976). Moreover, he saw the economic process as such too complex and statistics too limited to have a deterministic positivist economic model (Trotsky 1923). The logical consequence was that Trotsky denied the existence of long cycles and referred instead to distinct 'epochs', or historical 'periods', (Day 1976) which also showed patterns of economic growth and decline, for which the economy in the last analysis nevertheless stayed crucial, but were less deterministic and more open to influence from the superstructure. Governments are thus not totally at the mercy of the long-term developments of K-wave (Vayrynen 1983).

In his original critique, Trotsky (1923) identifies two political events that would have influence on long waves and their turning points: wars and revolutions. Basically these are two systems interrupting events on two apparently different domains: national politics and international politics. These are also the two different arenas where contradictions of the system of production express themselves in the form of a legitimation crisis, as Habermas (1975) analyzed, on the national level and will be developed further on in this paper. As is the case with the legitimation crisis of the system on the national level, imperialism and (neo)colonialism are a transfer mechanism for externalizing the internal contradictions between Labor and Capital, resulting in a social redistribution of power and wealth and a reconfiguration of power relations. What is expressed on the national level as a fiscal crisis or a crisis of overproduction, can culminate in major wars between major countries (Van Duijn 1982). These crises themselves can have a major effect on capital accumulation processes, by removing or erecting barriers to the accumulation process, and thus have effects on the long term development of capitalism and its long waves. Wars and revolutions often condition industrial change, but they are not its prime movers (Schumpeter 1976: 82). Both are determined, but only in last instance, by economic conditions, as they both are the consequence of changing power relations and changes in legitimacy of those relations.

Most studies about the interaction between long waves and politics have been conducted on the level of international relations. States are, for example, within certain limits, 'able to steer and restructure the reality, including engaging in military confrontations among themselves' (Vayrynen 1983: 402). The U.S. case, for example, shows the possibility that 'participation in a major

war outside one's territory may prolong the upswing preceding war by stimulating the economy' (Van Duijn 1982: 6; Vayrynen 1983: 408). But an economic crisis also does always lead to political and military confrontations. If the crisis is deep enough, however, as it was between the two world wars, such confrontations cannot be avoided. The best way to analyze the effect of long wave is thus to start from 'a mutually inter-dependent historical process' (Vayrynen 1983: 407) as major wars bring about economic consequences that alter the course of the economic cycle from what it would otherwise have been (*Ibid.*).

A similar point of view should be taken into account for the national social and economic policy, with the existence of a margin for governments to temporarily escape the effects of economic crisis through policy-measures, and by this temporarily overcome the contradictions of the capitalist system that provoked the downturn. This could explain how the crisis of the nineteen seventies could have been postponed by neoliberal reforms, the liberalization of financial markets and the reincorporation of the markets of Eastern Europe into the world market.

The above discussion illustrates why this paper does not speak out on the endogenous or exogenous character of long wave patterns. For the same reason, this paper uses the term 'long wave', as does Van Duijn (1982: 1), and not a 'long cycle'. 'The distinction between "wave" and "cycle" is important, as the term "cycle" suggests a model, in which fluctuations are generated as an endogenous process; with fixed periodicity and amplitude' (*Ibid.*).

LONG POLITICAL CYCLES THEORIES

Most of the research done on the mutual influence of economic cycle patterns and politics are focused on the influence of elections on macro-economic policy, concentrating on the macro-economic effects of electoral cycles, the so-called political business cycles (Tufté 1980; Willett 1988; Nordhaus 1975). The rest of this paper, however, will discuss theories that focus on the reverse relation: the influence of economic wave-patterns, in particular long waves, on the political sphere.

While Vayrynen (1983) and others also have studied the influence of long waves on international relations, this article concentrates on the political legitimacy of national institutions, assuming that political decision-making is affected by the economic evolution. The margins of decision-making are smaller during the periods of stagnation and negative growth. Hence constraints on government action are greater during long economic downturns. Those periods are usually associated with nationalism and conservatism while the upswing phase gives rise to liberalism and reformism (*Ibid.*). Wave-like patterns of political developments, based on economic cycles can be found in the work of

Eric Hobsbawm (1994). The most influential general theory, however, is that of Huntington (1991) (see Green 1999; Doorenspleet 2000; Fraser 2001).

In *The Third Wave: Democratization in the Late Twentieth Century*, Samuel Huntington (1991) elaborated a theory of 'waves of democracy' – believing that democratic institutions 'emerged in waves of democratization', observing three of those waves: the first one of 1828–1926 with the democratization of Europe, the second one between 1943 and 1962 in the period of the defeat of Nazi-Germany and the decolonization, and the third one, the democratization in Southern Europe, Latin America and Eastern Europe of 1974–1990. Between the three waves were reverse waves, these periods being 1922–1942 and 1958–1975 (Fraser 2001; Doorenspleet 2000).

Huntington (1991) defines waves of democratization as 'groups of transitions from nondemocratic to democratic regimes that occur within a specified period of time and that significantly outnumber transitions in the opposite direction during that period of time' (Huntington 1991: 15; cited by Fraser 2001: 53), also involving liberalization or partial democratization in political systems that do not become fully democratic. Reverse waves are periods in which 'some but not all of the countries that had previously made the transition to democracy, reverted to nondemocratic rule' (Huntington 1991: 13–16; cited by Fraser 2001: 41).

According to Huntington (1991) two factors might cause prolonged economic growth to give rise to a wave of democratization. The first one would raise the growth of Gross Domestic Product (GDP) per capita and create the economic possibility to 'afford' democratic governance. The second one, rapid economic growth, would give rise to political tensions and movements that disrupt and challenge the prevailing political order from which democratic governance may emerge (Fraser 2001).

Huntington's approach is an exogenous approach to democratization, as it assumes that 'democracies are equally likely to emerge at any level, that is, even if development under authoritarianism does not increase the probability that a country will become democratic' (Przeworski and Limongi 1997: 181), and the reason why more developed countries have a higher chance to be democratic is because once they are democratic they are more likely to stay democratic. The exogenous approach concentrates on external influences, such as wars, leading to exogenous transitions (Fraser 2001; Green 1999). World War I and the Russian Revolution, for example, played an important role in the establishment of universal suffrage in Europe (Fraser 2001; Green 1999). World War II and the destruction of Nazi-Germany played an important role in the second wave of democratization and the collapse of the Soviet Union could be seen as an external factor in Huntington's Third Wave of democratization

(1991). Nonetheless, the important role of external pressures for democratization does not contradict with the existence of wave-like developments, as we have seen that events as wars and revolutions are closely linked with them.

The endogenous approach, on the other hand, assumes democracy as the result of development itself, implying that 'if other countries become as rich as the economically advanced nations, it is highly probable that they will become political democracies' (Lipset 1959; cited by Przeworski and Limongi 1997: 175). This is essentially a modernization theory of democratization, assumes that some level of economic development is a prerequisite for democracy (Przeworski and Limongi 1993) and originated in the comparative study of Seymour Lipset (1959). It supposes that 'modernization consists of a gradual differentiation and specialization of social structures that... consist of sequences of industrialization, urbanization, education, communication, mobilization, and political incorporation, among innumerable others: a progressive accumulation of social changes that prepare a society to proceed its culmination, democratization' (Przeworski and Limongi 1997). Habermas (1975) adopts it in the next section 'Legitimation crisis' when he states that the increasing complexity of the economy and organization of society destroys barriers of participation and contradicts the top-down structure of authoritarian decision-making.

Although the debate between endogenous and exogenous models of democratization has been fierce, the holistic approach which this paper adopts, making no distinction between endogenous and exogenous models for long waves makes the difference between both models of democratization – or better periods of political contestation, as we will address further in this paper – pointless, as exogenous factors such as wars and revolutions can be brought into the model through the effect of long waves. In this sense, the only thing that matters is that a correlation between long waves and the democratization processes, be it endogenous or exogenous, appears to be proven in empirical studies (Fraser 2001).

Other criticisms on Huntington's theory (1991) are more relevant for this paper. The first is the problem that democratization and reversal, revolutions and counterrevolution, usually occur at the same moment. The Russian Revolution provoked on the wave of democratizations in Western Europe after WWI, but at the same time harsh counteractions happened (Green 1999). Although Huntington (1991) saw capitalist growth as a democratizing factor, Polanyi (1944) defends that popular democracy and social protectionism also were seen as threats to free markets and entrepreneurship by the economic elite, whose governments during the 1918 wave sought fascist help to restore law and order.

The second criticism is conceptual. Huntington's definition (1991) of democracy is based on Dahl (1971 cited by Doorenspleet 2000: 385) and incorporates three requirements: competition, inclusiveness and civil liberties. In practice he focuses only on competition, ignoring even the requirement of universal suffrage: voting rights for women, for example, do not play a role in Huntington's analysis (Doorenspleet 2000). Doorenspleet (2000) tries to answer these problems with a more inclusive definition and an adaptation of Huntington's countries-model. However, even this formal definition of Democracy remains very fragile. Although during the 1990s the number of democratic countries, according to her definition, would have been known as a peak, for example, the success of neoliberalism and the consequent reduction of the public sphere reduced the competences of voters. Or as Graeber (2011: 383) states that since Thatcher and Reagan, 'everyone could now have political rights, but political rights were to become economically meaningless'. The number of democracies in the procedural definition may thus have been augmented, the number of democracies in the substantive definition² probably not; decreasing party-memberships, decreasing participation in elections and the rise of anti-democratic parties in Europe since the beginning of the nineties reflect this trend.

LONG CYCLES AND LEGITIMACY

Keeping the previous criticisms on Huntington (1991) in mind, this paper concentrates on the relationship between long waves and legitimacy / political contestation of existing institutions instead of their immediate relation with democracy. The concept of legitimacy, and particularly the sociological approach to legitimacy, enables us to avoid arbitrary definitions of democracy; which are themselves a product of dominating norms and ideology. Moreover, a stronger relationship between long waves and political contestation should be expected, as political (output-) legitimacy³ of relationship forms the logical link between economics and the political superstructure.

Economic growth can provoke democratization, as Huntington (1991) and Doorenspleet (2000) propose, and recession could provoke a reverse cycle, but this is not necessary the case, it can even have the adverse effect. Growth can serve, and has historically served, as Przeworski (2000) showed, for providing

² Measuring them as regimes viewed by them as being a representative of the general will or common good, although the measurement is problematic (Schumpeter 1976).

³ As I am primarily interested in the relation between the economic developments and political legitimacy, this paper will primarily focus on output-legitimacy. For a further discussion about input and output legitimacy relating to financial crisis situations, see my paper 'A Sequential Theory of Legitimacy Loss', written for the seminar of Democratic Theory, PhD Course Democracy for the XXI century (Van Vossole 2012).

authoritarian regimes with the means to legitimize themselves, with contemporary China as an excellent example. Recession, on the other hand, can lead to claims for more equal redistribution of wealth and power, and thus for a more democratic society, as shown in the Arab Spring and the occupy movement in the recent period. Both up- and downturns of the long wave entail periods of withdrawal of legitimacy of the political system, and will provoke political contestation.

The upswing and legitimacy

The theory of the relation between strong economic growth and the evolution of political legitimacy, this paper uses, can be brought back to the factors influencing democratization Huntington (1991) addressed. Rapid and differential growth, as a consequence of the development of new sectors and technologies, would give rise to political tensions and movements that disrupt the prevailing political order. Growth would generate the political forces that could challenge the prevailing order and refuse to accept the legitimacy of existing power structures, when they are not adapted to new power relations (Fraser 2001). This is what Ronaldo Munck calls 'Marx-type of unrest'. It is based on Marx' historical materialist idea that economic development leads to new (class) forces with new interests and the creation of a new power struggle. The development of merchant capitalism, for example, created the first bourgeois classes, which contested the feudal institutions, and the process of early industrialization created a rising working class which contested the minimal democracy and the existing inequalities. These conflicts, and thus the contestation of the existing institutional order, originate in the basic contradictions between productive forces and social and political forms.

This explains why a new investment wave ultimately contributes to political and social instability (Day 1976). Examples of this kind of contestation are the feminist movement, consequence of the incorporation of women in the labor-market, which nearly doubled the labor supply needed for the reconstruction and boom of capitalism during and after the Second World War. The same holds for the American civil rights movement and decolonialization movements.

This destabilization through growth, with its higher probability of delegitimation of public policies, however, does not mean that democratic institutions are endangered themselves. Empirical data show that faster growing democracies survive longer than others (Przeworski and Limongi 1997: 167). As growth means there is a 'bigger pie' to be divided, wealth during the upswing creates a broader margin for policy-making and engages in compromises, making systems be able to afford democracy (Huntington 1991).

Rising political contestation during periods of upturn can thus be expected, but they are more likely to lead to reform of the existing policy structures than their overthrow. It should be noted, that according to Huntington, possible democratization during the upturn would threaten further growth. In his view 'democracy generates an explosion of demands for current consumption. These demands, in turn, threaten profits; hence they reduce investment and retard growth' (Huntington 2006; Przeworski and Limongi 1993), and thus lay the seeds for a new downturn.

The downturn and legitimacy

Despite the near trivial relation between legitimacy and economic crisis, only relatively few social scientists have analyzed the subject (Block 1981). Instead, most of the literature is based on the relation between democratic legitimacy and the degree of economic development, going back to the study of Lipset (1959) on the social requisites of democracy (Przeworski and Limongi 1997). Block attributes this to two factors: an excessive belief in economic growth, which was only strengthened in the last decades of neoliberalism, and the academic division of labor which separated economics and the other social sciences.

Economic crisis nevertheless represents one of the most common threats to stability (Diamond and Linz 1989; Przeworski and Limongi 1997: 169). Political systems have a high probability of transition and institutional change, when confronted with negative growth. This is the case for democracies as well as for autocracies. Empirical research by Przeworski shows that when democracies face a decline in incomes, they die at the rate of 0.0523 and can be expected to last for nineteen years. Authoritarian regimes die at a rate of 0.0261 and are expected to last for thirty-eight years. They are thus much less stable than in years of growth, with two rates of 0.0160 and 62 years in democracies, and 0.017 and 58 years in autocracies (Przeworski and Limongi 1997: 168). These effects of a crisis manifest themselves immediately. One year of an economic crisis is enough to produce political effects; growth in the recent past does not make any difference (Przeworski and Limongi 1997).

The theoretical relation between the downturn of economic cycles and political legitimacy in this paper is inspired by the transfer mechanisms theorized by Habermas (1975). Although Habermas bases his theory of legitimation crisis on the mechanism of short, decade-long (Juglar) business cycles, his observations are worth considering for long cycles.⁴ According to Habermas (1975), crisis tendencies shift from the economic into the administrative system through the transfer mechanism of government intervention. Government inter-

⁴ Habermas based his theory on the same cycle that served as inspiration for Kondratieff.

vention is required to protect⁵ citizens from an immediate transformation of the contradictions within the capitalist economy into a social crisis, causing mass unemployment, poverty, hunger and violence (Block 1981).

With this immunization, economic crisis, however, has been transferred to another level, meaning that crisis can be reflected in disparate wage developments, permanent inflation and corresponding uneven redistribution of income, disproportional sectorial and geographical developments, and a permanent fiscal crisis as 'the economic crisis is intercepted and transformed into a systematic overloading of the public budget' (Habermas 1975: 69). Ultimately crisis management is the re-coupling of the economic system to the political system. Economic processes, power-relations, class-relations and social distributions of wealth, which had been de-politicized and obscured by the market mechanism, by Habermas (1975: 36) designated as an 'ideology of fair exchange', are re-politicized and visualized suddenly. They are not anymore divine 'natural laws', but the part of a political choice (*Ibid.*).

Due to the re-politicization of the allocation of wealth, policy-makers are confronted with a dilemma. Policy-makers have the political choice between passing the social cost of the downturn to the majority of the population, by cutting back on public goods and services, and raising taxes beyond the levels that are seen to be fair, and thus risk to reduce its output-legitimacy, or they can undermine the accumulation process of the economic elite by reducing services needed to capital for its reproduction or 'by raising additional revenues in an inflationary manner' (O'Connor 2001 cited by Block 1981).⁶

The consequence of the first option is public poverty, impoverishment of public transportation, education, housing and health care (Habermas 1975). The concern with personal happiness that characterizes the consumer society, which has come 'increasingly to rest its claim for legitimacy on its capacity to assure continuous economic growth to provide a range of services to the population without raising taxation to a level perceived as oppressive', comes into conflict with the need for discipline in a period of slow growth (Block 1981: 2). The end of continually rising living in developed capitalist societies, dramatically undermines the legitimacy of modern states in capitalist societies, (Habermas 1975; O'Connor 2001 cited by Block 1981) and as governments lag behind what people expect from them, the 'penalty for this failure is withdrawal

⁵ According to Polanyi, this ability for protection against the 'self-regulating market' is the legitimation of the state.

⁶ The recent austerity measures can be put in the first category, QE2 can be put in the second. It should be noted, however, that QE and monetary expansion of the ECB primarily affect financial capital, and much less industrial capital. This financial capital, particularly in the USA, is in the hands of foreign investors.

of legitimation' (Habermas 1975: 46) meaning that 'the system does not succeed in maintaining the requisite level of mass loyalty' (*Ibid.*: 69).

Political legitimation should compensate for the loss of economic (output-) legitimacy of the market, as it cannot rely on its legitimizing claims of rationality during a crisis. However, while crisis management creates an increased need for legitimation by the political system, as a consequence of the crisis, the scope for action contracts precisely at those moments in which it needs to be drastically expanded to be successful (*Ibid.*), leading to a legitimation crisis of the political system. As the margins of decision-making are smaller during the periods of stagnation, political legitimacy is affected by a long economic downturn (Vayrynen 1983), and a higher level contestation of the political establishment can be expected.

WAVES OF POLITICAL CONTESTATION

The loss of legitimation is expressed, and can thus be empirically measured, in the political behavior of the subjects of the state.⁷ During a legitimation crisis subjects become both more critical and/or apathetic, while the state has the tendency to change its degree of repression (Habermas 1975). Keniston (1968 cited by Habermas 1975) observed the critical, activist side in student movements, revolts by school children, pacifists and women's emancipation. The retreatist, apathetic side would be represented by hippies, 'Jesus-people', drug subculture, phenomena of undermotivation in school, *etc.* Furthermore, Habermas (1975) believed that the legitimation crisis would re-visualize class contradictions, which had been concealed by the apolitical market-mechanism.

Data on the normal (Juglar) business-cycle time intervals show this relationship between conjuncture and political contestation. For example, a relation can be observed between rising unemployment and recession and the occurrence of general strikes (Kelly and Hamann 2009; see also Table 5 in the Appendix). A similar relation can be found between economic downturn and the electoral success of right wing extremist formations (De Bromhead *et al.* 2012). Within our theoretical framework of long waves, we could expect the same patterns: a downturn of the long wave could appear as a wave of political contestation and class struggle.

From this discussion, this paper assumes the existence of waves in political contestation, recurring waves of political action and higher degrees of politicized participation or politicized nonparticipation (retreatism) during the periods of highest growth in the course of the upswing of a long wave and during

⁷ For a further discussion see my paper 'A Sequential Theory of Legitimacy Loss', written for the seminar of Democratic Theory, PhD Course Democracy for the XXIst century (Van Vossle 2012).

the years of negative growth in the course of the downturn. A look at first glance on history in Europe confirms their existence. The great depression coincided with a general legitimacy loss of establishment parties, the success of political movements of the radical left and radical right and a wave of popular mobilization. A similar wave of contestation happened at the end of the sixties and the nineteen seventies, with a wave of protests, feminist mobilization, civil rights movements, terrorist actions of left and rightwing movements.

Hitherto, in the decades since World War II the most advanced capitalist countries have succeeded (the May 1968 events in Paris notwithstanding) in keeping class conflict latent in its decisive areas; in extending the business cycle and transforming periodic phases of capital devaluation into a permanent inflationary crisis with milder business fluctuations (Habermas 1975) by budgetary and monetary expansion. Today, both stimuli and policies reach their limits, both at the monetary (the loose policy was at the origin of the financial crisis) and budgetary levels, as the high sovereign debts become unbearable, a fiscal crisis situation developing in almost every country and defaults are bringing the financial system in the danger zone. This is expressed in a deeper legitimation crisis.

Today's legitimation crisis could be observed on the activist side in the occupy-movement, the general strikes sweeping through Europe, the Arab Spring, the success of the populist right and populist left in elections and the instability of governments. The retreatism could be found in decaying party-membership, particularly in government parties, the lower electoral participation, experiments of 'non-capitalist economies', *etc...*

Conclusion

This paper defends the case of the existence of long waves in politics. Existing main stream political wave theories, in particular that of Samuel Huntington (1991), show serious shortcomings. Huntington's observation, that rapid growth provokes possible legitimacy problems for regimes, could be retained in certain circumstances, but should be complemented with the fact that negative growth has even a bigger impact on legitimation and possible change of the political institutions (Przeworski and Limongi 1997).

As an alternative this paper proposed the existence of waves based on legitimation, which would be expressed as waves of political contestation. These waves find their driving force in the internal dynamics of the economical long wave theories.

Nevertheless, the long wave-approach should never be regarded in a deterministic sense, but as a framework which enables social scientists to engage with different dimensions of social sciences in interdisciplinary manner com-

binning elements of history, economy, sociology and political science to understand and frame current events. It enables us to place the recent economic crisis and the political turmoil into a historic perspective. It also gives us a framework to look critically at the solutions proposed by policy makers to this reality.

This paper only established a theoretical hypothesis that should be empirically substantiated. This could be done by a comparative approach of election results over the time, a comparison between social movements, as well as by the occurrence of general strikes for example. Other parameters are the occurrence of terrorism and the behavior of political parties. This paper should thus be an invitation for further research and the deepening of the presented hypothesis.

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Appendix

Table 1. Kondratieff wave chronology

Long wave number	Long wave phase	Dates of the beginning	Dates of the end
One	A: upswing	'The end of the 1780s or beginning of the 1790s'	1810–1817
	B: downswing	1810–1817	1844–1851
Two	A: upswing	1844–1851	1870–1875
	B: downswing	1870–1875	1890–1896
Three	A: upswing	1890–1896	1914–1920
	B: downswing	From 1914 to 1928/29	1939–1950
Four	A: upswing	1939–1950	1968–1974
	B: downswing	1968–1974	1984–1991
Five	A: upswing	1984–1991	2008–2010?
	B: downswing	2008–2010?	?

Source: Korotayev and Tsirel 2010, Table 1 and 2.

Table 2. Democratization waves

Democratization Wave	Reverse Wave
1828–1926	1922–1942
1943–1962	1958–1975
1974–1990	

Table 3. Long waves in industrial production since 1782

	Prosperity	Recession	Depression	Recovery
The first wave	1782–1792	1815–1825	1825–1836	1836–1845
	1792–1802*			
The second wave	1845–1856	1866–1872	1872–1883	1883–1892
	1856–1866			
The third wave	1892–1903	1920–1929	1929–1937	1937–1948
	1903–1913**			
The fourth wave	1948–1957	1966–1973	1973–	
	1957–1966			

Note: * War in 1802–1815; ** War in 1913–1920.

Source: Vayrynen (1983), based on Schumpeter (1939) and Huntington (1991).

Table 4. Hobsbawm's historical periods and long wave periodicities

	Upswing	Downswing
<i>Long Nineteenth Century</i>		
Age of Revolution 1789–1848	First 1793–1814/25	1814/25–48
Age of Capital 1848–75	Second 1848–73	
Age of Empire 1875–1914		1873–96
	Third 1896–1914/20	
<i>Short Twentieth Century</i>		
Age of Catastrophe 1914–45		1914/20–48
The Golden Age 1945–73	Fourth 1948–73	
The Landslide 1973–97/8		1973–98

Source: Hobsbawm 1994.

Table 5. Growth and strikes

		Greece	Italy	France	Spain	Belgium	Total
Unemployment	Falling	25	13	4	1	1	44
	Rising	13	3	6	6	6	34
Price inflation	Falling	18	7	5	5	1	36
	Rising	20	9	5	2	6	42
GDP growth rate	Falling	23	10	8	4	5	50
	Rising	15	6	2	3	2	28
Gross nominal earnings	Falling	20	5	5	5	5	40
	Rising	18	11	5	2	2	38

Source: Kelly and Hamann 2009.

Indicators – More than Evidence and Maths¹

Peter Herrmann

Abstract

Work on conceptualizing and measuring poverty is widespread. Looking at the literature we can make out some form of cycles of different perspectives on the topic, oscillating between issuing poverty as a very general matter, on the one hand, and concentrating on very specific problems as, for example, poverty of certain groups or the consequences of living in poverty. While, of course, attention is frequently paid to the connection between poverty and economic development, little consideration is given to the link between poverty and large cycles of capitalism. The present contribution is devoted to theoretical investigation of this matter. This means as well that certain aspects of empirical approaches will be critically investigated. The aim is to problematize some philosophical and methodological aspects of quantification/mathematization, equivalence principle and claim of exchangeability, individualization and, finally, evidence.

Keywords: *poverty, measurement of poverty, Europe, Kondratieff, social quality.*

Introduction

Moving between the worlds – it means not least that one has to deal with different and multiple facets of a complex picture – and considerations of different aspects of analytical thinking are surely merging with some biographical moments. In this perspective my personal-professional development – working in different countries and covering different subject areas – can surely be seen as some privilege. Getting different takes on specific issues – but also: being challenged to see more or less distinct issues as part of a wider picture. And many things may indeed look very clear if looked at in detail – but taking another perspective, a more distant view, they emerge easily as something entirely different, something that is miraculously beautiful, magic.

¹ The contribution goes back to notes made in preparation of a presentation during the Summer School in Cork: Conceptualising and Measuring Poverty, 18th–22nd June 2012.

Unfortunately such change is only optional – the changed perspective may also show something that is frightening, odious, though it may also be that more distant views open occasionally a door of some kind of social-romanticism while the reality, its close investigation, shows immediately another picture: niceties turn into a rather harsh reality for those who have to face it as matter of their everyday's life, as condition under which they live ... – I will return later to the point of conditions, just keep in mind that I mentioned the term already.

Johann Wolfgang von Goethe, in his piece on *Wilhelm Meister's Apprenticeship* may give us some guidance, saying:

The fabric of our life is formed of necessity and chance; the reason of man takes its station between them, and may rule them both: it treats the necessary as the groundwork of its being; the accidental it can direct and guide and employ for its own purposes; and only while this principle of reason stands firm and inexpugnable, does man deserve to be named the god of this lower world (Goethe 1917).

The European and Social Policy Framework

One aspect of my development has to do with my emigration from the European centre, namely from Germany – which was at that time a rich country – to the poor European periphery, namely Ireland. During that period we can see reasonably clear borders between these two countries.

Nevertheless, actually the lack of clarity brought me to Ireland – a project that started from looking the initial topic emerging to research economic activity on the street level. Over time, this moving between the worlds was also a move between different disciplines, subject areas of social science, covering sociology, law and economics – mind, I do not speak of social policy although this is usually considered to be my field of expertise.

It had been a long way – and although I maintained the commitment to combating poverty, my orientation shifted in several respects. For instance, my commitment shifted from working within Ireland towards activities outside of Ireland, first 'in Europe'. And two monuments may be mentioned as somewhat influential, the one standing in front of the European Parliament in Brussels – a woman, holding in a victorious position up the Euro-symbol. Is it the Europe, the young Europe, abducted by Zeus – abducted and apparently over all the years having forgotten her oppression, being tamed, domesticated by the divine bull, and now carrying herself the ring, not aiming at taming the beast but using it as device for self-discipline. This Europe, again in a victorious position, is presented by a statue in Strasbourg. And this reference to the ancient Greek saga is usually meant to represent not least the ancient Greek values which are seen as common tradition behind today's Europe.

The Positive about Europe

Leaving at some stage the work in the vicinity of the European institutions and not least developing activities in other countries and regions probably meant to develop more Europeaness than I had been the cases before. It meant in particular valuing the European social model (throughout the following I will name some ambiguity going hand in hand with this appreciation; see as well Herrmann 2007, 2011a). This appreciation is not any celebration of an illusionist renaissance of the Eudemian Ethics as it is usually considered as Greek tradition; my general appreciation is more about another root of European values, namely the Roman tradition, in particular the *Leges Duodecim Tabularum* – the twelve tables as foundation of Roman law and as such the origin of the modern legal system of the Western democracies.

But as much as such system of accountability and equality will be appreciated in the light of other traditions, this, of course, poses immediately a radical question: Positive law stands against negative developments, is suggested as answer to something that is considered to be fundamentally negative, as instrument in fighting poverty?

As much as there is immediately a question mark showing up when it comes to looking at this admittedly playful formulation as it is referring to a very serious and complex issue, there must be another question mark showing up when it comes to ‘indicators’.

As much as Plato is known – and misunderstood – for his rather special reflections on love, he should also be known for his view on numbers and figures respectively. In his opinion figures were *real*: for instance, in a row of four figures, starting with 1, the figure 3 was as real as the third wheel of a four-wheel drive even if you do not fully see it.

And such platonic love of figures is also frequently applied to indicators: though being at first technically nothing else than a row of figures, they are suggested as reflection of a row of life situations, a consideration of complex pictures of life.

Social Policy as Part of the Critique of Political Economy

Understanding is only possible if we look at the real complexity of life – and we should not be afraid to understand life as a fundamentally economic issue. As Frederick Engels put it:

According to the materialistic conception, the determining factor in history is, in the last resort, the production and reproduction of the immediate life. But this itself is again of a twofold character. On the one hand, the production of the means of subsistence, of food, clothing and shelter and of the implements required for this; on the other, the production of human beings themselves, the propagation of the species. The social institutions under which men of a definite historical epoch and a particular

country live are determined by both kinds of production: by the stage of development of labour, on the one hand, and of the family, on the other. (Engels 1990 [1884]: 131 ff.)

This means for Engels the topic is the production of everyday's life. Life and its production occur under certain conditions, that is as moment of the mode of production. And here the current relationship between economics and social (policy) science is comparable with the marriage of god and the devil. First a loving couple, inseparable, now they are still welded together but, like fire and water, hating each other: *odi et amo*.

Maintaining the Pyramid – Stabilizing the Foundation

Usually we consider this hate-love-relation in terms of available resources – and especially in times like ours there is a sadly-good reason for this.

- While watching the queues in Cork, people looking for jobs abroad and ready to emigrate, you may say (if you like positive thinking) something like ‘Well, about four years ago there were similar dole queues. Now there seem queues for hope’. It is about internationalization by way of migration.

- In Budapest people sleeping rough – actually many not sleeping rough anymore, because the Hungarian government criminalized homelessness, begging, being *cygan*, etc. It is about criminalizing the victims.

- Teachers in Greece, feeding pupils because they are collapsing at schools – and we are speaking of privileged kids as many do not even make the way to the lessons – actually I have also heard last weekend the same being true now for Germany. This is about the failure of statutory systems, depending on self-help and charity (I do not speak simply of solidarity though this surely plays a role).

- And of course, finally, we have to point at those rough pictures showing us blunt murder in the middle of the global village: starvation of the poorest; in other words, global trade as global mistreatment – German language allows for the play with words: the German word for trade is *Handel*, the word for mistreatment is *Mißhandlung*.

Acknowledging that this happens under the auspices of welfare states, we should feel encouraged to defend the achievements, but nevertheless enter a fundamentally critical debate of this system at the very same time.

There is surely a simple answer to this: redistribution – and I would be the last contesting the need for immediate steps. These have to be immediate and also massive.

This is importantly a different approach than frequent calls for the caring welfare state. The welfare state is undeniably one of the most important achievements of the last 150 years, incidentally the German Reich celebrates this year the 150th anniversary. And 2012 is also the 70th anniversary of the

Beveridge Report. And not least, 2012 is also the International Year of Cooperatives.

Social insurance was favored by the then German minister of trade, Graf von Itzenplitz. Later, Bismarck took the merit to himself through the history books though in the book of his life we find a chapter in which he is initially a strong opponent of what he characterized later by saying ‘This is state socialism, it is practiced Christendom in legalised action’.²

Acknowledging the importance of this system, we should not forget approaching it in a more systematic way. The following core moments should be highlighted:

1) The welfare state is not simply a matter of *Three Worlds of Capitalism*; rather, we are concerned with one answer to the changing capitalist mode of production.

2) This system is fundamentally misunderstood if we see it as being centrally characterized by values like solidarity. On the contrary, the central point of this system has to be seen in its unsolidaristic character – it is from the Calvinist negativity that the need and space for positive law emerges; this is without doubt the most important and constructive factor which characterises the German social state, the Nordic welfare societies of the early 20th century and the welfare state that developed as Keynes-Beveridgian pattern after WWII.

3) This is also a matter of redistribution: to some extent from the rich to the poor, to a larger extent between the phases of personal life cycles; and for a relatively small remainder – a matter of redistribution between generations. We should not forget that this opens a contradiction within the legal system. This legal system is first and foremost a matter of securing the individual right for exploitation – and any ‘social intervention’ actually contradicts the principle gist of positive law, thus positioning positive law against its own spirit.

4) ‘Social intervention’ maintained a fundamental pattern which actually closely links positive law, the feudal system and modern capitalism, namely the principle of individualization: in feudal societies it is the distinction between the deserving and non-deserving poor, in capitalist societies it is the monetarization of benefits – if you delve a little bit into economics and the analysis of money as general form of exchange you will easily see the connection.³

5) It is also characterizing the welfare systems, namely bureaucratization.

In this light the capitalist welfare system can be seen as – admittedly laudable – instrument that allows people to perform their jobs, however, without allowing discussing what people's job actually is.

² URL: <http://www.rboelling.de/quellen.htm>

³ A special section could be written on ambiguity of the question of women and the individualization of rights.

Outrage – Out of Range

We should not only and not primarily look at people – at least not at individuals. We are actually coming to a fundamental problem of so-called social policy. It allowed and even enforced very much – as an academic discipline and as an area of policy-making – an individualizing and normalizing approach. And it did so by claiming independence of economics and the economy.

Colin Crouch emphasized, for instance, in a recent interview:

Essentially economic knowledge is today in such a way recognised which I cannot comprehend. Especially as economics is dealing with matters on an intellectual level which is distant from real, social life. Economists are abstract in their thinking; they are more akin to mathematicians (Heppe and Mühlhausen 2012).

Investigating this in a wider perspective, the following remains. By separation from economics, social policy paradoxically enforced what it continues to criticize: an economistic model. Taking its point of departure in moral philosophy, economics arrived at a solely growth oriented model culminating in two perversions. The first is the take-over by micro-economics which nowadays dominates in large parts of the entire discipline. Even much of macro-economics is strongly influenced by a fundamentally individualist approach, actually applying micro-economic considerations on the level of a national economy (and equally on the level of global economic development). The second perversion is both, foundation and consequence of this: an empiricist pragmatism emerged already very early in social science, finding its roots in Cartesian thinking. Franz Borkenau brings this on the point, saying that ‘[a]bsolute empiricism conforms to pure practicisim, which completely denies the problematique of norms’ (Borkenau 1971 [1933]: 91).

This seems to be a never-ending story – as quick-motion picture captured by pointing at

- Descartes' proposition

I think, therefore I am, is the first and the most certain which presents itself to whoever conducts his thoughts in order;⁴

- being translated by Locke into the legal form as an ‘individualised social right’, namely the emphasis of private property as fundamental and all decisive

so that it cannot justly be denied him, when his pressing wants call for it: and therefore no man could ever have a just power over the life of another by right of property in land or possessions (Locke 1821 [1689]: 46);

⁴ Descartes, *Principles of Philosophy* (1644), passim.

- followed by Smith' invisible hand

directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention (Smith 1999 [1776]: 32);

- being translated into a general rule of social science where

particular acts of individual persons, since these alone can be treated as agents in a course of subjectively understandable action (Weber 1968 [1921]: 13);

- and finding its latest expression in the privatisation of an up to hitherto public sector closely interrelated with a tightened individualised mindset (see Herrmann 2011c, 2012b).

Seeing Thatcher's phrase that 'there is no such thing as society' as analytically valid, means to open a debate on the fact that societies are hugely, fundamentally and on different levels characterized by contradictions.

(i) One of these contradictions gets obvious in elitism, on the one hand, – estimation easily expressed in words, acknowledging positions but not reflected in deeds, measured in awards, publications, income but not in 'being' – and performance orientation, on the other hand, not least the requirements that have to be fulfilled by the deserving poor – sure, workfare is killing softly, not applying the swift stroke of warfare.

(ii) It seems to be easy to develop the counter argument: if societal figurations that are based on and thinking in figures lost normative guidance, we just have to return to norms, that is from the vicious cycle of greed to the virtuous cycle of good deeds. Even one of the key-figures of number-juggling-economists supposedly stated comfortingly that

[t]he day is not far off when the economic problem will take the back seat where it belongs, and the arena of the heart and the head will be occupied or reoccupied, by our real problems – the problems of life and of human relations, of creation and behavior and religion (attributed to Keynes).⁵

We face again one of the many paradoxes: the critiques of the figures provide numerous studies with myriads of figures, permanently updated and permanently more shocking and ... – I may quote a student from last year, who said 'But we all know this, all this had been said so often but nothing seems to change'.

⁵ URL: http://www.brainyquote.com/quotes/authors/j/john_maynard_keynes

So we find a play with numbers against injustice and, I am convinced, an honest indignation and good will to do better. And this is something we find on the right, on the left, and in the middle of the political spectrum and going hand in hand with the spectre of good-doers. On *The Spirit Level* (Pickett and Wilkinson 2009) we are reminded *Why Social Justice Matters* (Barry 2005). And indeed such figures are revealing, shocking and, of course, Stéphane Hessel is right: it is ‘Time for Outrage’.

But social injustice is much more than revealing and shocking – earlier I pointed at global trade, saying that the ‘German language allows for the play with words: the German word for trade is *Handel*, the word for mistreatment is *Mißhandlung*’.

The Anti-Globalist Moment of Global Capitalism

Rather than maintaining the division between economic and social dimension, we have to emphasize that there is no such thing as the economic or the social as separate sphere. The entire work of Marx is a *Critique of Political Economy* that means a critique of the entire system of how people produce the social conditions under which they live. Thus, we have to look at the determination of the value of labor power as the core question of poverty today. Here are some core points, selected with a focus on those highlighting facts that are of crucial importance in the present context.

- We are living in the era of global capitalism. The only reason for mentioning it is the need for qualification:
 - The system is still to a large extent dominated by national interests – as easily seen by the current Euro-debates: even a regional identity falls easily victim of nationalist interest;
 - The system is largely dominated by a relatively small number of enterprises:

147 companies formed a ‘super entity’ within this, controlling 40 per cent of its wealth. All own part or all of one another. Most are banks – the top 20 includes Barclays and Goldman Sachs. But the close connections mean that the network could be vulnerable to collapse (Waugh 2011).

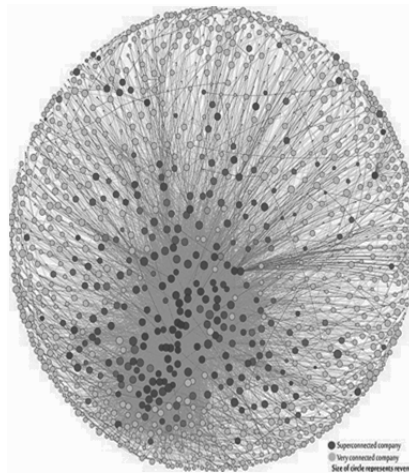


Fig. 1. Core of the Globalised Economy

This means that this capitalism is at least in three respects not simply global capitalism.

1) It is finance capitalism – a fundamentally different system than the capitalism standing at the beginning of this epoch (see for some aspects Herrmann 2011b; and the presentation by J. Huffschnid⁶);

2) It is controlled by a minority of capitalist entities and then again, a minority of this minority consists of ‘productive capitalists’, forcing many into inactivity also as it does not allow developing entrepreneurial activities (*e.g.*, Chang 2010; Schumpeter 1942; Sombart 1913);

3) And, crucially, it is a capitalist system that, in the course of the development of the previously named factors, undermines the fundamental law of its own existence: generating value through production and with this the standard for determining the value of the labour force. We may refer to Marx's famous statement that

[a]t a certain stage of their development, the material productive forces of society come in conflict with the existing relations of production, or – this merely expresses the same thing in legal terms – with the property relations within which they have been at work hitherto. From forms of development of the productive forces these relations turn into their fetters (Marx 1987 [1859]: 263).

– At least two important analytical problems remain for political economy, namely to determine if and to which extent the current changes are changes

⁶ Huffschnid J. Presentation on Occasion of the Seminar Theories of Capitalism. April, 2009. Vienna. URL: <http://www.univie.ac.at/intpol/?p=597> (In German).

of the productive forces or changes of reproductive and distributive forces. It may be possible to solve this by taking Marx's understanding of production very serious; however, it may also be necessary to overcome the understanding of the solely productivist underpinning of the mode of production and to open a path to 'social production' – we may find something going into the direction envisaged in the German Ideology: conditions that allow overcoming a strict division of labour.

– Arrighi allows us to understand more of the current processes that systematically drive us into poverty – and the *us* means: the supposed rich nations. The excess of money took various forms – being originally closely attached to productive processes, taking then the form of 'pure financial speculation'. The latter process moves at some stage beyond its own limits, combining itself with the speculation against states. However, in the meantime financial assets reached such dimensions that speculation is now taking the form of speculation that brings states themselves to the frontline – now as objects of speculation. Arrighi, taking a long-term perspective, shows the rise and fall of major states and empires. The basic pattern follows the sequence accumulation, over-accumulation, investment of excess capital in other countries, unfolding of new capitalist-civilisation there, with a subsequent new over-accumulation, searching for new investment opportunities abroad. It is the long way from Florentine to American capitalism, and possibly peaking in the near future in Chinese capitalism.

- We find a feature that seems to be rather remarkable if looked at against the backdrop of the mainstream publicized arguments, namely the increasing relative share of wages going hand in hand with the decreasing statutory debt while social spending increased.

- This links to another important moment: We are not talking about the lack of money but about the search for new profitable investment opportunities. We can follow a rise of capital since a long time and equally remarkable is the growth of financial assets. In particular the latter means that over years we see actually an increase of excess money.

The volume of finance transactions is currently about 70 times the amount of the entire world's social product, about 20 years ago this amounted to about 15 %. The following table may give you an insight.

Table 1. GNP Worldwide and Financial Assets – Development
(in billion US-dollar)

	1980	1990	1995	2000	2005	2006	2007	2008	2009	2010
GNP	10.0	22.2	29.7	32.2	45.4	49.3	55.7	61.2	57.7	62.9
Financial assets	12.0	54.0	72.0	114.0	155.0	179.0	202.0	175.0	201.0	212.0

Source: Bontrup 2012: 16; with reference to McKinsey Global Institute (Roxburgh, Lund, and Piotrowski 2011), and IMF.

Part of this is the speculation against states.

Another part is the lowering of the costs of working power and the shift of the responsibility for covering them.

• Consequently, we come to a major point in the economic analysis – and it will soon be clear that ‘economic’ development really means socio- and also political-economic development. A quick look at the following graph may give way to some insight – a simplification within the limits of the allowed:

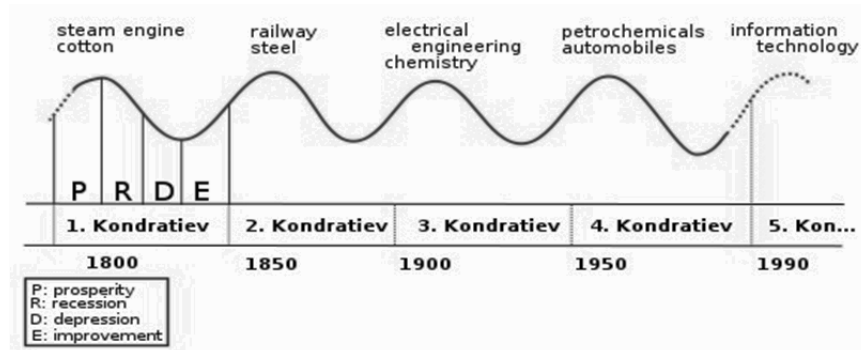


Fig. 2. Kondratiev waves

Source: URL : http://en.wikipedia.org/wiki/File:Kondratieff_Wave.svg. Date accessed: 27.06.2012.

Usually, what Kondratiev called *bol'shie tsikly*, to be translated as ‘major cycles’, is known as Kondratiev waves, long waves or long economic cycle. It is a rather simple and in many respects actually questionable economic model. Leaving the problems with the model aside, it can help us to get an understanding of the battlefield when we are looking at poverty. We can highlight the following major issues of the development:

- We are speaking about economic growth but now it has to be qualified as matter of growth of the ‘productivist sectors’, going qualitatively beyond simple numeric growth of an abstract national product.
- This is, on the one hand, carried by entrepreneurial individuals and groups.
- On the other hand, it offers investment opportunities for excess money (namely over-accumulated capital) – we may say accumulation by appropriation.
- Economic growth does not translate smoothly into any kind of wealth. On the contrary, in short and simplified: take-off phases are very much characterized by a specific pattern of pauperization, taking in particular two forms: precarization and pressure on wages, both reinforcing each other.

– This is accompanied and made possible – by a reduction of the labour power cost – a complex issue, ranging from direct pressure on wages to direct and indirect subsidies to investors and finally charitabilization.

This is in its own respect a factor which at least temporarily opens new fields of investment.

– Change of life styles is another major point in question. The row of path-breaking technological developments characterizing the major cycles can easily show this. All those inventions: steam engine, railway steel, electrical engineering/chemistry, petrochemicals/automobiles, information technology did have a major impact on the way of life – and this is true for all levels and walks of life.

– Having stated this, we are facing a paradox: as much as socialization is increasing, we see at the same time that this socialization itself allows increasing independence. We are dealing with a complex relationality, exceptionally well captured by Norbert Elias. He allows us to understand why Friedrich von Schiller states (after he looked with disappointment at the French Revolution): ‘Man only plays when in the full meaning of the word he is a man, and he is only completely a man when he plays (Schiller 1910 [1794]: Letter XV).

One fact is of special interest – actually justifying some of the traditional social policy orientation: the suggestion that social policy is distinct from the economy. Today the determination of the value of labor is to some extent again taken outside of the economic framework. Managers and enterprises respectively play outside of the pitch, and corporate charitability (for instance, part of the soup-kitchens) is more and more frequent in the countries that are usually considered to be the richest.

Social Quality – A Proposal for a New Orientation

The *first* fundamental point with regards to poverty is..., well: that we should not primarily look at poverty. It had been done for many times and there is obviously no light at the end of the tunnel. Some flickering here and there in a surrounding that remains caught within the limitations of a tube. Actually we may get the impression that things are getting worse, that problem zones shifted to previously unknown areas – but major changes are not in sight.

Second, at the center stage stands the definition of the social, understood as

outcome of the interaction between people (constituted as actors) and their constructed and natural environment. Its subject matter refers to people's interrelated productive and reproductive relationships. In other words, the constitutive interdependency between processes of self-realisation and processes governing the formation of collective identities is a condition for the social and its progress or decline (van der Maesen and Walker 2012: 260).

Normative concepts, based on claimed general values, abstract evidence and assumed commonalities are of no use. The social is something that has to be clearly analyzed, which the different facets have to be determined not as part of a primarily normative system but as part of a complex system. We are dealing with the social as a noun, thus allowing us to understand the substance rather than assuming it. Neglecting this important difference is also a key issue behind the permanent confusion in social policy. We hear of anti-social behavior, we learn about claims for a new social contract, we are confronted with enterprises claiming corporate social responsibility and ... and we hear our students saying 'But we all know this, all this had been said so often but nothing seems to change'.

Third, a major problem is the obsession with quantification. This goes much beyond the celebration of everything that can be expressed in figures. The major problem goes far deeper. Quantification emerges as a major issue in science – and this means in today's terms: natural and social science – at a specific point in time. With Borkebau we can point on three principles:

1) The rules of production in the period of manufacturing are very much based on the quantification and the quantitative comparison which is used in the form of equivalents. This is not only a matter of market exchange but also a matter of the technical side of manufacturing.

2) The principle of equivalence is applied in general, going far beyond the array of production and exchange.

3) With this a final aim is an 'all-rational system', aiming at justifying the capitalist rationality by suggesting the categories of formal law and exchange of equivalents as general rules of the world order (see Borkebau 1971 [1933]: 373 ff.).

Höffe elaborates on this in the work on Kant's *Critique of Pure Reason*, highlighting that '[t]he basic content of the first principle, taken with that of the second, presents mathematisation as a transcendental law of nature, or, more briefly put, as transcendental mathematisation' (Höffe 2010: 200).

Höffe continues by highlighting that mathematization, in Kant's view, is also a matter that has to be applied on intuitions, namely: '[a]ll intuitions, as matter of specific spatio-temporal extension, necessarily possess a quantitative character as extensive magnitudes' (*Ibid.*). And

[h]e grounds the process of mathematisation in the essence of the object: insofar as nature consists in intuitively given, and thus in spatio-temporally extended, data, then objectivity is necessarily bound to quantity, and quantity in turn is bound to extensive magnitudes. Every objective intuition is therefore a case of 'applied' mathematics (*Ibid.*: 201).

From here we can draw a line to later developments in social science: the positivism as proclaimed by Comte but also to some extent the Marxist claim that society could finally be broken down to mathematical formulas.

Fourth, evidence is the main issue in debates in social science – for instance, the European Commission highlighted this in a Communication (European Commission 2010). There is surely a good reason to request informed reasoning behind any decisions and, of course, the planning of decisions. It seems to be taken without question that the strongest evidence is given by numbers, especially numbers understood in a Platonic way as something real. But the flipside of looking for evidence should not be underestimated. Evidence, in simple translation, according to the Merriam-Webster dictionary,⁷ suggests a fact that cannot be challenged.

One of the major problems is the underlying reference to a set of norms that are and cannot be questioned – going back to the Latin root of *ex-videntem* this is getting especially obvious: taking visibility as proof is logically limited to affirmation.

Fifth, taking the definition of evidence from the Merriam-Webster dictionary (evidence as an outward sign, that is indicator), we face a problem with it. The Latin root of the term indicator is in this case actually not directing us to evidence but to something entirely different, we may even say that we arrive at the opposite. *In-dicare* is about valuing something, speaking about something and a proclamation. (a) The fact that a proclamation has to be made means first and foremost that the proclaimed matter is not self-evident – otherwise, it would not be necessary to speak about it. (b) It is reasonable to see such an indication as something that is not fixed, finally determined and self-contained – rather it is an indication by way of opening a field for a detailed exploration, and also lines which to be explored for finding the way across the field. As stated in a forthcoming article, indicators

are not measurement instruments *sui generis*. Rather they are instruments for developing an understanding of complex issues and their trends. As such they need to be guided by a sound conceptual reflection of what they are looking for. For instance, we need work on securing the basic means for existence for human society by indicator studies, and to make actions on both aspects of reserving natural resources and self-restriction on our consumptional behaviours (Herrmann 2012a).

Sixth, what had been said with respect to indicators is of course also part of a political debate which takes place in various realms. An important point of this is processuality – and with this relationality – as the core moment of

⁷ See <http://www.merriam-webster.com/dictionary/evidence>. Date accessed: 12.06.2012.

social research. Though on a seemingly rather abstract level, we are now dealing with some more technical issues of the Social Quality Approach (SQA). Of course, processuality and relationality are generally recognised (for instance, in time series analysis in poverty research). And of course, it is one of the truisms at least for Sunday-sermons that the *Homo sapiens* is a *zoon politicon* – actually it is an interesting exercise to look at the fundamentally individualist notion of pure Aristotelian thinking.

Simplifying tentatively processuality and relationality we can refer to the fact that ‘constitutive interdependency is created by the outcomes of the interplay between two basic tensions’ (Beck, van der Maesen, and Walker 2012: 50).

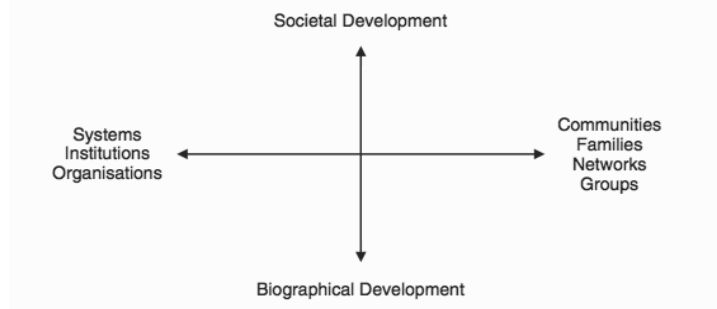


Fig. 3. Fundamental tensions for determining the social

Source: Beck, van der Maesen, and Walker 2012: 51.

This is then explained in the following:

The horizontal axis mirrors the tension between systems, institutions and organisations on the one side, and the life world of communities, families, networks and groups on the other. The vertical axis mirrors the tension between biographical life courses and societal developments of collective identities (the open ones and the closed ones) (*Ibid.*).

First, it is important to state that this is only a framework within which the assessment moves – and talking about the assessment means to look into two directions: the one is the analytical perspective and the other is about the development of political strategies. And as much as technical issues have to be considered, we are at the end dealing with political issues, in particular, issues that are based on interests and lead to conflicts. Second, this requires searching for the qualitative moments that is the qualitative aspects that are actually filling this space. However, saying ‘filling this space’ does not mean that we are dealing with a closed space. Being defined by two tensions, the framework is itself characterized by shifting borders.

Seventh, right at the beginning I said that ‘the reality, its close investigation shows immediately another picture: niceties turn into a rather harsh reality for those who have to face it as matter of their everyday's life, as condition under which they live’. As promised I am returning to this point, namely the question of conditions. We arrive subsequently at the core set of factors that are of immediate relevance for policymaking, in particular at what we call conditional factors (Beck, van der Maesen, and Walker 2012: 60, and extended: 61 ff.):

- socio-economic security,
- social cohesion,
- social inclusion, and
- social empowerment.

Eighth, conditions as such are only marking potentials – not less but not more. This has been frequently addressed. Of course, we will immediately remember Marx's analysis of the class relationships and the famous point he made with respect to the development of the class-struggle. There he points to the development of a class in itself to a class for itself (see Marx 1976 [1847]: 211).

And another interesting reference can be made to Bloch who discusses the perspective on potentiality in his work on *The Principle of Hope*. He points to four dimensions, namely: (1) the formally possible – what is possible according to its logical structure; (2) the objectively possible – possible being based on assumptions on the ground of epistemologically based knowledge; (3) the objectively possible – possible as it follows from the options inherently given by the object; (4) and the objectively real possible – possible by following the latency and tendency which is inherent in its elementary form (see Bloch 1959: 258–288).

So we have to look at the driving forces, which are in the SQA mainly presented as constitutional factors, outlined in the following (Beck, van der Maesen, and Walker 2012: 56; see extended definitions *Ibid.*: 58):

- personal (human) security,
- social recognition,
- social responsiveness, and
- personal (human) capacity.

Ninth, a third dimension can be seen as guidance, the orientations given by normative factors. Mind, in the social quality perspective these are not point of departure. Rather, it is a set that emerges from the interaction itself. One may say, in any historically given point in time they are evident – and as such they are also contested. This contest is not least a matter of the oscillation between the different horizons of possibilities/opportunities as they were mentioned before with reference to Bloch. These normative factors are (Beck, van der Maesen, and Walker 2012: 60, and extended: 61 ff.):

- social justice,

- solidarity,
- equal value,
- human dignity.

Tenth, the most important point – fully acknowledging what was said earlier – the SQA is not primarily about the data we are looking for. They are very much those that are commonly used. But taking the social serious we need to look at the complex relationship not only of people but the relationship of people as actors and also the complex interactions. So far we have four elements for the SQA:

- the basic tensions,
- the conditional factors,
- the constitutional factors,
- the normative factors.

The major challenge is to bring these together. Looking at the actual meaning of the tree sets:

- conditional factors being a matter of opportunities and contingencies and their limitations,
- constitutional factors as processes, and
- normative factors as orientation.

Now we also have some debate in the EFSQ, not least in the collaboration with Asian colleagues, if these factors are actually fundamentally different, if compared with traditional approaches. In the following some of the differences are presented. Niklas Luhmann talked about background noise, that is not directly interfering and determining development but nevertheless decisive as factor, supporting or even evoking certain developments or hindering, possibly blocking others. May be the SQA is something like this: a background noise, a challenge we have to keep permanently in mind, not least as a standard against which research, politics and policies can be measured.

Thus, four perspectives for which the approach is important can be highlighted:

- (1) it is an academic tool;
- (2) it is about politics;
- (3) it is about policy;
- (4) it is about a polity.

Eleventh, finally a few concrete issues shall conclude the contribution – examples rather than an attempt to offer a comprehensive picture.

I. Dissolution of development – development as dissolution

Social Policy – Economic Policy – Rights – Care. These four terms are opening a field going much beyond the four topics in the strict sense. Stretching this to

an ultimate border we can say that the historical perspective on the rise and fall of empires is closely related to their integration and dissolution.

Development seems to be intrinsically linked to and even depending on a process of dissolution – we find it discussed under major catchwords as division of labor, social divisions, specialization, individualization, *etc.* We could leave it there, trusting in the self-referential survival of the new units – it is important to see that such dissolution actually means establishment of new, distinct units. But as we are still dealing with human beings as social beings and as we are still living in societies, we have to think about the framing. Indeed, we find frequent new inventions, aiming at integration and integrity: Social security, social insurance, *Folkhemmet*, welfare state, social protection. And of course, we should not forget the brute fascist *Volksgemeinschaft*, gated communities, Etzioni's *Responsive Communitarian* movement ... and as recent idea of these 'good societies' we find the term 'social investment systems' – recently I have heard, still on an anecdotal level, that this is now increasingly replacing the term 'social protection systems'. It would be easy to reject this new yarn: It is the fundamental problem of a society that is caught in a linear concept of hierarchical thinking where people are celebrated on occasions if it suits, and where they are victims of mobbing if that suits better.

However, leaving criticism aside: are not we in fact all standing helplessly in front of a wall of evidence – thus, overlooking the evidence of the wall? In any case, without having a solution at hand, it is for social policy obvious: If we reduce the economic dimension of social policy on the dimension of 'resources' and the 'productivity of workforce', we will fall short and we will be left helpless. The challenge is to respect charity but to engage for an approach that is fundamentally rooted in the idea of fundamental rights without any reference to productive role in limited economic perspective, an approach that understands also the importance of production of the social. As much as I respect the honesty behind a lot of good-doers, we have to be sincere in what we mean. This means to be determined to speak about production. Otherwise, we are facing a structural problem, again linked to the equivalence principle and the claim of exchangeability.

We may speak of a monopolization paradox – the limitation of rationality on evidences which make it factually impossible to 'be wrong'.

II. EU: Stagnation through hyperactivity

If we take a reasonably wide perspective, we can say: for a long time the EU has been monitoring the development, setting up new programs and frameworks, thus disguising its standstill with a kind of hyperactivity. I do not think that there are simple solutions. This means that I do not believe in replicating

patterns that may have worked on national levels now on the EU-level. Nor do I believe in governance as it was initially proposed by the Forward Study Unit. Looking at governance, a major flaw has to be seen in the following: the way forward was too closely caught in early if not pre-capitalist notions. Voluntarism, social responsibility, general interest and the acceptance of equality as generally accepted value cannot be taken as given.

On the contrary, latest since the late 19th century we see that capitalist growth leads to inequality and conflicts. Already Adam Smith was indeed critical about the conflictual constellations of imperialism (see, *e.g.*, Smith 1999 [1776], the discussion in book IV, VIII, III).

Leaving the more theoretical debate aside, we can also look at the recent developments – here in particular the Irish case which delivers the pattern which has been repeated in many other countries like, for instance, Hungary, all striving for a tiger model: economic growth meant at the very same time increasing economic inequality. The especially important issues on the political level cannot be expressed in any figures – at least the figures are only expressing a small part. The real political dangers are

- the loss of the public;
- the loss of the general interest;
- by its translation into quantifiable individualist relations, based on the principles of exchange and equivalence;
- and finally the fostering of administratization or managerialization of the now calculable space.

To be clear: red tape is not cause but consequences of a social mind-set that lost its substance to an invisible hand.

Of course, this is not a recent issue and differentiated analysis is required. However, the strict orientation to growth policies is highly problematic.

We can look against this background at the Commission's Annual Growth Survey, issued in November 2011:

For 2012, the Commission considers that efforts at national and EU level should concentrate on the following five priorities:

- pursuing differentiated, growth-friendly fiscal consolidation;
- restoring normal lending to the economy;
- promoting growth and competitiveness;
- tackling unemployment and the social consequences of the crisis;
- modernising public administration (European Commission 2011: 3).

As we see in the 'Flash Eurobarometer 338', issued in April 2012 (European Commission 2012) the meaning of these policies, that is the social impact of the crisis and their public perceptions in the European Union, the results are sobering.

It is important to see the connection – to be exact: the disconnection. The growth strategy takes the centre stage of the European Union with a population of about 502,000,000 people (for 2011) – it is a strategy that is seen as an evident condition for overcoming poverty, it is a strategy that aims at increasing both private production and private consumption, and that is factually serving a minority, contributes to further personal and regional concentration of wealth, that drives entire countries into disastrous situations, that allows presidents with faked PhDs and psychotic prime-ministers to govern and finally creates regional despotism and nurtures neo-fascism – the perspective of a harsh reality you may easily overlook when travelling the tourist way.

Both, arguments brought forward on grounds of supposedly evident values and also proposals for simple institutionalist changes are likely to fail. The problem is the tension of equality as political and economic category – and the challenge is to seriously discuss again political economy rather than limiting the debate on economics and social-political technology.

We may speak of an equality paradox – the formal approach not being able to answer the substantial dimension.

III. Formalisation. The danger of a straightjacket

A fundamental problem has to be seen in the very limitation of our thinking as it has been outlined under the major headings: quantification/mathematization, equivalence principle and claim of exchangeability, individualization and, finally, evidence.

I am not entirely sure if it is possible to determine any ‘original sin’. Fact is that a mind-set, caught by these dimensions, has extremely limited capacities to deal with multiple contradictions. That society is marked by an antagonistic class contradiction is only side. The other is the recognition that the development of the productive forces is a driver behind the overall development. And this means to recognize also the contradictions, tensions and fractures. Four of them are highlighted below.

1) There are lost securities on one side. To mechanically maintain social security systems means to maintain capitalism.

2) Retirement – and over the years a reduced pension eligibility age – are surely a huge relief. But where is the simple answer to the subsequent loss of social identity in a society that is strictly and in nearly all respects – even when it comes to defining old age pension – based on the idea of own ‘gainful employment’ in the form of quantifiable and equivalent exchange?

3) Big society is again a big thing – and commenting on a recent publication by Armine Ishkanian and Simon Szreter, titled *The Big Society Debate*

(2012), Bill Jordan contends ‘There is nothing new about the notion of a Big Society’.⁸

I disagree to some extent. I follow Jordan to the point to which ‘civil society’ in its various forms was interpreted in highly problematic ways. However, I problematize the statement in two regards. First, it overestimates the ‘strategic diabolic intelligence’ – I see in the rulers more naïvety combined with obsession for power. Second, the understanding of civil society that is underlying David Cameron’s thinking is in multiple respects inconsiderate. Civil society today is not the same as it used to be when it discussed, for instance, by Hegel or de Tocqueville. And this has to be considered when we use – and also when we criticize – terms and concepts before we throw the baby out with the bathwater.

Looking at this example, and comparing it with others as, for instance, the recently published *World Happiness Report* (Helliwell *et al.* 2012) or the *Inclusive Wealth Report 2012* (United Nations University International Human Dimensions Programme 2012), we have to acknowledge good will and, importantly, the departmentalization in our heads: the traps of quantification/mathematization, equivalence principle and claim of exchangeability, individualization and, finally, evidence.

4) A fundamental contradiction which is frequently overlooked is that human beings are social,⁹ economic and historical beings and they are such as individuals in their own, very specific space-time (see Herrmann n.d., 2014). With this perspective we gain at least an understanding of the limitations – not least the limitations of thinking alternatives while taking the risk of transcending quantification/mathematization, equivalence principle and claim of exchangeability, individualization and, finally, evidence.

We may speak of a perpetuation paradox.

And the question will always be: But do we really have to start from here? And with this we arrive at a very fundamental challenge: fighting against poverty and exclusion can only succeed if it is a fight for another society.

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⁸ Bill Jordan, Blurb on Ishkanian and Szreter (2012). URL: http://www.e-elgar.com/bookenquiry_main.lasso?id=14782; 12/10/14.

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10

World System Energetics

Stephen I. Ternyik

Abstract

Human societies are evolving as energy transduction systems and the biophysical flow of energy in a socio-economic system quantizes the flow of time and drives temporal acceleration. The decisive role of money in a monetary production economy is highlighted as temporal access to energy. The greater the natural energy input for productive output, the higher the economic wave frequency and the shorter the wave length. A singularization of human history, that is a replacement of long wave patterns, in the nearer future depends on the technical achievement of a relatively constant energy input. According to the basic formulae of the Snooks–Panov curve, a significant quantum change of the temporal flow will take place in the next decade; it is an open mathematical guess and an ongoing human intelligence test, if this temporal turning point is of discrete or continuous nature.

Keywords: *transduction, energy, time, money, Snooks–Panov curve, acceleration, singularity, global intelligence.*

Waves can be understood as travelling energy and matter as geometry of curved space-time. Force equals geometry and the structure of matter equals different wave's types. An increase in whatever size is proportional to size itself and the speed of evolutionary waves in human civilization is directly proportional to the number of its inhabitants, that is a systemic process of self-similar evolution. This is a stochastic process with time dependency where the statistical coupling of equal parameters/values is either rapid (short-range) or slow (long-range) in performance curves (e.g., of human production and learning); however, economic life or being is an existential conflict that consumes energy and increases entropy and it takes energy to convert energy from one form to another, always with a loss of some energy by friction.

The more energy (e) in a wave, the higher its frequency (f); the wavelength (l) is inversely always proportional to f (we can actually interconvert e, f and l). *It follows that shorter wavelengths are more energetic than long wave lengths, increasing energy input leads to higher wave frequencies and shorter wave lengths, that is principle of cyclical causality, most probably in spiral form as applied evolutionary to human history. Measuring the empirical acceleration of observable human history (equal to about 50,000 solar years, Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 321–325*

eventually starting with 1 million people) tells us that every new great techno-economic wave took only about one third of former evolution temporary intervals, expressed as logarithmic scale formula (Snooks–Panov curve); from this evolutionary algorithm follows that the duration of future technological shifts will become exponentially smaller and that techno-economic evolution could become a continuous process, rather than the discrete time-lapsed cyclical waves of past experiences, leading to a singular techno-global civilization until 2050, with 9 billion people and the quantum of potentially more inventors or entrepreneurs.

World energy consumption per capita has almost doubled from 40 to 80 gigajoules (1960–2010), according to the numerical canon of all statistical data charts (*e.g.*, BP); this not only reflects the corresponding symmetric population dynamics, but points to our argument that every human civilization can be observed primarily as an energy transduction system and that predictive models can be based on this technical fundament. It is, for example, important to note that even U.S. non-governmental debt (divided by GDP, *e.g.*, FED data) tripled in this temporal period which methodically recalls the financial misuse of bank credit money to stimulate ‘the economy’ via fiat debt and interest ‘creation’; in any case, this monetarist technique is no more sustainable and monetary policy will have to become more congruent with energy economics. In addition, new technologies have to be consequently applied to as ‘time saving technics’, according to the life maintaining principle of syntropy. Unfortunately, we found not one data extrapolation of the world energy consumption that modeled any stoppage of the increasing energetic demand, concerning the temporary interval of the time-space from 2000 to 2050.

The 6th Kondratieff (of eco-energetics, biotech, health science, propelled by advanced AI, new energy technology and quantum monetary economics) that started in 2000/2001 could convert in the time-space from 2018 to 2050 into technological singularity (like envisioned by J. Neumann and visualized by Snooks and Panov), *if* world energy consumption can be kept relatively constant by sustainable global economics science (if **e** will be constant / **f** and **I** will behave accordingly / in *reciprocal conversion*). It goes without saying that any future monetary system has to implement this factual formula via narrow reserve banking, that is applying a more ‘boring’ financial system; it is unwise to finance artificial living standards via credit money as placebo and ultimately palliative effect, because money is *physically* access to energy. In any case, not the speed of any reform is decisive, but its direction; this is basically a radical rational challenge for the human mind to expand intelligence beyond traditional methods of cognitive thought (different levels of time and causality). For example, mathematical logic is consciously not directed at temporal levels, but any causal formulation of the bio-physical universe in classical or quantum theoretical terms is actually operated in temporal sequences. A future extension

of the human cognitive horizon has to be methodically rationalized via causal, retro-causal and super-causal process learning that implies multiple time arrows or loops.

Our scientific inquiry deals actually with the last 5 minutes of a 24 hour day, that is about 50,000 years of human archeological evidence, with accelerating economic long wave spiral cycles of 5000, 500 and 50 years. It is not big history research, but human history in-depth. We methodically suspect that the quantity of energy input for productive output (conversion of natural energy for human needs) is a reliable measure for the scientific observation and prediction of human societal change along this temporal algorithm. However, we do not perceive this biophysical scaling of socio-economic systems as determinism or 'randomism', but as a human behavioral phenomenon of probabilistic adaptation and cognition. The dogmatic objection that there is no natural science of human society cannot be accepted from our side; it might be biographically true that the fate of an individual is not calculable, but *collective action* (e.g., *energy consumption, monetary payments*) is countable mass motion with biophysical consequences. As we are now in the last seconds of the 24 hour cosmic day, it is exiting to elaborate the methodical guess for future human direction of the beginning new day cycle, that is to research into the current quantum leap to a new level of science, in search of creative unity for humankind. However, we are aware that the demand for ideas and ideals is not equal to knowledge, but that which can be improved by knowledge, should be.

The more natural energy a human economy transduces into social needs, the more accelerates the economic life of that social entity in temporal terms (the increasing conversion of energy quantities equals physically the temporal acceleration of economic wave frequency and length). This seems to be the *basic hypothesis* of applied natural law for social science; the formal statement applies biophysically to global geometric time and local arithmetic time (*chronos* in Koine Greek), but is physically not valid for universal cosmic time: the temporal clock on this globe (closed world clock / *kairos* in Koine Greek) is not equal to the universal time flow (open cosmic clock); according to ancient Hebrew wisdom, human biological age follows the cosmic clock (*aeon* in Koine Greek). The energetics of (monetary) economics is decisive and especially in a monetary production economy, *money is access to energy* (inter-conversion of energy, time, money; the economic circuit reads: **energy/quantizes/time = time/quantizes/production = money/quantizes/energy**).

Human performance will never outperform these natural forces, but intelligence can cleverly adapt and expand the degrees of economic freedom, reaching higher rational levels of human action; this qualitative temporal interval between thought and deed can be called consciousness, with the human brain as time-processing organ, operating basically on changing levels of photonic energy. The techno-economic evolution of human civilization in fractal waves

from natural chaos to social harmony is a cosmological enigma that implies the existential question why human life emerged as growing organism on the surface of this limited globe (?); the purpose of the civilizing process is to defend human life from the brutish laws of Mother Nature via the survival strategy of dynamic efficient syntropy. The natural enemy of human life as individual and as collective is entropy and it is world time for economic science to learn this lecture from biophysical science. Consequently, all data quantifications of how and what of human evolution imply the qualitative rational challenge of data interpretation. The biophysical paradox that is rationally hidden in all these energy transductions is that death makes life possible; L. Fantappie and E. Schrödinger were synchronically the first scientists to point to this psycho-medical and philo-theological mystery of extreme future value for human problem-solving.

The economic production cycle is primarily not a perpetual motion of human firms, households, banks and the like (which is the canonical explanation of standard textbook liturgy and litany), but fundamentally an energy circuit of natural input and processed output, with the cyclical motion of energy, time, production and money (= access to energy). This biophysical viewpoint is not an ethical denial of human ingenuity or liberty; on the contrary, social psychology is an eminent analytical part of this methodical approach that fits mathematization and statistical data science. The methodical research into universal history via natural-law social science can measure the degrees of human freedom more exactly than any other systems forecasting strategy; monetary critique has to be an essential part of world system energetics, because a fiat monetary system intrinsically first tends to spend and then to earn (the only realistic brake for this financial mischief is technically narrow reserve banking). We have to remember that Economics is still not a science, but a profession that evolved from private and public accounting techniques for property, credit and interest; it is more than probable that book-keepers developed human script out of counting finite entities for stock formation and trading in the Sumerian city states where temples served as commercial centers. In any case, further mathematization of global system energetics (mathematical globalistics) will surely clarify the original and natural laws of energy waves in our human social economy and its role in the quantum time-space of future production circuits as discrete repetitive or continuous singular socio-natural events.

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III. THE SIXTH WAVE AND FUTURE OF TECHNOLOGIES

11

The Sixth Kondratieff. The Growth Engine of the 21st Century

Leo Nefiodow and Simone Nefiodow

Abstract

Is it possible to forecast a Kondratieff cycle? The following article introduces a method that is able to predict Kondratieff cycles in their early phase and describe them in ever-greater detail during their further development. This method was first published in 1996 (Nefiodow 1996). The fifth Kondratieff still shaped economic events during this time, and the new, sixth Kondratieff was in its early stage (Fig. 1). This prediction was possible, because prior to that long wave researchers created a broad-based foundation for the Theory of Long Waves and thus demonstrated the regularity of the Kondratieff. In the second part of this article, we use this method to identify the sixth Kondratieff.

Keywords: *sixth Kondratieff, Kondratieff waves, Kondratieff cycles, basic innovation, leading industry, value chain, long cycle, fifth Kondratieff.*

Criteria to Identify and Predict a Kondratieff Cycle

To identify a Kondratieff cycle, it should be searched on four levels:

1. The technological level (Criterion 1).
2. The economic level (Criterion 2).
3. The social level (Criterion 3).
4. The time level (Criterion 4).

These levels are described below with the example of the fifth Kondratieff.

Criterion 1. The first criterion is the search for those innovations that are able to trigger and support a Kondratieff cycle. Here we follow and acknowledge Schumpeter (1961). To distinguish them from other innovations, we call them *basic innovations*. A basic innovation most notably differs from other innovations by the following characteristics: it triggers the Kondratieff cycle, definitively shapes the innovation process for several decades, creates a large new market, extensively alters society and has a life cycle of 40–60 years.

Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 326–353

Information technology was the basic innovation of the fifth Kondratieff (Fig. 1). Over five decades, it shaped technological, economic and social changes in the developed countries and turned the world into a global village in terms of information. The scientific foundation was primarily supplied by informatics and computer science. No other technology was able to even remotely exhibit comparable economic dynamics and widespread effect during the second half of the 20th century (Nefiodow 1991).

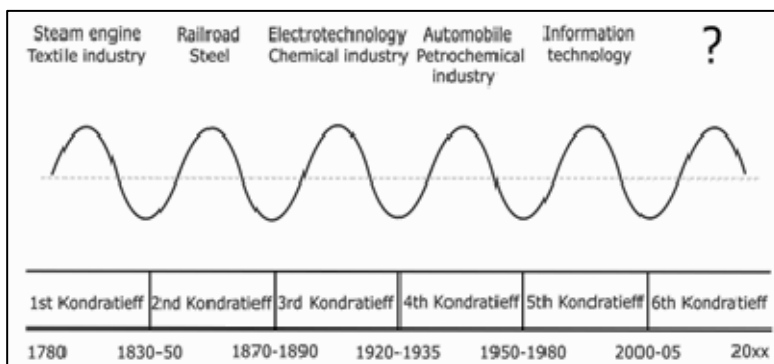


Fig. 1. The long waves of economic development

Source: Nefiodow and Nefiodow 2014.

The core of information technology was the digital computer (Fig. 2). To achieve high performance, microelectronics, software technology and data processing technology were invented. At the same time, the introduction of the computer into communication technology, office technology, industrial electronics, consumer electronics and military engineering was the prerequisite for the introduction of digital technology into these technologies, whereby their performance could be considerably increased.

The dynamics of information technology could also be seen in the extent of research and development expenditures (R&D). Towards the end of the fifth Kondratieff, more than one third of global research and development expenditures were allocated to information technology (*ca.* 250 billion U.S. dollars in 2003). It formed the core focus of research expenditures for all larger companies (Table 1).

Criterion 2. The second criterion pertains to the economy and consists of identifying the *leading industry* and the *value chain*. The leading industry is the industry, which newly develops thanks to the basic innovation. And it is also the one that benefits the most from the basic innovation. This leading industry acts as an engine of growth for the overall economy for the duration of the

Kondratieff cycle. During the first Kondratieff, this was the textile industry, during the fifth Kondratieff it was the information technology industry.

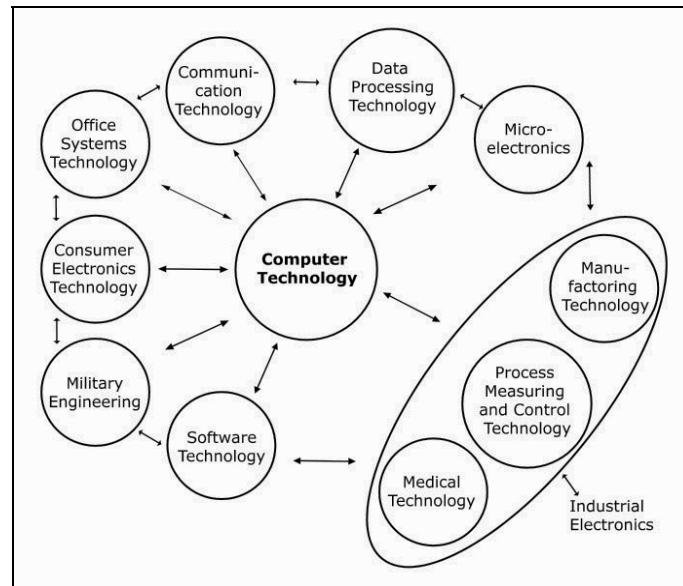


Fig. 2. The technological network of the information technology

Source: Nefiodow 1991.

For an industry to be classified as a leading industry it needs to be an economic heavyweight. As emanates from Table 2, due to its above average growth, the information technology industry skyrocketed from zero to the first place among globally manufacturing companies during the fifth Kondratieff.

To be able to properly assess the importance of a leading industry, its contribution to economic growth needs to be determined. The annual contribution of the aerospace industry for example to Germany's gross domestic product between 1980 and 2000 was below 0.7 percent. The volume of the aerospace industry was therefore too small to be able to affect the economic development overall. This industry can be classified as an important high technology industry, but not as a leading industry. By comparison, the economic growth of the USA in the 1990s was supported by the information technology industry by more than 30 percent (Fig. 3).

Table 1. 1997 research and development expenditures in the private sector (billion D-marks)

Company	Headquarters	R+D	Industry Sector
General Motors	USA	14.9	Auto/IT
Ford Motor	USA	11.5	Auto/IT
Siemens	Germany	8.2	IT/Electro
IBM	USA	7.8	IT
Hitachi	Japan	7.	IT/Electro
Toyota Motor	Japan	6.3	Auto/IT
Matsushita	Japan	6.1	IT/Electro
Daimler-Benz	Germany	5.7	Auto/IT
Hewlett-Packd	USA	5.6	IT
Ericsson	Sweden	5.5	IT/Electro

Source: Nefiodow and Nefiodow 2014 based on *Wirtschaftswoche* from November 19, 1998.

Table 2. The major industries in the manufacturing sector

Industry Sector	Total Revenue in 1997 Globally in Billion US-\$
Information Technology	1730
Automotive	1190
Oil	1010
Chemical Industry (incl. Pharmaceutical Industry)	460
Food and Beverage Industry	340
Mechanical Engineering/Plant Engineering & Construction	300
Steel/Metal Production	200
Aerospace	150

Source: Nefiodow and Nefiodow 2014 based on 'The Fortune Global 5-Hundred' in *Fortune Magazine* from August, 3, 1998: F-15-F-26.

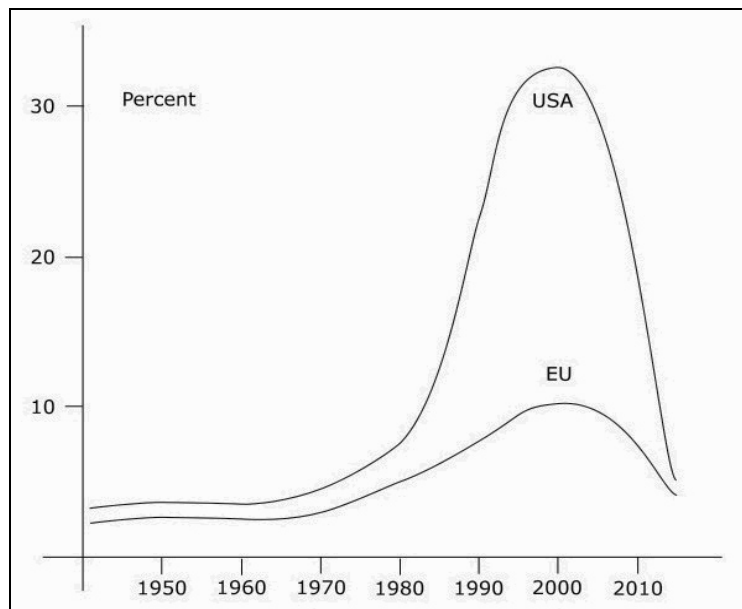


Fig. 3. Contribution of information technology industry to GNP growth including revenues for telecommunication services

Note: Average values are taken during 3–5 year periods. Value added creation was calculated at 50 % of IT revenue.

Source: Nefiodow and Nefiodow 2014.

The leading industries affect the economic system like a locomotive affects a train: they put all wagons of the train in motion. Joseph Schumpeter (1961) called this phenomenon ‘the Bandwagon Effect’. If we stay with the image of a train, the individual wagons represent the sectors of the economy, which benefited from the basic innovation and its leading industries.

The *value chain* is made up of the leading industry and all other sectors that benefit from the basic innovation. Whereas the basic innovation triggers the Kondratieff cycle, the value chain is its actual carrier. This can be illustrated by the example of the fourth Kondratieff (Fig. 4). The car was the basic innovation, the automobile and petrochemical industry sectors were the leading industries and the value chain was made up of the leading industries and all other industrial sectors that benefited directly or indirectly from the automobile: This included highway, bridge and road construction companies, steel and tire manufacturers, manufacturers of fuel power stations and gas-fired power plants as well as countless suppliers of metal, electric, electronic and plastic parts. Numerous companies and service sectors were also a part of the value chain: gas

stations, automobile associations, mass tourism, car dealers, transport companies, banks, insurance companies and the leisure industry. All of these participants built a global network of suppliers, customers, retailers and users, which created millions of new jobs. Every fifth job in the USA and every seventh job in Germany became dependent on the car during the fourth Kondratieff.

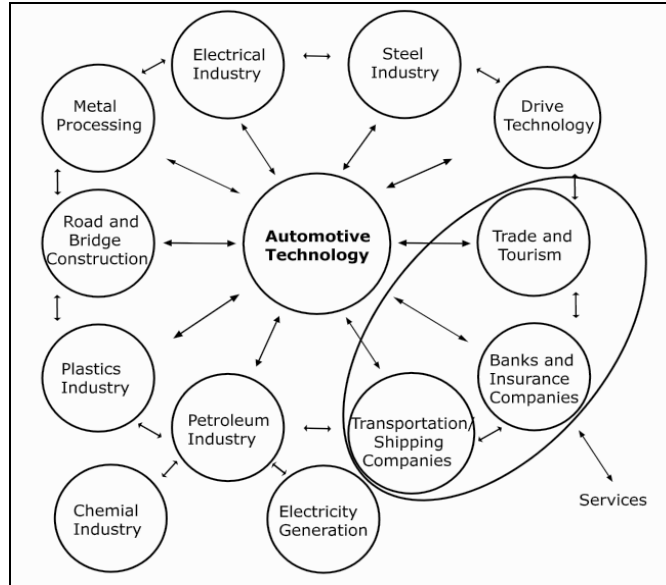


Fig. 4. Value chain of the 4th Kondratieff (this list is not exhaustive)

Source: Nefiodow and Nefiodow 2014.

The value chain of the fifth Kondratieff is illustrated in Fig. 5. When we add the contributions to growth of the value chain including information services such as education, business consulting services, media, advertising, *etc.*, whose development during the fifth Kondratieff was significantly determined by information technology, then the fifth Kondratieff determined more than 70 per cent of U.S. growth during the 1990s.

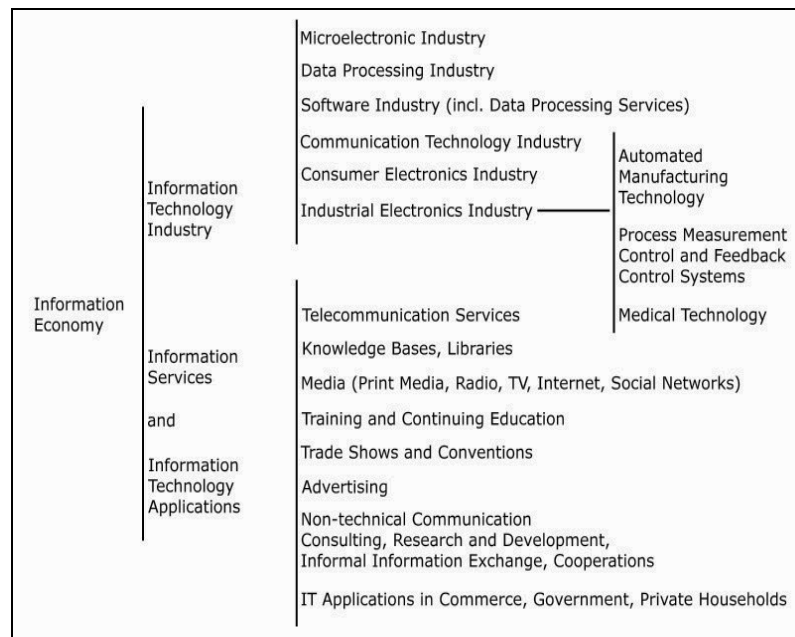


Fig. 5. The value chain of the fifth Kondratieff

Source: Nefiodow and Nefiodow 2014.

Criterion 3. The third criterion pertains to society. The value chain that is caused by the basic innovation leads to a far-reaching reorganization of society.

Observance of this criterion is being checked by determining the diffusion of the basic innovation in society (see Nefiodow and Nefiodow 2014: Appendix 5):

- A brand-new infrastructure develops thanks to the basic innovation. Examples: water routes in the first Kondratieff for coal transportation; the railroad network during the second Kondratieff; connecting society to electrical networks in the third Kondratieff; road and highway networks during the fourth Kondratieff; the telecommunications network of the fifth Kondratieff.

- Thanks to the basic innovation, more efficient work as well as management that is more efficient and organizational concepts are possible in companies.

- In the field of education, it creates new occupations, new areas of expertise, learning contents and studying techniques.

- To ensure controlled handling of the basic innovation, new legal controls have to be created (e.g., data protection acts during the fifth Kondratieff).

- At the stock exchange, the basic innovation guides capital investments to those companies that have specialized in its production and application.

– New forms of leisure, communication and entertainment emerge from the basic innovation.

Criterion 4. The fourth criterion pertains to the *life cycle*. The basic innovation and its leading industry must average a 40 to 60 year life cycle.

The innovation life cycle can be described by the S-curve. The S-curve is determined for instance by accumulating the quantity of the basic innovation (e.g., the number of registered cars in a country) or the value added of the information technology industry and illustrating it over time (Fig. 6). During the life cycle, the basic innovations and leading industries display an above average growth.

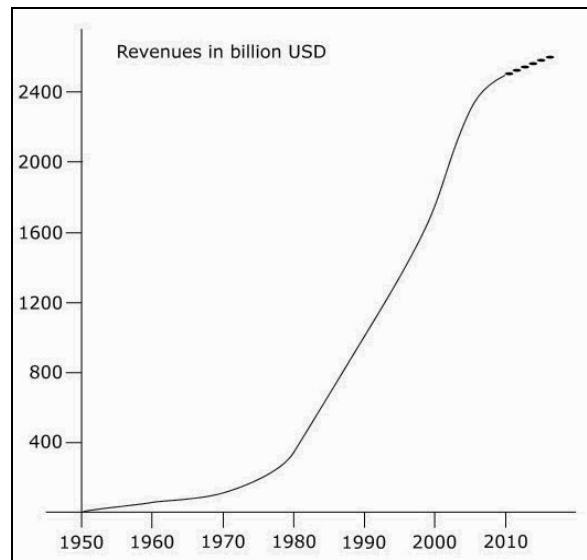


Fig. 6. The life cycle of the information technology industry in the fifth Kondratieff

Source: Nefiodow and Nefiodow 2014.

The 40–60 year duration of a Kondratieff cycle only applies to the pioneers. Latecomers like China or Brazil were able to catch up with the previous Kondratieff cycles in a shorter amount of time, because they utilized the experiences of leading countries through cooperative efforts.

We can remove each innovation that progressively develops for less or longer than 40–60 years for identifying a Kondratieff cycle. Criterion 4 explains why environmental protection for instance is not a basic innovation of the sixth Kondratieff. You can date the birth of modern environmental industry back to the year 1972 when the Club of Rome's famous report *On the Limits of*

Growth was published. Since then, this industry sector has grown above average and there are no discernible growth limits. The life cycle of environmental industry is likely to be far beyond 60 years and is therefore eliminated as a basic innovation of the sixth Kondratieff. That said, environmentalism delivers important contributions to the sixth Kondratieff, in particular as it pertains to ecological health. Although it is not a basic innovation, it is an important part of the holistic health value chain.

These four criteria are sufficient to identify a Kondratieff cycle. To be able to *predict* a new Kondratieff cycle however, you need to add a fifth criterion.

Criterion 5. The barriers of the new Kondratieff cycle.

At the end of a Kondratieff cycle, the previous growth pattern has been mostly exhausted. Before you begin to search for the new basic innovation, you need to first identify the primary growth barriers that conflict with a Kondratieff cycle's development. After all, of all the potential innovations, only those that reduce the barriers the most can be classified as basic innovations. Those barriers can be adherence to outworn concepts, a lack of willingness to innovate, fear of the future, lack of infrastructure, *etc.*

The recession at the end of the first Kondratieff for instance occurred, because companies back then were confronted with a growth barrier. Regional market opportunities had exhausted during the course of the first Kondratieff and transportation costs back then did not allow expansion on a grander scale. High transportation costs were the barrier to the second Kondratieff. This problem was solved with the introduction of the railroad. It cut costs by a factor of 200 and now companies were able to get into mass production, reduce piece costs and export to larger areas.

The growth barrier of the fifth Kondratieff was the lack of a highly productive information processing technology. The number of information and service professions had steadily increased during the fourth Kondratieff, but the technology that was available at the time – the phone, the telegraph, teleprinter and typewriter – was not efficient enough. This barrier was overcome with the invention of the computer.

What growth barriers are we facing today? What impedes sustainable economic growth today in Europe, Japan and the USA?

Every Kondratieff cycle faces its own barrier. Based on our analyses, there are two main barriers when it comes to the sixth Kondratieff; we call the first one the entropic sector.

Barrier No. 1: Worldwide social entropy

Entropy is a term taken from physics that describes the disorder of a physical system. Here the term is used to demonstrate the global social disorder.

Let us take Germany as an example: every fourth German cheats his/her insurance, eight million times per year things get stolen in retail, every fourth fire that costs millions traces back to sabotage; by now every fourth company has fallen victim to cyber crimes, illicit work in 2010 is estimated at 360 billion

euros – that is 15 percent of the gross domestic product. Harassment at work is spreading and costs the German economy 15 billion euros each year. Forty percent of marriages are failing. One quarter of scientific publications is based on manipulated data. This list could go on and on.

Let us take the USA as an example. Statistically speaking, every fifth male American of working age is a criminal. Fourteen percent of adults are considered severely mentally ill and about 50 percent of all marriages end up in divorce. Every fourth American student is being bullied; at least 160,000 children skip school every day for fear of being bullied and 280,000 students are being physically attacked in high schools each month. Almost every tenth adolescent person smokes marijuana; many of them regularly have a joint. Every third U.S. scientist cheats in his/her publications. The national debt has steadily increased for years and is higher than the gross domestic product. Social inequality broke a record in 2009. The net income of the top one percent of income earners increased from 1979 until 2009 by 277 percent; the net income of the poorest fifth, however, only increased by 18 percent to where 0.1 percent of high-income earners made more money than the 120 million people on the bottom. This list could go on and on.

Athletics is also not spared from this increasing disorder. Discoveries of doping cases, referee bribery, manipulations of sporting events and corrupt sports officials are on the agenda every day. During their lifetime, up to 70 percent of women all over the world become victims of physical, psychological or sexual violence. By their own account, every fourth man in Asia raped their partner or another woman at least once. Piracy on the world's oceans is increasing; patent protection and copyrights are systematically being ignored or evaded. Cyber crime is growing by double-digits, computer virus attacks and counterattacks are increasing and have led to a new type of warfare, so-called cyber warfare between countries and institutions. Today, every business and every government can be heavily disrupted or even paralyzed (as the example of the cyber attacks in Estonia in 2007 has shown). This list could also go on and on.

Disorder has become a worldwide mega problem and a mega market. Global money laundering has increased twentyfold from 1990 until 2009 and had almost reached US \$2,000 billion. Corruption and bribery are at a record high all over the world and in 2009 caused at least five percent of all economic costs. The large banks manipulate interest rates (*e.g.*, Libor and Euribor rates) for pure profits interests at the expense of the general public. Millions of people all over the world work for illegal and criminal organizations.

In the following section, the global disorder is conceptualized as an *entropic sector*. If we add up the damages, losses and costs that accumulate every year in this sector, we get an amount of at least US \$14,000 billion for the year 2006 (Nefiodow and Nefiodow 2014). That was more than the United States gross national product. Based on our own calculations, global entropy has increased by at least 25 percent between 2006 and 2013.

The entropic sector plays a key role in the sixth Kondratieff, because the enormous losses, damages and costs that incur year after year in this instance have turned this into the most significant barrier for the economic and social development. This means that the first barrier is not a technological problem, not a problem of energy, but rather an ethical one. We are faced with a similar situation to the one at the beginning of the second Kondratieff, where enormous unfair social structures – lack of rights, extreme impoverishment and worker exploitation – had seriously put the existence of the free market economy at risk. Those countries that introduced social and political innovations just in time (*e.g.*, global health insurance coverage, disability and pension insurance as well as universal male or manhood suffrage) were able to reduce social disturbances and barriers and thus prevent revolutionary upheavals and enable the second Kondratieff to fully develop.

This ethical barrier presented by the entropic sector can also be viewed from a different perspective. Ethical deficits can be seen as health deficits. This becomes apparent if you draw a comparison with the behavior of healthy people. A psychologically healthy person does not cheat and does not rob other people's houses. A mentally healthy person has a good perception of reality, does not use drugs and cannot be bought. A socially healthy person has a sense of community, advocates well-being of all people and does not harass others. A spiritually healthy person does not lie, has a structured and trusting relationship with God, strives for reconciliation, truth and peace and does not spread hatred and violence. Inner disturbances and diseases and the social misconduct caused by them are the deeper reasons for global entropy (see Fig. 7).

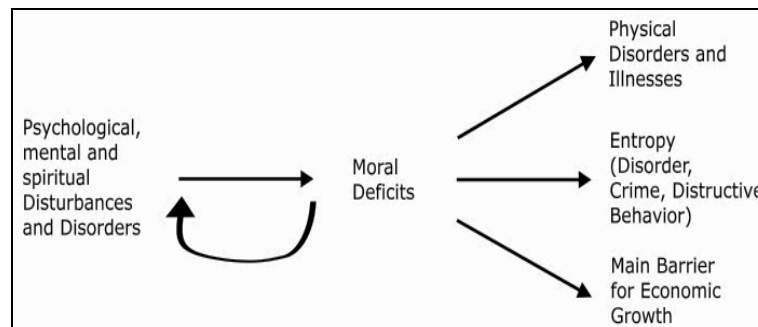


Fig. 7. Causes of global entropy

Source: Nefiodow and Nefiodow 2014.

Barrier No. 2: The traditional health care system

Besides entropy, the traditional health care system is the second main barrier to the sixth Kondratieff (Fig. 8). It includes the pharmaceutical industry, medical technology and academic medicine with physicians, hospitals, pharmacies, health insurance companies, *etc.*

Over the past two centuries, the traditional health care sector made tremendous progress. Many diseases that were considered incurable or fatal in the past can now be effectively treated. Today acute medical care and surgery offer life-saving help even in extreme cases, which is something that was barely considered possible in the past. The history of medicine over the past two centuries was a real success story.

But this success story is about to end. Since the late 20th century, the new medical advances are no longer sufficient to adequately deal with the dynamics and complexity of modern life and its high demands on the physical, emotional and mental strength of human beings. Between 1980 and 2010, the global number of breast cancer incidence rates has doubled and, according to estimates by the United Nations, cancer rates in general are going to more than double during the 2000–2030 period. According to projections by the World Health Organization (WHO), depression is globally going to be the second most common cause of not being able to work and premature mortality by 2020. The increasing number of diseases is also reflected in spending. In 1965, health care spending as a percentage of the U.S. gross domestic product was 5.9 percent; in 2012, it had increased to 17.2 percent (US \$2.8 trillion).

Demographic development is not the only cause for this trend. Young and middle-aged people are also getting sick more often than before. Between 2000 and 2010, the number of mentally ill students in Germany has increased by 20 percent and adolescents and young adults under the age of 25 are among the group with the largest increase in depression. In 2000, every fourth adolescent in Europe suffered from allergies; in 2010, it increased to every third person. Every tenth European between the ages of 45 and 54 regularly takes antidepressants. In the USA, type 2 diabetes has risen tenfold in middle-aged adults during the past 20 years.

The traditional health care system

- Medical technology.
 - Pharmaceutical industry.
 - Health services.
(Doctors, non-medical practitioners, hospitals, health insurance companies, health insurance funds, pharmacists, public health services, medical care facilities.)
 - Health spas/sanatoriums.
 - Company health services.
Health as a competitive factor, training and continuing education (*e.g.*, in people skills), human resource development, health management.
 - Other (health-related).
Skilled trades (*e.g.*, for orthopedic products), sporting goods and sports facilities, health publications, medical EDP, *etc.*
-

Fig. 8. Value chain of the traditional health care sector

Source: Nefiodow and Nefiodow 2014.

Pharmaceutical drugs are among the biggest shortfalls of the traditional health care sector. Most of them do not cure the disease; they only suppress its symptoms. What is more, drugs often remain ineffective, because their effectiveness has not been tested before the patient takes them. Migraine medications, for instance, only work for 50 percent of all patients, antidepressants for 40 percent, drugs to treat Alzheimer's disease for 30 percent and cancer therapeutic agents work for 20 percent of all patients at best.

Unwanted side effects are another downside. According to a study by the University of Toronto, using drugs as prescribed is the fourth leading cause of death in the United States.

What we call the traditional health care system today is in fact not a health care system at all. The system structures are not geared towards healing, but mainly towards the treatment of physical diseases. The correct label would be disease care system, since more than 95 percent of expenditures go towards the research, diagnosis, treatment, administration and management of diseases. And this disease care system costs more and more money. Today every sixth dollar in the United States flows into the traditional health care system. More than US\$ 10,000 billion were spent in this area throughout the world in 2012. Medical technological progress is the key driver of these expenditures. It generates approximately 70 percent of the cost increase (Schneider *et al.* 2014: 107). However, the costs of medical technological advances are not offset by obtained savings, which explains the permanent increase in costs.

In contrast, only limited means are available for prevention, preventive medical checkups and healing. Dementia is an example that shows us the consequences. In 2010, the U.S. federal health insurance programs *Medicare* and *Medicaid* spent approximately 140 billion U.S. dollars to treat dementia; but only 0.5 billion to research its causes (Coy 2012). That is a ratio of 280:1.

The traditional health care sector is important; it will remain important and indispensable. It plays a key role today in the economy and society, but it uses up too many resources at this point while productivity is too *low* (Schneider *et al.* 2014).

How can those two barriers – big losses, expenses and damages of the entropic sector and the high costs and low productivity of the traditional health care system – be overcome? In the past, growth barriers were overcome by developing those basic innovations that were able to make the biggest contribution to reducing the primary growth barriers. And these new basic innovations do exist. The new basic innovations are biotechnology and psychosocial health and they come with an emerging new value chain. This new value chain will be the main carrier of the sixth Kondratieff (Fig. 9).

Biotechnology as a Basic Innovation of the Sixth Kondratieff

In the new value chain, biotechnology satisfies the most important criteria for identifying one of the basic innovations of the sixth Kondratieff cycle. It is not

just a brand-new technology, it answers the question on how the second barrier, the traditional health care sector, can be overcome.

Criterion 1. One first-rate indicator is investments in research and development. How much biotechnology has globally shaped the research scene over the past few decades is evidenced by the fact that from 1999 to 2012 two-thirds of all Nobel Prizes in Medicine were awarded for findings in this area.

Within the research scene, private companies play a decisive role both in their research expenditures and in implementation of findings. Biotechnology companies lead the field. The companies in this industry that are listed on the stock exchange globally invested 20–40 percent of revenues in research and development. Biotechnology also obtained top priority worldwide quite early on when it comes to R&D government aid, not just in the USA, but also in Europe, Japan, the People's Republic of China, Australia and Singapore.

The newly emerging health care sector

- Biotechnology.
- Naturopathic treatments, natural products, all natural foods.
- Complementary/alternative medicine.
Homeopathy, classic acupuncture, electroacupuncture according to Dr. Voll, kinesiology, bioresonance therapy, anthroposophic medicine, magnetotherapy, Dr. Rath's cellular medicine, biofeedback, quantum healing, traditional Chinese medicine, Ayurvedic medicine, Reiki, *etc.*
- Environmental protection (predominantly).
- Agriculture, diet, food.
- Wellness/fitness, tourism (health tourism).
- Architecture (healthy living), building and construction industry (healthy building materials), textile industry (allergy free and breathable fabrics and clothing), the senses (color therapies, aromatherapies, music therapies).
- Self-medication and self-care.
Participation of illness costs, rising self-care.
- Workplace health management.
Company health insurance funds, company sponsored fitness programs, cafeterias, welfare centers, health seminars, preventive medical checkups, good health bonus.
- Psychology, psychiatry, psychotherapy, psychosomatic medicine.
- Religion/spirituality.

Fig. 9. Health value chain of the new emerging health care sector

Source: Nefiodow and Nefiodow 2014.

Even in the early phase of the sixth Kondratieff – from 1997–2003 – the life sciences whose core is biotechnology, registered by far the largest increase in the USA with 95.7 percent of R&D government aid. Likewise, at

25.7 billion U.S. dollars, the life sciences were the largest promoted single item in 2003 (Figs 10 and 11).

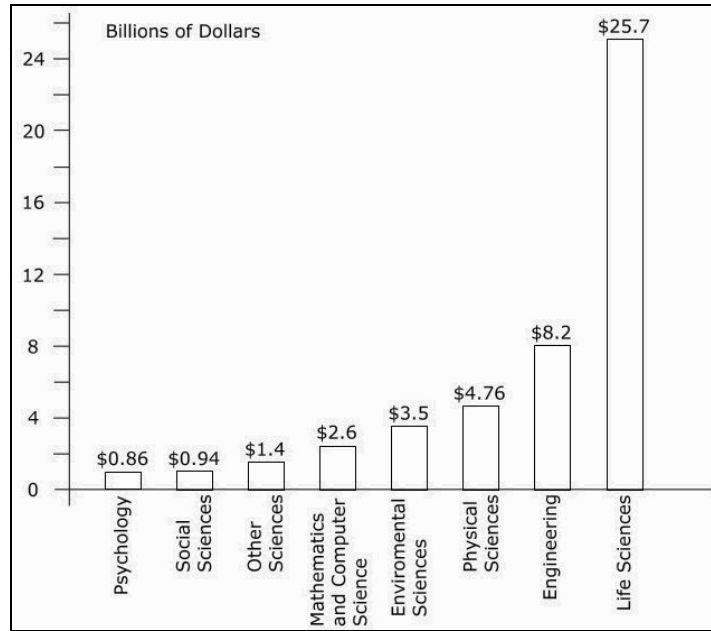


Fig. 10. Research and development expenditures by the U.S. Federal Government.

Source: Carey 2004.

The large R&D expenditures become very noticeable in the health care sector. In 1995, less than ten cancer treatment products were in clinical trials in the USA, most being acutely toxic chemotherapy. In 2005, over four hundred cancer treatment products were in the human testing phase; more than 60 percent of these drugs came from biotechnology companies and most were designed to have minimum side effects.

One impressive example on how biotechnology is able to reduce the second barrier of the sixth Kondratieff and significantly improve productivity of the traditional health care sector is personalized medicine, which emerged in the early 21st century. A little known fact, but nonetheless true, is that pharmaceutical products are completely overrated in their effects today. This is not because the active ingredients are bad. In fact, this is because these active ingredients are used for every patient with the same diagnosis. The genetic makeup of the individual patients is completely disregarded. This results in the fact that 90 percent of drugs, for instance, work only for 30 percent of patients.

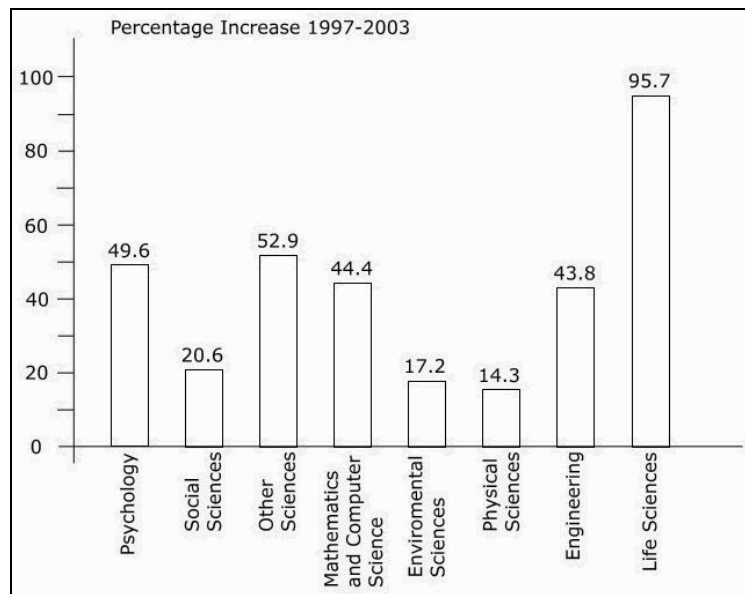


Fig. 11. Research and development expenditures by the U.S. Federal Government.

Source: Carey 2004.

Personalized medicine will make it possible to prescribe drugs in terms of individual effectiveness and tolerance, to avoid medical malpractice, improve the detection and healing of diseases and to reduce the costs for new drug development and costs in the healthcare sector overall. According to American research, personalized medicine could save up to 50 percent in drug spending. Globally this would amount to just under 400 billion U.S. dollars annually. Personalized medicine should put an end to the era of one-size-fits-all drug policies. This is important, because their unwanted side effects are the second most common reason for emergency hospitalizations. Whatever paths personalized medicine will take, the possible improvements are tremendous.

Criterion 2. The basic innovation, its leading industry and its value chain are the most important drivers of economic growth.

The growth of biotechnology from 1980 to 2009 ranged between 14 and 20 percent. Even during the 2000–2002 and 2008–2009 crisis years, the sector grew at double-digit rates. In 2010, genuine, DNA-based biotechnology reached a global turnover of US\$ 120 billion (Nefiodow and Nefiodow 2014). This figure could almost double by 2015.

Among the research-intensive industries, biotechnology has the largest number of startups. In 2008, 4,700 companies worldwide operated in the field of biotechnology, 44 percent of which in North America, 40 percent in Europe and 16 percent in the Asia-Pacific region. Consequently, their contribution in creating brand-new jobs was very important. In 2010, about 500,000 people all over the world were employed in the field of biotechnology.

The economic significance of biotechnology cannot just be deduced from the turnover generated by genuine biotechnology companies. An assessment also needs to consider the revenues, the productivity improvements and the many impulses for new applications, which biotechnology induces in other business sectors, particularly in the industrial sector, in agriculture and nutrition as well as the healthcare sector.

In 2010, one-fifth of the global revenue for the chemical industry is allocated to biotechnological processes and procedures ('white biotechnology'), which equals revenues of *ca.* 250 billion euro. Within the industrial sector, in 2010 the direct and indirect markets in biotechnology reached a volume of 1,500 billion euro. The relative value for pharmaceutical products was 800 billion euro.

The European Union has highlighted the special importance of biotechnology by combining the individual sectors of biotechnology into one mega industry called 'bioeconomy' (this includes the food industry, agriculture and forestry, the fishing industry, the textile, cosmetic and pharmaceutical industries as well as the energy carriers from biomass). In Europe in 2010, this industry employed more than 22 million employees who generated annual sales of 1,700 billion euro (European Union). There are no growth limits detectable over the next few decades.

Criterion 3. The basic innovation and its value chain is the driver of far-reaching changes in society as a whole.

The applications for biotechnology reveal that biotechnological applications are going to significantly change the entire society (Fig. 12): medical science, health, environmental protection, energy production, the chemical industry, agriculture, nutrition, raw material production and biological information processing. Every year new applications are added to this (*e.g.*, the production of artificial plants, microorganisms and brand-new creatures).

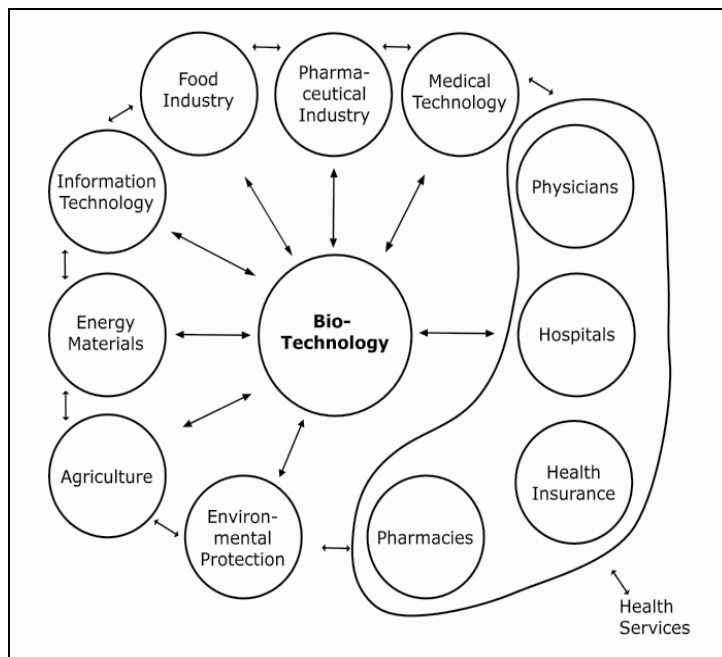


Fig. 12. The biotechnology value chain

Source: Nefiodow and Nefiodow 2014.

Biotechnology can improve the quality of life in many areas of society given a responsible approach. Science can broaden its horizon when it comes to understanding life, which improves the knowledge about human beings and nature. The environment can be protected more effectively and crime fought more successfully with genetic identification methods. Congenital physical disabilities and diseases will be successfully treated over the next 10–20 years. Productivity in the healthcare sector, industrial production, in nutrition and agriculture can be significantly improved, which reduces shortages in the world (hunger, unemployment, raw materials scarcity).

However, a frivolous handling of this highly productive technology can result in considerable damages. Biotechnology could be abused for control purposes and discrimination (*e.g.*, when career and life opportunities would be made contingent on genetic testing). By interfering in hereditary disposition, nature's balancing act can become unbalanced. The respect for Creation can be affected and thus opens the floodgates to manipulations of human beings. And it is also possible that the production of artificial microorganisms, plants and animals could create new diseases and epidemics.

Criterion No. 4. The lifecycle of the basic innovation equates the length of a Kondratieff cycle.

The overall growth cycle cannot be exactly determined during the early phase of a basic innovation. Instead, one has to determine its respective state each year and estimate its further development. From the view of the early 21st century, one can assume that the potential of biotechnology will not be fully developed over the next two decades. At the same time, it is unlikely that the industry will maintain its above-average growth rates over the entire 21st century. Hence, its life cycle almost certainly should be between 40 and 60 years – and thus within the length of a Kondratieff cycle.

Psychosocial Health as a Basic Innovation of the Sixth Kondratieff

Psychosocial health is the second basic innovation of the sixth Kondratieff and the answer to the question on how its biggest barrier – global entropy – can be reduced most efficiently. It also meets the four criteria that are required for identifying a Kondratieff cycle.

Criterion 1. The basic innovation and the innovations based on it in neighboring fields are characterized by above-average innovation dynamics.

Scientific interest, for instance, shows that this criterion is being met. Between 1980 and 1982 approximately one hundred studies on mental and psychosocial health were published in the USA; between 2000 and 2002 it was more than 1,100 (Koenig 2007: 105). This signifies an eleven-fold increase. From 1990 to 2012 it was more than 5,200 (Bonelli and Koenig 2013). This enormous increase in scientific interest speaks for itself.

U.S. government-funded psychology projects also increased above average. With an increase of 49.6 percent between 1997 and 2003, psychology ranks second behind the life sciences among the funded individual disciplines (Fig. 11).

The increasing importance of psychosocial health is also revealed in the increasing research efforts in brain research, neuropsychology and psychiatry. It is indisputable at this point that neural processes and mental and psychological conditions are closely connected in the human brain. Mental disorders and illnesses point to faulty brain activity at the mid range of cell structures. Area 25 of the brain, for example, is seen as the center of the depression circuit; the amygdala causes anxiety and five nerve centers in the midbrain have been identified as the control center of aggression. One can assume that through further findings the relationship between the mind, brain, consciousness, body and social behavior will be better understood and contribute to improved psychosocial health.

The computer provides the opportunity to model mental phenomena, to study them and to develop new therapies. This makes it an important tool for

future psychosocial research. At present, however, many mental and psychosomatic disorders and diseases cannot be treated with modern technologies, because the theoretical understanding is still incomplete. Before computer-aided technologies are able to properly take effect, theoretical and practical research will have to better examine the relationships. Early experiments to treat mental disorders (*e.g.*, phobias) with computer-aided virtual reality technologies have proven successful. People who had fear of small spaces were able to learn how to cope with their fear in virtual rooms. Even though psychoinformatics is still in its infancy, it should experience a rapid development over the course of the sixth Kondratieff.

Criterion 2. The basic innovation, its leading industry and the value chain they trigger will be the main driver of the economy.

To meet this criterion, the basic innovation and its value chain need to penetrate the overall economic structure, to lead it on a solid growth path over several decades and generate large new sales volumes.

And the volumes that can be unleashed by psychosocial health are indeed enormous. As pointed out above (Barrier No. 1), the global losses, damages and costs that are caused by psychological, mental, spiritual, and social disorders and illnesses – social entropy – exceeded US\$ 14,000 billion in 2006. The largest percentage of this is made up of mental and social disorders and illnesses. Ten percent less psychosocially caused entropy would deliver the economy over US\$ 1,400 billion for productive purposes year after year.

An improvement of mental and social health cannot just avoid the enormous losses, damages and costs of entropy; the physical, creative and productive potential of a person is also better mobilized this way. Psychosocial health is a quality of cross-sectional character: it increases productivity in all areas of the society: on the individual, institutional, economic and social level. And since the overall productivity can be increased through psychosocial health, it has an enormous potential for quantitative and qualitative growth.

Criterion 3. The basic innovation is the driver for far-reaching overall social changes.

At first glance, the social importance can be recognized by the high and continuously increasing demand for psychosocial health. This applies to psychotherapeutic, psychological and psychiatric services as well as to radio and television programs, Internet services and publications with psychological, psychiatric and psychotherapeutic content.

A second look shows how much psychology has infiltrated language and awareness and has mentally changed society. The term ‘self-esteem’ for, instance, was not mentioned even once in British newspapers in 1980; in 1990 it appeared 103 times and in 2000 already 3,328 times. In 1993, the word ‘stress’ appeared less than 1,000 times in the British press, but in 2000 more than 24,000 times (Furedi 2004).

Many other terms from the psychology scene have also infiltrated everyday language: repression, projection, sublimation, defense mechanism, depression, neurosis, burnout, psychosis, *etc.* More and more, the mental layers of humans are being specifically addressed, examined, commercialized and burdened. The things that people divulge in public these days in TV talk shows would have still been unthinkable in the mid-20th century. At the beginning of the 21st century, psychological content has developed into a general climate of opinion and in parts into a pseudo-religious doctrine of salvation.

Criterion 4. The life cycle of the basic innovation corresponds with the duration of a Kondratieff cycle (40–60 years).

This criterion cannot be exactly determined during the early phase of a Kondratieff cycle and needs to be assessed and checked year by year instead. From the viewpoint of the early 21st century, we can assume that thanks to increasing networking between brain research, neuropsychology, psychoinformatics, psychiatry and psychotherapies over the next three decades, a noticeable improvement of psychosocial health can be achieved. In light of the increased efforts in research, however, it is unlikely that the industry sector will maintain its leading function throughout the entire 21st century. Hence, this subsequently means that its life cycle should almost certainly be within the length of a Kondratieff cycle.

A New and Holistic Definition of Health

The World Health Organization (WHO) definition of health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. In 1997, the Executive Board of the World Health Organization provided some food for thought with a broader definition of health, '*Health is a dynamic state of complete physical, mental, social and spiritual well-being and not merely the absence of disease or infirmity*' (Khayat n.d.). This is likely the first time a prestigious international institution emphasizes the importance of spirituality for health. This was once again highlighted in the WHO 2005 Bangkok Charter for Health Promotion in a Globalized World, '*Health is one of the fundamental rights of every human being and encompasses mental and spiritual well-being*' (WHO 2009). According to the WHO, terms like disease and health are no longer limited to the body. They are systems concepts. There are also sick souls, social dysfunctions and diseases and sick families, companies and societies.

The Sixth Kondratieff

The new value chain of the sixth Kondratieff also includes other important drivers of growth – aside from the two basic innovations. Naturopathic treatments belong to the new value chain (Fig. 13). They have expanded for many years and will play an important role as a competitive concept for diagnosis,

treatments and healing. Complementary and alternative medicine has expanded also very strongly.

The traditional healthcare system

- Medical technology, pharmaceutical industry.
- Health services.
(Doctors, non-medical practitioners, hospitals, health insurance companies, health insurance funds, pharmacists, public health services.)
- Health spas/sanatoriums.
- Company health services.
Health as a competitive factor, training and continuing education (*e.g.*, in people skills), human resource development, health management.
- Other (health-related).
Skilled trades (*e.g.*, for orthopedic products), sporting goods and sports facilities, health publications, medical EDP, *etc.*

The newly emerging healthcare sector

- Biotechnology.
- Naturopathic treatments, natural products, all natural foods.
- Complementary/alternative medicine.
Homeopathy, classic acupuncture, electroacupuncture according to Dr. Voll, kinesiology, bioresonance therapy, anthroposophic medicine, magnetotherapy, Dr. Rath's cellular medicine, biofeedback, quantum healing, traditional Chinese medicine, Ayurvedic medicine, Reiki, *etc.*
- Environmental protection (predominantly).
- Agriculture, diet, food, wellness/fitness, health tourism.
- Architecture (healthy living), building and construction industry (healthy building materials), textile industry (allergy-free and breathable textiles and clothing), the senses (color therapies, aromatherapies, music therapies).
- Self-medication and self-care.
Participation of illness costs, rising self-care.
- Workplace health management.
Company health insurance funds, company sponsored fitness programs, cafeterias, welfare centers, health seminars, preventive medical checkups, good health bonus.
- Psychology, psychiatry, psychotherapy, psychosomatic medicine.
- Religion/spirituality.

Fig. 13. The health value chain of the sixth Kondratieff

Source: Nefiodow and Nefiodow 2014.

Big portions of environmental protection are a part of this new value chain as well. Why were CFCs, those gases that destroy the ozone layer, banned? Not because we discovered our love for the ozone layer, but because we are facing a skin cancer epidemic with a damaged ozone layer. Why did we put cata-

lytic converters in cars? When you take a closer look, most environmental protection measures only serve the environment at first glance; protecting the health of human beings is the stronger motive. This is why large portions of environmental protection are a part of the health value chain.

The wellness industry, fitness studios and health tourism have expanded strongly. Companies increasingly have come to realize that employee health has become a strategic weapon: SAP for instance, one of the largest software companies offers its 65,000 employees worldwide optional and free genome analysis for them to be able to organize a customized, individual cancer treatment in case of cancer.

In the long run, both value chains are most likely going to merge (Fig. 13). There are already close collaborations between both sectors today. **Health economy** will make up the core of the new value chain, while a network of industry sectors will be around where health plays an important role (*e.g.*, health tourism in the tourism industry or health protection in environmental technology). When you consider the health documents by the WHO, the value chain of the sixth Kondratieff reveals health in a holistic sense: physically, psychologically, mental, social, ecological and spiritual (Fig. 14).

Today the healthcare sector already makes the most important contribution to growth and employment in those countries that respond positively to the sixth Kondratieff. At 3.8 %, the health care sector in Germany, for example, grew almost twice as much between 2006 and 2011 than the overall economy (2.1 %) and the number of wage earners in health care was 5.7 million (2009). When you add those jobs that are indirectly allocated to the health care sector, the number of employees increases to 8.8 million. That amounted to 22 percent of all wage earners (BMW 2013; Ostwald *et al.* 2014). By comparison, the German automotive industry, the showpiece of German industry, only employed about 1 million people (2.5 %). Germany's sizable international reputation over the past years is closely tied to the successful devotion to the sixth Kondratieff.

The fact that the health care sector is a job creator can be also seen in the USA – even though the productivity potential of the health care sector is underdeveloped and the social potential is still being underestimated. In 2001–2012 more than half of all new jobs in the private sector were created in health care (Mandel 2008 and our own calculations). The largest growth barrier for the USA as well as Japan and other countries is the wrong way of handling the health care sector.

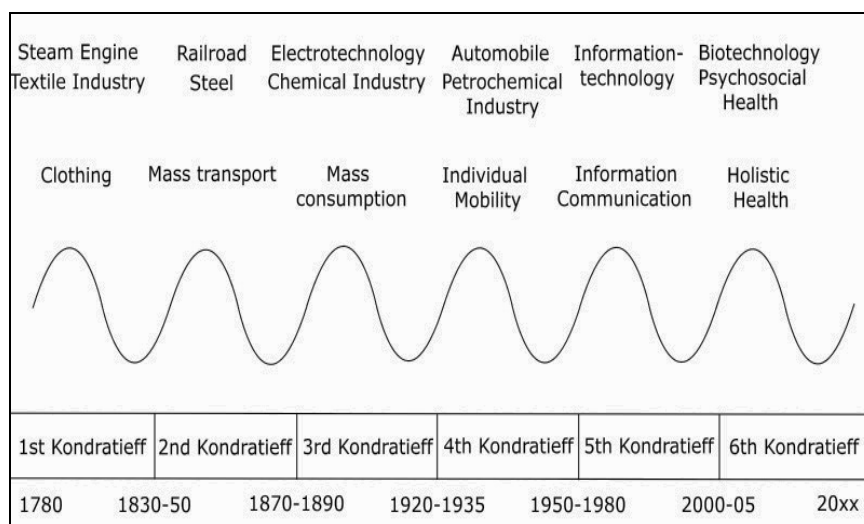


Fig. 14. The six long waves in economic development

Source: Nefiodow and Nefiodow 2014.

Health and Spirituality

In several documents of the WHO faith is mentioned as an integral part of health (WHO 2009). In addition, there is an analysis of 5,200 scientific studies that have been conducted between 1990 and 2010 on the relationship between health and spirituality. The result: in 74 % of cases, there was a positive correlation. In 19 % of cases, the result was neutral, in 5 % negative and in 2 % there was no correlation at all (Bonelli and Koenig 2013). In an extensive study, the World Economic Forum also determined that religious belief could make a vital contribution to preserving individual and social order (World Economic Forum;¹ Ventura and Magnoni 2014). That is why faith plays a key role in the health value chain.

A Look into the Future: Morality as a Competitive Factor

Moral factors frequently do not get high priority in politics and the economy. Yet the financial crisis of 2008–2010, the European debt crisis (2010–2014) and many other crises have shown what devastating consequences poor morals can bring. For a country to be able to renew and to be economically successful, it is not just enough to formally have the structures of democracy, a formally

¹ World Economic Forum's Global Agenda Council on the Role of Faith 2012–2014. URL: <http://www.weforum.org/content/global-agenda-council-role-faith-2012-2014>

free market economy and a due process concept. What is crucial are the morals with which they are being practiced.

The relationship between social responsibility, economy, politics, and morals can be shaped. For centuries, for instance, it was common practice among merchants of Hamburg to seal an agreement with a handshake and its observance was a point of honor. Economy and morals do not have to exclude each other. One large step to strengthen morals on a global basis was the extension and link up of the different international courts of justice and criminal courts. These days, it is no longer as easy as it used to be for public officials and military leaders of the world to totally disregard human rights and get away with it.

Klaus Schwab, the founder of the renowned World Economic Forum, where 1,600 top managers and 40 heads of state participated in 2012 in Davos, Switzerland, stated on the eve of the conference that capitalism in its existing state is no longer the economic model that is able to solve the global issues. Schwab² asks for a new spirit of global social responsibility (Grabitz 2012). His statements are noteworthy, since Schwab is a market economy expert and far from being an opponent of capitalism.

Brazil is one success story of how entropy reduction makes economic progress possible. In the 1980s, the country still ranked among the poor and underdeveloped countries. In the 1990s, thanks to conservative economic policy, it managed to keep hyperinflation in check; the country subsequently introduced active social policy. Yet at first, it did not amount to much. Crime gangs took money away from the poor, which was intended to pay for their children's education, health expenses and to create an independent livelihood. The country then used its armed forces. Three dozens of the worst slums were being occupied and the Mafia driven away. Now the residents were not just able to breathe a sigh of relief, but also invest in their future. From 2001 to 2011, Brazil's middle class grew by 93 percent; it made up almost half of all Brazilians in 2012 (Vèlez-Plickert 2013).

Greece serves as a counterexample. After the end of World War II, the country quickly recovered and worked its way up into the ranks of industrial nations. But then a nationwide network of corruption, political old-boy networks and nepotism developed, which increasingly strangled the economy. Several billion euros from Brussels and European relief programs also trickled away in obscure channels and did not take a turn for the better. As long as corruption was not under control, the country continued to decline. In 2013, Greece lost its status as an industrial nation and was downgraded to emerging market status. The biggest barrier to Greece's growth was and is entropy.

We would like to remind at this point that the free market economy is an economic system that, even though it does not stipulate specific morals for

² See K. Schwab in *Die Welt Newspaper* from January 25, 2012.

market participants, does not work without morals. To be able to work efficiently, the free market economy needs honest business people, incorruptible officials and politicians and unbribable journalists and scientists.

Final Remarks

When the first edition of *The Sixth Kondratieff* was released in 1996, it made a daring prediction. Each year it became more specified and is now supported by studies of renowned institutions (Allianz 2010; BMWi 2013; Ostwald *et al.* 2014). It is not unusual that a new Kondratieff cycle is met with skepticism in the beginning. However, those who identify it early on and consequently develop its potential are able to benefit the most from its dynamics.

A Kondratieff cycle represents a unique historical process. At the innovation level, each Kondratieff cycle has its very own pattern of development, produces new protagonists and satisfies new needs of people. What is so special about this sixth Kondratieff? What makes it so different from the previous cycles?

The sixth Kondratieff is a health-related cycle. This means that for the first time in history, the focus of economic and social development is not on a machine, a chemical process, energy or hardware technology, but rather the human being with his physical, mental, psychological, social, ecological and spiritual needs, problems and potential. We leave the growth patterns of previous Kondratieff cycles behind. Now the human being takes center stage. This is the message of the sixth Kondratieff: the healing of man is the best program for the future.

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12

The Sixth Kondratieff Wave and the Cybernetic Revolution *

Leonid E. Grinin and Anton L. Grinin

Abstract

In the present paper, on the basis of the theory of production principles and production revolutions, we reveal the interrelation between K-waves and major technological breakthroughs in history and make forecasts about features of the sixth Kondratieff wave in the light of the Cybernetic Revolution that, from our point of view, started in the 1950s. We assume that the sixth K-wave in the 2030s and 2040s will merge with the final phase of the Cybernetic Revolution (which we call a phase of self-regulating systems). This period will be characterized by the breakthrough in medical technologies which will be capable to combine many other technologies into a single complex of MBNRIC-technologies (med-bio-nano-robo-info-cognitive technologies). The article offers some forecasts concerning the development of these technologies.

Keywords: *production revolutions, production principle, Industrial Revolution, Cybernetic Revolution, self-regulating systems, Kondratieff waves, fourth K-wave, fifth K-wave, sixth K-wave, World System, center, periphery, medicine, biotechnologies, nanotechnologies, robotics, cognitive technologies.*

I. Production Principles, Production Revolutions and K-Waves

According to our theory (Grinin 2007a, 2007b, 2012b, 2013; Grinin and Grinin 2013a, 2013b), the whole historical process can be most adequately divided into four large periods, on the basis of the change of major developmental stages of the world productive forces, which we call production principles. *The production principle is a concept which designates very large qualitative stages of development of the world productive forces in the historical process. It is a system of the unknown before forms of production and technologies surpassing the previ-*

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ous ones fundamentally (in opportunities, scales, productivity, efficiency, product nomenclature, etc.).

We single out four **production principles**:

1. **Hunter-Gatherer.**
2. **Craft-Agrarian.**
3. **Trade- Industrial.**
4. **Scientific-Cybernetic.**

Among all various technological and production changes that took place in history the following three production revolutions had the most comprehensive and far-reaching consequences for society:

1. **Agrarian** or Agricultural Revolution. Its result is the transition to systematic production of food and, on this base, to the complex social division of labor. This revolution is also connected with the use of new power sources (animal power) and materials.

2. **Industrial**, or Production Revolution as a result of which the main production concentrated in the industry and began to be carried out by means of machines and mechanisms, and at that not only the replacement of manual labor by machines occurred, but also biological energy was replaced by water and steam energy.

3. **Cybernetic** Revolution which have led to the emergence of powerful information technologies, and in future will stimulate transition to wide use of self-regulating systems.

Structural model of production revolutions. Within the proposed theory we suggest a fundamentally new idea that each production revolution has an internal cycle of the same type and, in our opinion, includes three phases: two *innovative* (initial and final) and one *modernization* phase (Grinin and Grinin 2013a, 2013b; see Fig. 1). At the initial *innovative* phase new advanced technologies emerge which spread in other societies and territories after a while. As a result of the final *innovative* phase of a production revolution the new production principle reaches its peak.

Between these phases there is the *modernization* phase – a long and very important period of distribution, enrichment, diversification of the production principle's new technologies (which appeared in the initial innovative phase) when conditions for a final innovative breakthrough are created.¹

¹ For example, in the modernization phase of the Agrarian Revolution local varieties of plants and breeds of animals borrowed from other places were created.

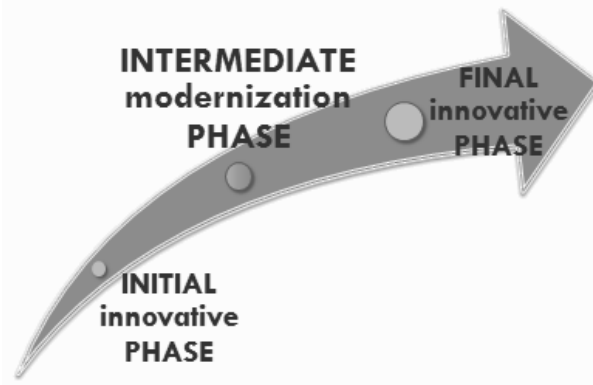


Fig. 1. Phases of production revolutions

Thus, the cycle of each production revolution looks as follows: *the initial innovative phase* (emergence of a new revolutionizing production sector) – *the modernization phase* (diffusion, synthesis and improvement of new technologies) – *the final innovative phase* (when new technologies acquire their mature characteristics).

The scheme of *innovative* phases of production revolutions in our theory looks as follows (modernization phases are omitted).

Agrarian Revolution: **the initial** phase – the transition to primitive manual (hoe) agriculture and animal husbandry (started about 12,000–9,000 BP); **the final** – transition to irrigation agriculture (or plow agriculture without irrigation) (this began approximately 5,5 thousand years ago).

Industrial Revolution: **the initial** phase starts in the 15th century with the development of navigation, water-powered equipment and mechanization, with qualitative growth of labor division in the manufacturing, and also other processes; **the final** phase – the industrial revolution of the 18th – the first third of the 19th century, connected with the introduction of various machines and steam energy.

Cybernetic Revolution: **the initial (scientific and information)** phase dated back to the 1950–1990s. The breakthrough occurred in automation, energy production, synthetic materials, space technologies, exploration of space and sea, agriculture. But especially – in creation of electronic control facilities, communication and information. **The final** innovative phase (**of self-regulating systems**) will begin in the 2030s or 2040s and will last till the 2060s or 2070s.

Each of production revolutions means the transition to a fundamentally new production system; the beginning of each production revolution marks the borders between corresponding production principles.

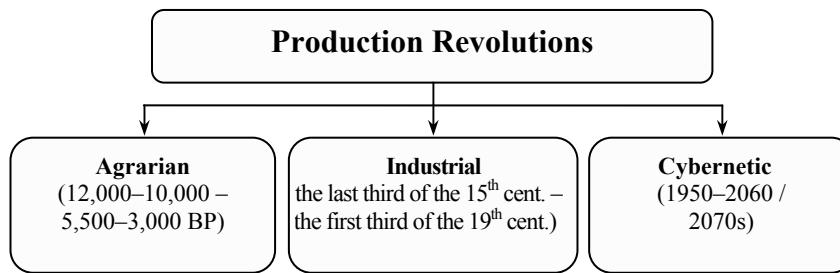


Fig. 2. Production revolutions in history

Structure of the Production Principle

Development of the production principle is a period of genesis, growth and maturity of new forms, systems and paradigms of organization of economic management, which surpass many times the former ones in major parameters.

The principle of production is a six-phase cycle. Its first three stages correspond to three phases of the production revolution. The subsequent three (post-revolutionary) stages are a period of the maximization of the potentials of the new forms of production in structural, systemic, and spatial sense:

1. *The phase of the production revolution's beginning.* A new, not yet developed principle of production emerges.

2. *The phase of primary modernization* – diffusion and strengthening of the production principle.

3. *The phase of completion of the production revolution.* The production principle acquires advanced characteristics.

The first three phases of the production principle still present an incomplete production principle.

4. *The phase of maturity and expansion of the production principle.* Wide geographical and sectoral diffusion of new technologies, bringing the production principle to mature forms, transformations in social and economic spheres.

5. *The phase of absolute domination of the production principle.* The final victory of the production principle in the world, intensification of technologies, bringing opportunities to the limit beyond which crisis features appear.

6. *The stage of non-system phenomena, or preparatory* (for the transition to a new production principle) *phase.* The intensification leads to emergence of non-system elements which prepare the birth of a new production principle. (When, under favorable conditions, these elements form a system, in some societies the transition to a new production principle will begin and the cycle will repeat at a new level.)

The last three phases of the production principle characterize its mature features.

Table 1. Chronology of the production principle's phases

No	Production Principle	1 st phase	2 nd phase	3 rd phase	4 th phase	5 th phase	6 th phase	Total Production Principle
1.	Hunter-Gatherer	40000–30000 (38000–28000 BC)	30000–22000 (28000–20000 BC)	22000–17000 (20000–15000 BC)	17000–14000 (15000–12000 BC)	14000–11500 (12000–9500 BC)	11500–10000 (9500–8000 BC)	40000–10000 (38000–8000 BC)
		10	8	5	3	2,5	1,5	30
2.	Craft-Agrarian	10000–7300 (8000–5300 BC)	7300–5000 (5300–3000 BC)	5000–3500 (3000–1500 BC)	3500–2200 (1500–200 BC)	2200–1200 (200 BC – 800 AD)	800–1430 AD	10000–570 (8000 BC – 1430 AD)
		2,7	2,3	1,5	1,3	1,0	0,6	9,4
3.	Trade-Industrial	1430–1600	1600–1730	1730–1830	1830–1890	1890–1929	1929–1955	1430–1955
		0,17	0,13	0,1	0,06	0,04	0,025	0,525
4.	Scientific-Cybernetic	1955–1995/2000	1995–2030/40	2030/40– – 2055/70	2055/70– – 2070/90	2070/90– – 2080/105	2080/2105– – 2090/2115	1955–2090/2115
		0,04–0,045	0,035–0,04	0,025–0,03	0,015–0,02	0,01–0,015	0,01	0,135–0,160

Note: Figures before the brackets – absolute scale (BP), figures in the brackets – BCE. Chronology in the table is simplified (a more detailed chronology see in Grinin 2006b, 2009; Grinin and Korotayev 2013). The duration of phases (in thousand years) is marked by the bold-face type. Duration of phases of the scientific-cybernetic production principle is hypothetical. The duration of the scientific-cybernetic production principle is also given in Fig. 3.

As is clear, the scientific-cybernetic production principle is at the beginning of its development. Only its first phase finished, and in the mid-1990s the second started. The second phase is proceeding now and will last till the early 2030s. The third phase is likely to begin approximately in the 2030s or the 2040s. At this particular time the final phase of the Cybernetic Revolution should start. The end of the scientific-cybernetic production principle will fall on the early 22nd century (for more details see Grinin 2006b).

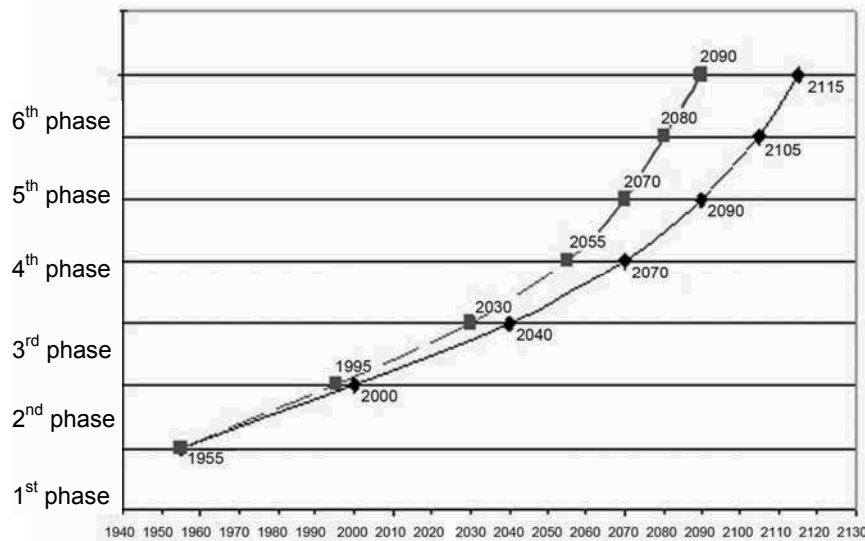


Fig. 3. Development of the scientific-cybernetic production principle

Note: The dashed line depicts one of the scenarios of expected development of the scientific-cybernetic production principle and corresponds to the dates before the slash in the fifth column of Table 1.

The industrial production principle as a cycle, consisting of K-Waves. We have established a close correlation between production principle cycles and Kondratieff cycles (for more details see Grinin 2012a, 2013). Taking into account that K-waves arose only at a certain level of economic development of societies, we can consider *K-waves as a specific mechanism connected with the emergence and development of the industrial-trade production principle and the way of expanded reproduction of industrial economy.* Given that each new K-wave does not just repeat the wave motion, but is based on a new technological mode, *K-waves in a certain aspect can be treated as phases of the development of the industrial production principle and the first phases of development of the scientific-cybernetic production principle.*

In the mentioned articles (Grinin 2012, 2013) it has been shown that the first three K-waves are connected with the industrial production principle. The special attention is paid to the correlation between the duration of the industrial production principle phases and the duration of K-wave phases. Certainly, there can be no direct duration equivalence of both K-waves and their phases, on the one hand, and the industrial production principle phases, on the other, due to the different duration of the industrial production principle phases (that is within the principle of production's cycle its phases differ in duration,

but their duration proportions remain the same in each production principle [Grinin 2006b, 2009]). However, we have succeeded in establishing a more complex ratio according to which *at the average one K-wave corresponds to one phase of the industrial production principle*. In general, we found out that three and a half waves coincide with three and a half phases of the industrial principle of production! It is clearly seen in Table 2. Such a correlation is not coincidental, as innovative development of the industrial production principle is realized through long Kondratieff cycles which are largely defined by large-scale innovations.

Table 2. Periods of the industrial production principle and Kondratieff waves

Phases of Industrial Production Principle	The Third Phase, 1730–1830 ≈ 100 years	The Fourth Phase, 1830–1890 ≈ 60 years	The Fifth Phase, 1890–1929 ≈ 40 years	The Sixth Phase, 1929–1955 ≈ 25 years	Total: ≈ 225 years, from 1760 – 195 years
The Number of the K-wave	Zero (B-Phase) / The First Wave (A-Phase), 1760–1817 – about 60 years	The End of the First Wave / The Second Wave, 1817–1895 – more than 75 years	The Third Wave, The Upward Phase, 1895–1928 – more than 35 years	Third wave, The Downward Phase, 1929–1947 – about 20 years	About 190 years
The Phase of K-wave	B-Phase of the Zero Wave, ² 1760–1787	The Second half of the Downward Phase, 1817–1849	The Upward Phase, 1895–1928	The Downward Phase, 1929–1947	
The Phase of K-wave	The Upward Phase, 1787–1817	The Upward Phase, 1849–1873			
The Phase of K-wave		The Downward Phase, 1873–1895			

Note: For simplicity, we take concrete years for the beginning and the end of the periods, though such a transition obviously lasts for a certain period of time.

² We took as the beginning a zero K-wave which downward phase coincided with the beginning of the Industrial Revolution, *i.e.* the 1760s (as we know, it is downward phases that are especially rich in innovations).

II. The Cybernetic Revolution, Scientific-Cybernetic Production Principle, the Fourth, Fifth and Sixth K-Waves

The **production revolution** which began in the 1950s and is still proceeding, causes powerful acceleration of scientific and technological progress. Taking into account expected changes in the next 50 years, this revolution deserves to be called ‘**Cybernetic**’ (see our explanation below). The initial phase of this revolution (the 1950s – the 1990s) can be referred to as a **scientific-informational** as it was characterized by the transition to scientific methods of planning, forecasting, marketing, logistics, production managements, distribution and circulation of resources, and communication. The most radical changes took place in the sphere of informatics and information technologies. The final phase will begin approximately in the 2030s or the 2040s and will last until the 2070s. We called this phase a ‘phase of self-regulating systems’ (see below). Now we are in the intermediate (modernization) phase which will last until the 2030s. It is characterized by powerful improvement and diffusion of innovations made at the initial phase in particular by a wide proliferation of easy-to-handle computers, means of communication, and formation of macrosector of services among which information and financial services took the major place. At the same time the innovations necessary to start the final phase of the Cybernetic Revolution are being prepared.

The Cybernetic Revolution *is a great technological breakthrough from the industrial production principle towards production and services based on the operation of self-regulating systems*. In general, it will become the revolution of *self-regulating systems* (see Grinin 2006a, 2007b, 2012b, 2013; Grinin and Grinin 2013a, 2013b).

Table 3 demonstrates the connection between three phases of the scientific-cybernetic production principle (which coincide with three phases of the Cybernetic Revolution) and three Kondratieff waves (the fourth, fifth and sixth). Correlation is here even stronger than between the first three K-waves and the industrial production principle phases, due to the shorter duration of the scientific-cybernetic production principle phases in comparison with those of the industrial production principle.³

³ The reason for the shorter duration is the general acceleration of historical development.

Table 3. The scientific-cybernetic production principle (initial phases) and Kondratieff waves

Phases of the Scientific Cybernetic Production Principle	The first phase (initial phase of the Cybernetic Revolution) 1955–1995 ≈ 40 years	The second phase (middle phase of the Cybernetic Revolution) 1995 – the 2030s/40s. ≈ 35–50 years	The third phase (final phase of ‘self-regulating systems’ of the Cybernetic Revolution) the 2030s/40s–2055/70s ≈25–40 years	Total: ≈ 100–120 years
K-Wave and Their Phases	The Fourth Wave, 1947 – 1982/1991 ≈ 35–45 years	The Fifth Wave, 1982/1991 – the 2020s. The beginning of the upward phase of the sixth wave (2020–2050s) ≈ 30–40 years	The sixth wave, 2020 – 2060/70s. The end of the upward phase and downward phase (the latter ≈ 2050 – 2060/70s) ≈ 40–50 years	About 110–120 years
K-Wave and Their Phases	Upward phase, 1947 – 1969/1974s	Downward phase of the fifth wave, 2007–2020s		

K-Wave and Their Phases	Downward phase, 1969/1974 – 1982/1991	Upward phase of the sixth wave, 2020 – 2050s.	
K-Wave and Their Phases	The fifth wave, 1982/1991 – 2020s, upward phase, 1982/1991 – 2007		

Taking the theory of production principles into account, we have also revised the sequence of change of the major (leading) production sectors during the change of K-waves (Grinin 2012a).⁴

⁴ During the table compiling we took into account ideas and works cohering with the theories which explain the nature and pulsation of K-waves by changing of technological ways and/or *techno-economic paradigms*: Mensch 1979; Kleinknecht 1981, 1987; Dickson 1983; Dosi 1984; Freeman 1987; Tylecote 1992; Glazyev 1993; Mayevsky 1997; Modelski and Thompson 1996; Modelski 2001, 2006; Yakovets 2001; Freeman and Louçã 2001; Ayres 2006; Kleinknecht and van der

Table 4. K-waves, technological modes and leading macrosectors

Kon- dratieff Wave	Date	A New Mode	Leading Macrosec- tor	Production Principle and Num- ber of Its Phase
The First	1780– 1840s	The textile industry	Factory (consumer) industry	Industrial, 3
The Second	1840– 1890s	Railway lines, coal, steel	Mining industry and primary heavy indus- try and transport	Industrial, 4
The Third	1890– 1940s	Electricity, chemical in- dustry and heavy engi- neering	Secondary heavy industry and mechanic engineering	Industrial, 5/6
The Fourth	1940-e – the early 1980s	Automobile manufacturing, manmade ma- terials, elec- tronics	General services	Industrial, 6, Scientific- Cybernetic, 1
The Fifth	1980s – ~2020	Micro- electronics, personal com- puters	Highly-qualified ser- vices	Scientific- Cybernetic, 1/2
The Sixth	2020/30s – 2050/60s	MBNRIC- technologies (med-bio-nano- robo-info- cognitive)	Medical human ser- vices	Scientific- Cybernetic, 2/3

Peculiarities of the fourth K-wave in connection with the beginning of the Cybernetic Revolution. The fourth K-wave (the second half of the 1940s – 1980s) fell on the initial phase of the Cybernetic Revolution. The beginning of a new production revolution is a special period which is connected with the fast transition to a more advanced technological component of economy. All accumulated innovations and a large number of new innovations generate a new system that has a real synergetic effect. It would appear reasonable that *an upward phase of the K-wave coinciding with the beginning of a production revolution can appear more powerful than A-phases of other K-waves.*⁵ That was

Panne 2006; Dator 2006; Hirooka 2006; Papenhausen 2008; see also Lazurenko 1992; Glazyev 2009; Polterovich 2009; Perez 2002.

⁵ Therefore, it appears reasonable that A-phase of the sixth K-wave can also make a great progress, as it will coincide with the beginning of the Cybernetic Revolution final phase. Thus, the sixth wave is to have a stronger manifestation than the fifth one. We will return to this point below.

the feature of the upswing A-phase of the fourth K-wave (1947–1974) which coincided with the scientific-information phase of the Cybernetic Revolution. As a result a denser than usual cluster of innovations (in comparison with the second, third and fifth waves) was formed during that period. All this also explains why in the 1950s and 1960s the economic growth rates of the World System were higher, than in A-phases of the third and fifth K-waves. The downswing phase of the fourth K-wave (the 1970s – 1980s) in its turn also fell on the last period of the initial phase of the Cybernetic Revolution. This explains in many respects why this downswing phase was shorter than those of the other K-waves.

The fifth K-wave and the delay of the new wave of innovations. It was expected that the 1990s and the 2000s would bring a radically new wave of innovations, comparable in their revolutionary character with the computer technologies, capable to create a new technological mode. Those directions which had already appeared and those ones, which are now supposed to become a basis for the sixth K-wave were considered to be a breakthrough. However, it was the development and diversification of already existing digital electronic technologies and rapid development of financial technologies that became a basis for the fifth K-wave. Those innovations which were really created during the fifth K-wave as, for example, energy technologies, still have a small share in the general energy, and, above all, they do not grow properly. Some researchers believe that from 1970s up to the present is the time of the decelerating scientific and technological progress (see discussion about Brener 2006; see also Maddison 2007). Polterovich (2009) also suggests a notion of a technological pause. But, in general, the mentioned technological delay is, in our opinion, insufficiently explained. We believe that taking features of the intermediate modernization phase of a production revolution (that is the second phase of the production principle) into account can help explain this. Functionally it is less innovative; rather during this phase earlier innovations are widely spread and improved. As regards the 1990s – 2020s (the intermediate phase of the Cybernetic Revolution) the question is that the launch of a new innovative breakthrough demands that the developing countries reach the level of the developed ones, and the political component of the world catches up with the economic one; all this needs changes of the structure of societies and global relations (see about some aspects Grinin and Korotayev 2010b). Thus, the delayed *introduction of innovations of the new generation* is explained, first, by the fact that the center cannot endlessly surpass the periphery in development, that is the gap between developed and developing countries could not increase all the time. Secondly, economy cannot constantly surpass the political and other components, as this causes very strong disproportions and deformations. And the appearance of new general-purpose technologies, certainly, would ac-

celerate economic development and increase disparities. Thirdly, introduction and distribution of the new basic technologies do not occur naturally, but only within the appropriate social political environment (see Grinin 2012a, 2013; see also Perez 2002). In order for basic innovations to be suitable for business, structural changes in political and social spheres are necessary, eventually promoting their synergy and wide implementation in the world of business.

Thus, the delay is caused by difficulties of changing political and social institutions on the regional and even global scale, and also (and, perhaps, first of all) within the international economic institutions. The latter can change only thanks to the strong political will of the main players, which is difficult to execute in the framework of the modern political institutions. These institutions rather can change under the conditions of depressive development (and probable aggravation of the foreign relations) compelling to reorganization and breakage of the conventional institutions that could hardly be changed due to the lack of courage and opportunities under ordinary conditions.

The above said explains as well the reasons of different rates of development of the center and periphery of the World System during the fifth K-wave (for more details see Grinin 2013; see also Grinin and Korotayev 2010a). The periphery was expected to catch up with the center due to the faster rates of its development and slowdown of the center development. However, one should not expect continuous crisis-free development of the periphery – a crisis will come later and probably in other forms. Without slow-down of the development of the periphery and serious changes full harmonization of the economic and political component will not happen. Consequently, it might be supposed that in the next decade (approximately by 2020–2025) the growth rates of the peripheral economies can also slow down, and internal problems will aggravate that, as said above, can stimulate structural changes in the peripheral countries and strengthen international tension. Thus, we suppose that in the next 10–15 years the world will face serious and painful changes.

As is known, among researchers there is no agreement about periodization of the Kondratieff waves (about this see Korotayev and Grinin 2012). We believe that at present we witness the downward phase of the fifth K-wave which will last till the early or the mid-2020s. However, for example, Leo Nefiodow in his contribution to this yearbook and the other works (Nefiodow 1996; Nefiodow and Nefiodow 2014) argues that the sixth K-wave began in the late 1990s. Thus, according to Nefiodow's logic, now we observe an upward phase (however, the crisis of 2008–2014 and prospects for the next years contradict this), and in the 2020s the downward phase should come.

III. Characteristics of the Cybernetic Revolution

What are self-regulating systems and why are they so important? Self-regulating systems are systems that can regulate themselves, responding in a pre-programmed and intelligent way to the feedback from the environment. These are the systems that operate with a small or completely without human intervention. Today there are many self-regulating systems around us, for example, the artificial Earth satellites, pilotless planes, navigators laying the route for a driver. Another good example is life-supporting systems (such as medical ventilation apparatus or artificial hearts). They can regulate a number of parameters, choose the most suitable mode of operation and detect critical situations. There are also special programs that determine the value of stocks and other securities, react to the change of their prices, buy and sell them, carry out thousands of operations in a day and fix a profit. A great number of self-regulating systems has been created. But they are mostly technical and informational systems (as robots or computer programs). During the final phase of the Cybernetic Revolution there will be a lot of self-regulating systems connected with biology and bionics, physiology and medicine, agriculture and environment. The number of such systems as well as their complexity and their autonomy will dramatically increase. Besides, they will essentially reduce energy and resource consumption. The very human life will become organized to a greater extent by such self-regulating systems (for example, by monitoring of health, regimen, regulation of or recommendation concerning the exertions, control over the patients' condition, prevention of illegal actions, *etc.*).

Thus, we designate the modern revolution 'Cybernetic', because its main sense is the wide creation and distribution of self-regulating autonomous systems. Cybernetics, as is well-known, is a science of regulatory systems. Its main principles are quite suitable for the description of self-regulating systems (see, *e.g.*, Wiener 1948; Ashby 1956; Foerster and Zopf 1962; Umpleby and Dent 1999; Tesler 2004).

As a result, the opportunity to control various natural, social and production processes without direct human intervention (that is impossible or extremely limited now) will increase. At the fourth phase (*of maturity and expansion*) of the scientific cybernetic production principle (the 2070s and 2080s) the achievements of the Cybernetic Revolution will become quite systemic and wide-scale in its final phase (for more details see Grinin 2006a).

Below we single out the most important characteristics of the Cybernetic Revolution. One can observe them today, but they will realize in mature and mass forms only in the future. These features are closely interconnected and corroborating each other (for more details see Grinin and Grinin 2013a, 2013b).

Group of self-regulating properties:

1. Transition to self-regulating systems of various types and nature and qualitatively growing controllability of systems and processes.

2. Transition to the control over deeper and more fundamental processes and levels (up to subatomic particles), using tiny particles as building blocks (as is clearly seen in nano- and biotechnologies).

3. Control over humans activities to eliminate the negative influence of the so-called human factor, and control the lack of human attention in order to prevent dangerous situations (*e.g.*, in transport) as well as to prevent human beings from using means of high-risk in unlawful or disease state (*e.g.*, not allowing driving a vehicle while under the influence of alcohol or drugs).

The group of attributes of task-aware adaptation of materials and systems:

1. Radical increase in systems' abilities to choose optimal regimes for different objectives and tasks.

2. Individualization as trend of technology. The opportunities of self-regulation will allow choosing a particular decision for the variety of individual tasks, orders and requests (*e.g.*, with 3D and 4D printers and choosing of programs adapted to specific individual needs). We also expect a rapid increase in the market of cosmetic corrections and plastic surgery of any kinds and other private orders to change individual organisms.⁶

3. Resource and energy saving in many spheres.

4. Increasing opportunities in the synthesis of materials with previously lacking properties in biological and bionic (techno-biological) systems (as in Chemistry).

5. Miniaturization and micro-miniaturization as a trend of the constantly decreasing size of particles, mechanisms, electronic devices, implants, *etc.*

Various directions of development should generate a system cluster of innovations.⁷

Medicine as a sphere of the initial technological breakthrough and the emergence of MBNRIC-technology complex. It is worth remembering that the Industrial Revolution began in a rather narrow area of cotton textile manufactory and was connected with the solution of quite concrete problems – at first, liquidation of the gap between spinning and weaving, and then, after increasing weavers' productivity, searching of the ways to mechanize spinning.

⁶ Even now this market is growing rapidly, and in the future it will run up to hundreds billion dollars.

⁷ So, for example, resources and energy saving can be carried out via the choice of the optimal modes by autonomous systems that fulfil concrete goals and tasks and *vice versa*, the choice of an optimal mode will depend on the level of energy and materials consumption, and the budget of a consumer.

However, the solution of these narrow tasks caused explosion of innovations conditioned by the existence of a large number of the major elements of machine production (including abundant mechanisms, primitive steam-engines, quite a high volume of coal production, *etc.*) which gave an impulse to the development of the Industrial Revolution. In a similar way, we assume that the Cybernetic Revolution will start first in a certain area. Given the general vector of scientific achievements and technological development and taking into account that a future breakthrough area should be highly commercially attractive and have a wide market, we predict that the final phase (of self-regulating systems) of this revolution will begin somewhere at the intersection of medicine and many other technologies. Certainly, it is almost impossible to predict the concrete course of innovations. However, the general vector of breakthrough can be defined as a rapid growth of *opportunities for correction or even modification of the human biological nature*. In other words, it will be possible to extend our opportunities to alter a human body, perhaps, to some extent, its genome; to widen sharply our opportunities of minimally invasive influence and operations instead of the modern surgical ones; to use extensively means of cultivating separate biological materials, bodies or their parts and elements for regeneration and rehabilitation of an organism, and also artificial analogues of biological material (bodies, receptors), *etc.*

This will make it possible to *radically expand the opportunities to prolong the life and improve its biological quality*. It will be the technologies intended for common use in the form of a mass market service. Certainly, it will take a rather long period (about two or three decades) from the first steps in that direction (in the 2030–2040s) to their common use.

The drivers of the final phase of the Cybernetic Revolution will be medicine, bio- and nano-technologies, robotics, IT, cognitive sciences, which will together form a sophisticated system of self-regulating production. We can denote this complex as **MBNRIC-technologies**. As is known, there is the widely used abbreviation of NBIC-technology (or convergence), that is nano-bio-information and cognitive (see Lynch 2004; Dator 2006; Akayev 2012). However, we believe that this complex will be larger.

It should be noted that Leo Nefiodow has been writing about medicine as the leading technology of the sixth Kondratieff wave for a long time (Nefiodow 1996; Nefiodow and Nefiodow 2014; also in this volume). In general, we support his approaches (including the ideas about a new type of medicine), but it is important to point out that Nefiodow believes that it is biotechnologies that will become an integrated core of a new mode. However, we suppose that the leading role of biotechnologies will be, first of all, in their possibility to solve

the major medical problems.⁸ That is why, it makes sense to speak about medicine as the core of a new technological paradigm. Besides, Nefiodow practically does not mention nanotechnology that will be of great importance in terms of the development of biotechnologies and medicine (they are supposed to play a crucial role in the fight against cancer; at the same time nanotechnologies will play a crucial role in other spheres too, in particular in energy and resources saving). It is difficult to agree with his opinion that psychosocial health, which, in his opinion, cover not only psychotherapeutic, psychological and psychiatric services, but also numerous measures of people's health improvement that is capable to reduce, in his terms, social entropy, will be the second leading mode. The problems of this social entropy which he points out (corruption, growth of small and large crime, drug addiction, loss of moral guide, divorces, growth of violence, *etc.*) have always existed in society; many of them even had a greater share than today. Social changes can be really extremely important for creation of starting conditions for a long-term upswing and its keeping (for more details see Grinin and Korotayev 2014 in this issue). However, it is production and/or commercial technologies that represent the driving force of the K-Waves upward phases.

Thus, we suppose the following:

1. Medicine will be the first sphere to start the final phase of the Cybernetic Revolution, but, later on, self-regulating systems development will cover the most diverse areas of production, services and life.

2. We treat medicine in a broad sense, because it will include (and already actively includes) for its purposes a great number of other scientific branches (*e.g.*, the use of robots in surgery and care of patients, information technologies in remote medical treatment, neural interfaces for treatment of mental illness and brain research; gene therapy and engineering, nanotechnologies for creation of artificial immunity and biochips which monitor organisms; new materials for growing artificial organs and many other things to become a powerful sector of economy).

3. The medical sphere has unique opportunities to combine the abovementioned technologies into a single system.

4. There are also some demographic and economic reasons why the phase of self-regulating systems will start in medicine:

- Increase in average life expectancy and population ageing will favor not only the growth of medical opportunities to maintain health, but also allow the extension of working age, as population ageing will be accompanied by the lack of working-age population;

⁸ We agree with Nefiodow that it is also necessary to include in this complex food, pharmaceuticals and ecology (see Grinin and Grinin 2013a, 2013b).

– People, in general, are always ready to spend money on health and beauty. However, the growth of the world middle class and the cultural standard of people implies much greater willingness and solvency in this terms;

– Medical corporations usually do not impede technological progress, but, on the contrary, are interested in it.

Thus, today medicine is a very important sector of the economy, and tomorrow it will become even more powerful.

In the present article we confined ourselves to a short description of the spheres which represent a new, in a broad sense, medical system or realm of medicine, creating a complex of technologies and their application with other perspective directions.

Surgery. Robots have become widely used in surgeries (see Fig. 4). The da Vinci robot has become especially popular. In the future, an increasing number of surgical operations will be performed with less involvement of professionals. Many simple surgeries will need no human participation at all.

Robots can perform a wide range of surgeries because of:

- easy access to the zone of surgery;
- small scars;
- superhuman accuracy;
- no hand tremor;
- possibility to control a robot at a distance via Internet.

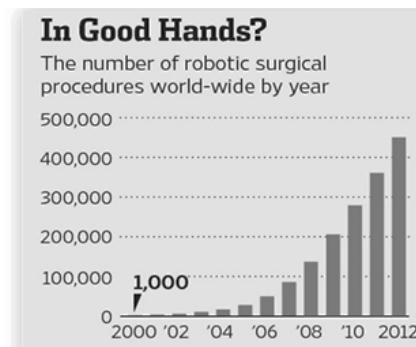


Fig. 4. Robots in surgery

Source: Pinkerton 2014.

Biochips represent a new trend of combining medical and nanobiotechnologies. Biochips are able to register a wide range of physiological changes and respond to them or perform specific actions. In the long term, biochips will permit a continuous control of a person's health. There are many biochips in medicine today. For example, cardio-chips which are connected to the heart

cells, register all necessary indices, and transmit them to devices. Some bio-chips are so small in size that can be placed into a cell or tiny spheres of lipids, liposomes. They can be used for different purposes, for example, for targeted drug delivery.

Artificial organs are the key to resolving the urgent lack of enough donor organs. In medicine scientists already use or work to design different artificial organs: skin, retina, trachea, vessels, heart, ear, eye, limbs, liver, lungs, pancreas, bladder, ovaries. This will definitely increase life expectancy and can have various consequences. The artificial womb, for example, can provide an opportunity to have children for people irrespective of age and, perhaps, even gender.

Artificial immune system is an autonomous intellectual system against diseases and pathogenic organisms. For example, a nanorobot can travel through the body and collect pathogenic organisms into a special module, where they are decomposed. Organic compounds are further used by human organism.

Gene therapy is an explosively developing sector. It is a powerful tool for correcting hereditary diseases as well as developing new abilities that an organism lacked before. In our view, the crucial breakthroughs in gene therapy will be made in the treatment of genetic disorders and sport medicine.

Neural interfaces are an interaction between brain and computer systems that can be realized via electrode contact with head skin or via electrodes implanted into the brain. The implementation of neural interfaces is already widespread. They have developed neural interfaces that allow prosthetic devices to be moved via brain signals. Today, scanning techniques have been developed that allow studying brain signals. This gives an opportunity to reproduce any brain response.

So the final phase of the Cybernetic Revolution:

- will create various self-regulating systems;
- will start in medicine, which in the conjuncture with other fields will create the revolutionizing system of MBNRIC (med-bio-nano-robo-info-cognitive) technologies;
- will improve the quality of life particularly of old people and disabled persons;
- will increase average life expectancy (up to 100 years);
- will lead to the emergence of opportunities to correct and modify human biology itself.

However, the final phase of the Cybernetic Revolution will have ambiguous consequences. On the one hand, vigorous growth of production volume will be expected. On the other hand, due to the diffusion of various self-regulating systems the number of specialists needed in different spheres will decrease. For in-

stance, due to the development of self-regulation and remote medical care the number of doctors will significantly diminish.

The possibilities of medicine will hugely increase. At the same time the emergence of opportunities to radically change the human organism may bring about unprecedented ethical issues and seriously damage such vital aspects as family, gender, and morals. That is why it is very important to search for some optimal social, legal and other means beforehand. Then those changes will not be completely unexpected and their negative consequences could be minimized.

IV. The Phase of Self-Regulating Systems and the Sixth K-Wave

A-Phase of the sixth K-wave: acceleration to enter the final phase of the cybernetic revolution

The sixth K-wave will probably begin approximately in the 2020s. Meanwhile the final phase of the Cybernetic Revolution has to begin later, at least, in the 2030–2040s. Thus, we suppose, that a new technological mode will not develop in a necessary form even by the 2020s (thus, the innovative pause will take longer than expected). However, it should be kept in mind that the beginning of the K-wave upswing phase is never directly caused by new technologies. This beginning is synchronized with the start of the medium-term business cycle's upswing. And the upswing takes place as a result of the levelling of proportions in economy, the accumulation of resources and other impulses that improve demand and conjuncture. One should remember, that the beginning of the second K-wave was connected with the discovery of gold deposits in California and Australia, the third wave with the increase in prices for wheat, the fourth one with the post-war reconstruction, the fifth one with the economic reforms in the UK and the USA. And then, given an upswing, a new technological mode (which could not completely – if at all – realize its potential) facilitates overcoming of cyclic crises and allows further growth.

Consequently, some conjunctural events will also stimulate an upward impulse of the sixth K-wave. And, for example, the rapid growth of the underdeveloped world regions (such as Tropical Africa, the Islamic East, and some Latin American countries) or new financial and organizational technologies can become a primary impulse. Naturally, there will also appear some technical and technological innovations which, however, will not form a new mode yet. Besides, we suppose that financial technologies have not finished yet its expansion in the world. If we can modify and secure them somehow, they will be able to spread into various regions which underuse them now. One should not forget that large-scale application of such technologies demands essential

changes in the legal and other systems, which is absolutely necessary for developmental levelling in the world. Taking into account a delay of the new generation of technologies, the period of the 2020s may resemble the 1980s. In other words, it will be neither a growth recession, nor a rise, but rather an accelerated development (with stronger development in some regions and continuous depression in others).

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

Another scenario. The final phase of the Cybernetic Revolution can begin later – not in the 2030s, but in the 2040s. In this case the A-phase of the sixth wave will terminate before the beginning of the regulating systems revolution; therefore, it will not be based on fundamentally new technologies and will not become so powerful as is supposed in the previous scenario. The final phase of the Cybernetic Revolution in this case will coincide with the B-phase of the sixth wave (as it was the case with the zero wave during the Industrial Revolution, 1760–1787) and at the A-phase of the seventh wave. In this case the emergence of the seventh wave is highly possible. The B-phase of the sixth wave should be rather short due to the emergence of a new generation of technologies, and the A-phase of the seventh wave – rather long and powerful.

The end of the Cybernetic Revolution and disappearance of K-waves

The sixth K-wave (about 2020 – the 2060/70s), like the first K-wave, will proceed generally during completion of the production revolution. However, there is an important difference. During the first K-wave the duration of the one phase of the industrial production principle significantly exceeded the duration of the whole K-wave. But now one phase of the K-wave will exceed the duration of one phase of production principle. This alone should essentially modify the course of the sixth K-wave; the seventh wave will be feebly expressed or will not occur at all (on the possibility of the other variant see above). Such a forecast is based also on the fact that the end of the Cybernetic Revolution and distribution of its results will promote integration of the World System and considerably increasing influence of new universal regulation mechanisms. It is

quite reasonable, considering the fact that the coming final phase of the revolution will be the revolution of the regulating systems. Thus, the management of the economy should reach a new level. *So, K-waves appear at a certain stage of social evolution and are likely to disappear at its certain stage.*

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IV. NIKOLAI D. KONDRATIEFF'S HERITAGE AND THE ECONOMIC SCIENCE

13

The Feat of Life and Creativity¹

Valentina M. Bondarenko

Abstract

The article reflects the views of Academician Leonid Abalkin on Nikolai Kondratieff's scientific heritage: starting from the presentation made at the International academic conference held in 1992 to commemorate Nikolai Kondratieff's 100th anniversary (Abalkin 1992) to his subsequent reports and presentations related to Kondratieff's works.

Keywords: *Academician Leonid Abalkin, N. D. Kondratieff, feat of life and creativity, regaining of scientific knowledge, historical memory, Kondratieff waves, unresolved problems of methodology.*

The academician of the Russian Academy of Sciences (RAS) and the first President of the International N. D. Kondratieff Foundation (1992–2007), passed away in 2011. Therefore, it would be worthwhile to recall that period again in the context of a direct link between the names of Nikolai Kondratieff and Leonid Abalkin.

Abalkin devoted much effort and time to the study of history of the Russian socio-economic thought. He did it not only in order to introduce less known names to the broad audience of readers, but mainly to reveal their role in the development of the Russian socio-economic thought as well as to memorize the prominent national figures and to contribute to the revival of Russia.

In his presentations, articles and books Leonid Abalkin explores the lives and academic heritage of the Russian socio-economic thinkers of the 18th – 20th centuries. He analyzes the theoretical and publicistic heritage of once best-known representatives of that school, such as Ivan Pososhkov, Andrey Shtorch, Nikolay Mordvinov, Vladimir Vernadsky, Nikolay Danilevsky, Nikolay Bunge, Alexander Chouprov, Ivan Yanzhul, Mikhail Tugan-Baranovsky, Sergey Vitte,

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Dmitri Mendeleev, Maxim Kovalevsky, Nikolay Zheleznov, Alexander Chayanov and Alexander Bogdanov. When addressing these names, Leonid Abal'kin considered it especially important to return Nikolai Kondratieff's honour and works into the academic discourse.

Nikolai Kondratieff (1892–1938) ranks among the most prominent representatives of the Russian school of economics of the early twentieth century. His name is associated with fundamental studies in the theory of conjuncture, regularities of its dynamics, and substantive explanation of long waves of economic conjuncture. He also published several works on the issues of forecasting and long-range planning, agrarian problems and statistics. In the last years of his life, he extended his research to sociology and mathematics. Life treated this scholar rather cruelly. However, his tragic destiny and decades of oblivion could not destroy or derogate his achievements. Nikolai Kondratieff's scientific heritage, his universally recognized ideas and theories were rejected and severely criticized in his native country. One should note that for the sake of destructive criticism of his ideas there were published numerous books and articles, for example, such collected volumes as the *Kondratievschina* [Kondratieff's Wild Fantasies], published by the Communist Academy in 1930 (*Kondratievschina* 1930) and in 1931 – *Kondratievschina: Class Struggle in the Economic Theory* (*Kondratievschina* 1931). The entry in the Big Soviet Encyclopedia says that the theory of big cycles is a vulgar bourgeois theory of crises and economic cycle, which is targeted against the Marxist theory of crises and tones down the irresolvable contradictions of the capitalist society (Titarev 1973). In Volume 2 of the encyclopedia *Political Economy* (Figurovskaya 1975) it is noted that Nikolai Kondratieff is the author of the apologetic theory of big cycles of conjuncture, which shaded the essence of the general crisis of capitalism by presenting it as a simple long-term conjuncture depression. We come to know from different sources that after the destruction of the Russian economic school in 1929, Kondratieff's works were withdrawn from the country's academic life for almost fifty years. His name was mentioned only in connection with criticism of his alleged mistakes. The death sentence under Kondratieff's case was cancelled in 1962, while the verdict under the 'case' of the Labor Peasants Party was disavowed only 25 years later, in 1987. Kondratieff lived for only 46 years, and his creative work lasted for only 15 years – from the graduation from the university to imprisonment, but that 15-year period was indeed a 'big cycle' that left a notable trace in the history of the Russian and world science. His scientific heritage continues to be timely and up to modernity. The restoration of memory of Nikolai Kondratieff was a result of perestroika in Russia.

However, it would be correct to recall that his contribution to the world science had been much earlier recognized in the West, where his name is often mentioned and one can find numerous references to his works in economic literature. The theory of big cycles was named to memorize its author, and also the long-term fluctuations were called the Kondratieff long waves or K-waves. Kondratieff's theory of long cycles won international acclaim due to a number of articles published in European languages: in 1926, in German (Kondratieff 1926), and in 1935 – in English (Kondratieff 1935). Several decades passed after his recognition in the West before Nikolai Kondratieff's honor and ideas came back to his native country. Yuri V. Yakovets in his monograph entitled *Regularities of Science-Tech Progress and Their Systematic Use* (1984) positively interprets N. D. Kondratieff's theory of long cycles of conjuncture as regards the development of the theory of cyclic dynamics. In the same period, Stanislav M. Menshikov (1984) also gave a positive assessment of Kondratieff's theory; the same was made in 1986, in S. Nikitin's *Theory of 'Long Waves' and Science-Tech Progress* (1986) and in Yu. V. Shishkov's article (1986) on the long-waves concept. In 1988, the International Institute of Applied System Analysis and the Siberian branch of the USSR Academy of Sciences held an International Academic Conference on long waves in economic dynamics in Novosibirsk. The Academy of National Economy hosted the first cross-disciplinary discussion on the theories of cycles. The works, developing the theory of cycles, among others included the monograph *Acceleration of Science-Tech Progress: Theory and Economic Mechanism* by Yu. V. Yakovets (1988), as well as articles by Natalia A. Makasheva, Vadim V. Simonov, Elena V. Belyanova, Sergey H. Komlev, and others.

Even after the first wave of the Thaw, the prominent scientist's research works remained in the oblivion in his motherland. It was only in 1989, when, after the decision of the Bureau of the Economics Division at the USSR Academy of Sciences to establish the Commission on N. D. Kondratieff's scientific heritage under the lead of Academician L. I. Abalkin, there started intensive activities in order to publish Kondratieff's works. One can name just a few Kondratieff's books that were published in 1989–1991 (apart from publication of some articles in journals): *Problems of Economic Dynamics* (1989), *Grain Market and Its Regulating during the War and Revolution* (1991a), and *Major Problems of Economic Statics and Dynamics* (1991b). By March 1992, when the International Academic Conference was held on the occasion of his 100th anniversary, another book was published, which contained N. D. Kondratieff's as well as other authors' works that reviewed his contribution to the world economic science.

As Abalkin wrote, all that was a part of the grand work connected with the revival of the Russian economists' names, crossed out from history, and publi-

cation of series of works under the general heading of 'Economic Heritage'. Nikolai Kondratieff was not an individual scholar. The time of his academic prime was the period of development of economic thought in Russia. He was both a product and the brightest representative of that school. While working at the university, he learned in coteries and seminars conducted not only by Mikhail Tugan-Baranovsky, but also by such prominent scholars as Academician Alexander Lappo-Danilevsky, Professor Lev I. Petrazhitsky, privat-docents Sergey Solntsev, Mikhail Svetlovsky and Mikhail Ptukha. He lived, worked and created together with those, who made the honor and glory of the Russian school of economic thought. In parallel with publication of Nikolai D. Kondratieff's works, grand efforts were taken to restore the memory of the prominent Russian scholars in Economics.

The series, issued within the 'Economic Heritage' program under the lead of L. I. Abalkin, included many publications of works by Kondratieff's teacher M. I. Tugan-Baranovsky, as well as by Sergey Bulgakov, Alexander Bogdanov, Peter Struve, Leonid Yurovsky, and Alexander Chayanov. Broad attention was as well attracted to the study of the Market Research Institute, founded in 1920 which Kondratieff headed until 1928. The social atmosphere in those years, creative interaction of academic researchers, and combination of theoretical analysis with generalization of massive empirical material were among the major factors that formed the intellectual elite of the Russian economic school.

Leonid Abalkin emphasizes that of utmost importance is not the belated recognition or tribute to those who passed away but rather the fact that their work is of great public value. It is tightly connected with the revival of Russia and its spiritual resources. Besides, the knowledge of history of science and the works of those who make the glory of science is indispensable for raising professional scholars and for the formation of their academic ethics. Nikolai Kondratieff consciously connected his life and destiny with the destiny of Russia, and together with his country drained the cup of sorrow to the dregs. We can only guess the doubts, hesitations and passions that filled his heart, but he fulfilled his civil and moral duty to Russia. While sharing quite a few approaches of the arising 'official' science and being even less enthusiastic about administrative methods of interference in economic life, he served to the people rather than to the authorities. At the same time, as Leonid Abalkin emphasized, Nikolai Kondratieff was not only a Russian scholar but a scholar of the global fame and scale. He was elected the member of the American Academy of Social Sciences, American Economic Association, American and London societies of statistics, and American agricultural Association. Nikolai Kondratieff, a profoundly-thinking and multi-faceted researcher, left a huge academic heritage and was a talented organizer in science. In Leonid Abalkin's

view, it was not incidental that Kondratieff was both an outstanding economist and a prominent statistician who scrutinized facts and figures. By all evidence, exactly the love for facts that he adopted from his teacher M. M. Kovalevsky served a prerequisite for his later interest in the long waves of conjuncture, the interest that was based on generalization of the abundant statistical material.

In the introduction to Kondratieff's book *Long Cycles of Conjuncture and Theory of Forecast*, published in 2002 and dedicated to his 110th anniversary and the 10th anniversary of International N. D. Kondratieff Foundation (Kondratieff 2002: 4), Leonid Abalkin wrote that the book represented a collection of the Kondratieff's works on the title subject, including the book *The World Economy and Its Conjunctures during and after the War*, which had been first published in Vologda and then became a bibliographic rarity. The reprint of this book helps to specify the time when the theory of long waves in economic dynamics originated. Today it is clear that Kondratieff had developed the given theory much earlier than the observers used to suppose. At the same time, Abalkin argues (Kondratieff 2002: 5) that long cycles of the conjuncture have been and remain the subject of a broad academic discourse, and this is quite natural since they are not considered as some preset dogma but rather as a real object of academic analysis. It would be wrong to maintain that Kondratieff foretold the course of events from the time of appearance of his theory up to the present day. Neither Adam Smith, nor Karl Marx, nor John Keynes ever had such a foresight. Great scholars do not need to be conferred with the title of prophet.

At the opening session of the 6th International Kondratieff Conference 'Does Russia have the Non-Resource Future?' Leonid Abalkin, developing his analysis of N. D. Kondratieff's heritage, said:

As evidenced by the analysis of Nikolai Kondratieff's academic heritage, his achievements include more than a discovery of the long waves of conjuncture. His teaching is much richer. He (1) formulated methodological approaches to the analysis of the reality and the must (*Sein und Sollen*); (2) analyzed the correlation between the teleological and genetic methods of research; (3) developed the theory of forecasting; (4) strongly oriented economy to high vendibility (Abalkin 2007).

Understanding this is especially important in the context of the fact that

Some researchers of N. D. Kondratieff's creative work drew the conclusion that his worldview may be described largely as 'statistical' worldview. This opinion was formed to a significant extent under the influence of A. Chouprov. It would be wrong to say that such conclusion is absolutely ungrounded. The grounds are seen in Kondratieff's proba-

bilistic statistical approach to description of regularities of societal development, in broad use of statistical 'facts', in construction of diversified models and, finally, in special respect and even love for facts (Abalkin 1992: 6).

One should note that today many Nikolai Kondratieff's followers develop exactly this idea, that is the long waves of conjuncture. The huge interest in K-waves is supported by the fact that today, when the global financial crisis hit the world, everybody recalled again exactly this part of N. D. Kondratieff's heritage.

However, as Prof. Abalkin wrote in his paper devoted to Nikolai Kondratieff's 100th anniversary in 1992, the attentive study of Kondratieff's academic heritage gives reasons to maintain that he had a broad methodological basis and seriously focused on philosophical fundamentals of theoretical constructions. Among the latter, special attention is paid to the correlation between such categories as *Sein und Sollen*, and to the question on whether the research of 'social economy' must proceed only through the prism of the *Sein* category, or whether it would be proper (without going beyond the scientific boundaries) to consider 'social economy' through the prism of 'must', the category of *Sollen*, as well? There are some reasons to suppose that N. D. Kondratieff was interested in these issues throughout the whole period of his research activities. As early as in the first year of study at Petersburg University, in the study group headed by M. I. Tugan-Baranovsky, he delivered a paper on 'Teleological Elements in Political Economy', which, in particular, also manifested themselves in the course of analyzing the issue of correlation between the genetic and teleological methods in planning, as well as in the research of many other problems. While in the Butyrskaya prison, where he reviewed his research activities, Kondratieff included in the prepared manuscript the chapter entitled 'The Category of the Reality and the Must (*Sein* and *Sollen*) in Socio-Economic Sciences'. Although, as Prof. Abalkin writes, the dialectics of reality and the 'must' ranks among eternal problems, and in every epoch new tints and nuances would be attached to this correlation, while new answers would be found and new questions would arise, we have no way to evade such questions as: where the violence over the reality would lead; what would be the results of the strive to realize, at all costs, the 'must' – that is a social norm or an ideal model of social organization. In general, should logical and abstract theoretical constructions (which are absolutely necessary in science) acquire the status of a public ideal and become a banner of political struggle? Today, however, the interest in these problems arises also from an absolutely different sphere. It is generated by the lost orientation for socio-economic progress and ideals and other things that used to be described as 'the reason for living'. What is the destination of the societal progress, and can it be re-

ferred to as progress if no reliable criteria are available for the movement to a certain goal or condition, whether the latter are called as 'bright future' or 'the God's Kingdom on the Earth'? And, is it possible to answer all these questions without appealing to 'the must'? And if otherwise, is it possible to appeal it without departure from the positions of science?

In Abalkin's opinion, Kondratieff was concerned about all these issues. He had his own view of the correlation between the reality and the must. He found the contradiction in approaches to them in the 'dual human nature' expressed in the fact that 'the man not only and not so much cognizes the reality, but also acts, sets practical goals and puts forward the ideals of his aspirations' (Abalkin 1992: 8). However, socio-economic sciences address subject as the reality, the *Sein*, while ideals and social norms, described by Kondratieff as 'judgments of value' are practical (rather than scientific) notions. In Kondratieff's view, ideals may not be withdrawn from the logic of science, while the task of creating scientific notions is principally irresolvable. Such quite forthright and even mechanic division between the reality and the must, or between theoretical and practical judgments ('judgments of value') is quite far from the dialectics of their correlation. As Leonid Abalkin writes further, Nikolai Kondratieff also feels it intuitively (rather than understands logically) and therefore, writes that 'the view of the reality under the category of the must, expressed in judgments of value, is essentially permeated by the spirit of activity and ardent willingness to change and reconstruct the reality'. Not without reason, he comes to the conclusion that 'the enormous value of the judgments and unordinary inclination to voice them evidently stems from the profound connection of social economy (political economy – *L. A.*) with the practice and interests in societal life' (*Ibid.*).

Academician Abalkin also notes that one should take into account the time period, when N. D. Kondratieff's position on these questions was taking shape. A rapid collapse of socio-economic structures, forcefully accelerated rates of industrialization, attack at peasantry and voluntarism in economic policy (Kondratieff was the first one who exposed its detriments) could not but motivate the honest researcher to reject the methods, which were disguised by references to the 'must'. The next step of such a rejection was to accept the specific-historical form, known to the author, as the only possible means to realize the concept of 'the must'. The psychological undertone of such reasoning is also clear. While recognizing that it would be correct to introduce the 'judgments on the value' into practical policy, in which, as Kondratieff believed, the struggle of ideas takes the form of the struggle of worldviews, the scientist wanted to stay away from such a struggle and to avoid its importing into 'pure' science. However, while expressing his own position on the dialectics of reality and the must, Leonid Abalkin holds the view that some questions would remain unre-

solved, such as: Is not it an illusion to try to stay 'above the fray'? Would not such approach diminish the enormous creative role of social sciences, and to what extent the given approach is appropriate in scientific fields dealing with social matter? Further on, Dr. Abalkin writes (Abalkin 1992: 9) that here again we face with 'eternal' questions, to which an unequivocal answer would hardly be ever found. This, however, does not mean that the search is useless at all. Having learned the experience of the past generations, we start this search not *ex nihilo*. Every time we conduct the search not in an abstract society but also at a quite certain period in history. And Nikolai Kondratieff was evidently right when he wrote that 'the question of whether the given ideal is live or dead would be resolved by neither a scholar, nor by a logical proof, but by the aggregate conditions of the societal life that determine the belief of the masses' (*Ibid.*).

Coming back to one of Kondratieff's major and best-known academic achievement, that is to the development of the theory of long cycles or waves of conjuncture, it is worth remembering Prof. Abalkin's words, who in 1992 wrote:

The interest in some or other aspects of the long-waves issue is predetermined largely by social conditions at a certain stage. As a number of researchers noted, in the period between the 1970s and the 1980s, the discourse on this problem was predetermined by the development of scientific and technological progress and was focused on searching for a connection between the science-technological progress and the long-term fluctuations of economic activities. At the present time and in the near future, as I see it, the agenda of long-cycle studies would expand considerably. It would include the problems of socio-economic progress in connection with understanding of its non-linear nature and its inherent oscillation... (*Ibid.*: 10)

The reason is that Kondratieff

by all evidence grasped the main point – that is, the material basis of long cycles. However, there are quite serious grounds to identify broader than purely economic bases of long cycles – such as the stereotypes of mass consumption that form and then dominate for a rather long time. Satisfaction of the established needs is connected with the downward wave, and transition to the upward wave suggests formation of a new, more attractive idea of the quality of life becoming an important incentive for savings and development of production. All this, in my view, is connected with the change of the type of economic culture, change of generations and, naturally, has to be checked thoroughly by means of economic and statistical models (*Ibid.*: 12).

Indeed, the last several years, marked by the unfolded global crisis, witness the revival of interest to Kondratieff's works. Many academic publications appeared which applying economic-mathematical methods and basing on the updated empirical information, confirm the validity of Kondratieff's theory of long cycles and waves, and actually prove that Russia and the world are on the threshold of a new K-cycle. Thus, proceeding from Kondratieff's theory, the researchers state that in 2008 the global economy entered the downward wave of Kondratieff's long cycle. Therefore, the exit from this long downward wave is expected approximately in 2020–2025. According to some observers, a new phase of the current crisis, which many anticipate to start in 2012–2015, would be comparable to the Great Depression in terms of the world economic decline rates.

Leonid Abalkin was right when he wrote on Kondratieff's theory of long cycles:

It never happened (and would hardly ever happen) that a theory would appear at once in a complete form, encompassing all connections and mediations of the sphere under study. The value of any truly scientific theory is found in its capability for development and self-enrichment and in its ability to integrate new knowledge. All these qualities are present in N. D. Kondratieff's theory of long cycles and they just make it up-to-date and timely (*Ibid.*: 13).

However, Abalkin attached an equally great importance to other sections of Nikolai Kondratieff's academic heritage, in particular, those focused on the problems of planning and forecasting. Exactly in the 1920s, the struggle of ideas on the problems of planning was underway, and the position, taken by N. D. Kondratieff, served the basis for the political charges brought against him and crowned by his shooting execution.

N. D. Kondratieff's thoughts and judgments on planning were most closely connected with his participation in drafting of the long-term plan for the development of agriculture and forestry and in discussion of the draft of five-year plan for national economy development, prepared by the Central Commission under the USSR State Planning Committee supervised by Stanislav Strumilin. This circumstance would explain the polemical and sometimes sharply critical tone of his public statements. In his article 'Plan and Prediction' Kondratieff quite clearly articulated his position on the need to combine the elements of planning with development of market and competition:

As both elements are present in our economy in a rather salient form, none of them exists here in a pure form. As market exists in our country, enterprises of the state sector are partly involved in the market relations and have to consider the market as the fact, and thus the elemental factor

also invades the orbit of the economic sector being under the direct control of the state. On the contrary, as the state directly controls the sufficient sphere of the economic life and therefore has leverages to cause powerful influence on the sphere of private economy and the market, the elemental factor under such influence is present here in the inevitably transformed shape (Kondratieff 1989: 95).

In Abalkin's opinion, Kondratieff's research interests were not focused on organizational or technical issues of planning activities, but rather on the issues of planning methodology. Therefore, Kondratieff identifies three summands of planning: (1) the system of prospects, which the bodies of economic regulation intend to realize; (2) analysis of the objective economic reality and trends for its elemental dynamics; and, (3) construction of a system of measures and leverages, by which the state would control such elemental development in order to direct it along the maximally desired path. Kondratieff devoted special attention to feasibility of plans and sharply criticized discrepancy between the planned targets and the available potentials as well as development of the so-called 'bold plans'. He called the audience not to fall under 'hypnosis' of grand but unfeasible projects and 'fetishism of figures'. 'We must choose one of the two', N. D. Kondratieff wrote,

either we want to have serious and real plans, in which case only those things must be included there for which we have certain scientific grounds; or, we would continue doing all sorts of 'bold' calculations and projections for the future without any sufficient grounds, and in this case we must from the very start reconcile with the fact that such calculations are made arbitrarily and that such plans have nothing to do with reality. But what is the goal and value of such latter plans? In the best case, they would remain harmless, because they are unfeasible, dead for practice. In the worst case, they will be detrimental because they might put the practice on the very erroneous path (*Ibid.*: 126–127).

In some statements he warned against the implications of voluntarism in planning – such as an attack at the living standard of population, destruction of agriculture, and then an inevitable deterioration of situation in the commodity market and industry. As Abalkin sums up, we all know that was exactly the case. That was the price the society paid for neglecting the conclusions and warnings by economic science.

Today this logic appears undisputable and even elementary. It is hard to imagine that in those years it met strong resistance and served the basis for political charges against the scholar. In response to Kondratieff's appeals for feasibility of plans, Strumilin objected, 'We shall never give up our goals for the only reason that their realization is not secured by 100 per cent reality'

(Strumilin 1958: 314). As for the way to find the missing resources and potentials, Strumilin's answer was very simple, 'The proletariat's will and our plans, concentrating this will for the fight for the assigned tasks, can and must become the decisive chance that is lacking for their successful resolution' (*Ibid.*). Thus, in Abalkin's opinion, a favorable environment was created for the penetration of subjectivism into the planning activities, and for the development of unbalanced plans with all ensuing and currently well-known consequences.

In the second half of the 1920s, a broad discussion was underway on the so-called genetic and teleological methods of planning. Nikolai Kondratieff highly appraised the value of the first method, based on manifestations, as he put it, of 'elemental' laws and trends of economic and social development. The roots of such approach are linked organically with all the logics of his research. At the same time, however, he did not reject the significance of the 'teleological method', which suggests that the planning activity must be considered as the mechanism for realization of the preset targets of the economic policy. As Abalkin (1992: 9) summed up, under contemporary conditions the genetic and teleological approaches do not at all appear as antipodes but rather represent the two interconnected and mutually supplementing methods. Certainly, it is true that the target guidelines of the plan may not be suggested *a priori*, without a proper consideration of the actual trends. But, the past does not predetermine the future development unequivocally. At critical stages society always has options of its development, and this suggests juxtaposition of targets as such (including their ranking by priority) and juxtaposition of targets with the real opportunities of their realization. This statement, according to Abalkin, does not completely deny the academic significance and cognitive value of genetic methods, but just warns any approach against unilateralism and absolutism, and emphasizes efficiency of using different approaches provided that they are included in an integral system of forms and methods for regulating economic life. Kondratieff's works on planning bring to the conclusion that his position was very balanced and that he went ahead of many scholars in the theory of planning. There is every reason to state that Nikolai Kondratieff is the main theorist of the 'forecasting plan', and having synthesized the genetic and teleological approaches he actually antedated the indicative planning.

In 1997, speaking at the opening session of the 5th Kondratieff Readings focused on Nikolai D. Kondratieff's theory of forecasting and mid- and long-term scenarios for development of the Russian economy, Prof. Abalkin again drew the audience's attention to the major issues of the transition period. He said that while standing 'at the turn of the century' and making plans for the twenty-first century, it is necessary to evade the danger of putting serious

research 'at service of fashion' and thus devaluating the very notion of processes of transition. This is an alarming trend, and we, representatives and agents of science, must foresee such devaluation, act proactively, and prevent from leveling down the academic discourse to primitive judgments. Another doubt, he said, which we should bear in mind, is connected with the fact that we have not yet summed up the results of the twentieth century, but we already try to forecast the course of events in the twenty-first century. By all evidence, this is not quite logical, and we need to reach a sufficiently high level in order to analyze the transformations that took place in the twentieth century – not the landmarks of political history, but rather the qualitative transformations occurred in the socio-economic models and systems (Yakovets 1997: 5).

Further on, Abalkin draws the audience's attention to the three major break-points that marked the twentieth century:

- the agony and collapse of the socio-economic model that was formed in the nineteenth century and historically exhausted itself. It became necessary to find some new ways to overcome the crisis of these no longer working models, and with an active participation of the state different attempts were made to transform it;

- the development of a new model, with shaping of entirely different processes, gradual development of new technological systems and the scientific and technological revolution widely discussed in the 1950s, 1960s and 1970s. Many other non-traditional processes took place that turned typical of this period, when in a number of regions a rather high dynamism of society was provided together with the formation of mass well-being. This period (the second third of the twentieth century) was marked by cardinal changes in the political and economic geography of the world, caused by the collapse of the colonial system. The factors of human capital, education and science manifested themselves in an entirely different way;

- many contradictions in the common welfare model were revealed in the last 35 years of the twentieth century. The ecological situation on the planet aggravated tangibly. The arising ecological, energy and other crises demanded qualitatively new approaches and solutions.

Prof. Abalkin had no ready answer to the question of development condition in the twentieth century. He just pointed that a realistic, generalized and systematizing approach to the events of the twentieth century was needed in order to work out a scenario for development in the twenty-first century. Lessons must be drawn from the past experience, because there can be no future without the past.

Another circumstance, which attracted Leonid Abalkin's attention and updated the theme of the 5th Kondratieff Readings, was the absence of sufficiently

serious, grounded and adopted development strategy for Russia for a long-term or at least mid-term future.

For a rather long time, the Russians have lived without any idea of the final goals of the current transformations, or of the stages and priorities leading to their attainment. And we try to write post-factum that everything is done properly. Looking back into the past again, I would say that for the last hundred years we have never had a situation similar to what we have today – the absence of a more or less clear development strategy for Russia. Since the late nineteenth century, we have never had a period when national leaders would have no vision of future. They always had their programs, which reflected the respective epoch and sometimes might be drawn in a form different from strictly formalized documents. But, they had a concept and a vision of strategic tasks. We may criticize those programs, or point to their shortcomings and inadequacy. Sometimes attempts were made to impose some purpose-oriented guidelines of the societal development. But all those were the lessons to make respective conclusions. And, at all times there was a strategy. But the lack of prospects is unique for Russia (Yakovets 1997: 5).

Leonid Abalkin spoke about it in 1997, and in 2007, at the 6th International Kondratieff Conference ‘Does Russia Have a Non-Resource Future?’ he again brought up the issue of choosing a developmental strategy, but this time he added that

the Kondratieff conference is not a proper forum to resolve the given issue. The choice of a developmental strategy is the function of government based on the country's intellectual forces and institutes of civil society, as well as on their joint actions. Today, we do not see such a joint strategy. We do not see any strategy as well. We have a new version of ‘heroes and crowd’, when the government makes decisions without serious academic discussion and public consensus (Abalkin 2007: 4).

It should be pointed, however, that as early as in 2008 the Ministry of Economic Development of the Russian Federation devised the ‘Strategy-2020’, which initially contained many pathetic statements, for example, about the expected GDP growth to 30 thousand USD per year (as in South Korea), but the financial crisis made the strategy actually unfeasible. The document was returned for improvement, and academic community was involved in the process. Then, in March 2012, the authors published a summarizing report (over 850 pages), which is available on the relative website. Over a thousand scholars took part in its development under the lead of Yaroslav Kouzminkov (President of the Higher School of Economics), and Vladimir Mau (President

of the National Economy Academy). The 'brainstorm' proceeded in 27 working groups, organized in blocs of economic policy. The document offers a set of cardinal changes to be introduced into the country's economic and social life. Some of its ideas have been already presented many times, and some others were rejected as too unpopular. Despite the general support of this project, today it is neither known nor clear to what extent the government is prepared to hear the experts' view. Anyway, it is clear that the proposed strategy is not a systemic integral document, but it rather represents a combination of separate plans, which, in our view, are made subjectively and have very little to do with reality.

Leonid Abalkin used to say that current complicated issues of the Russian revival and modernization of its socio-economic structures and institutes would require great joint efforts, honesty of scholars and wisdom of policy-makers. To this end, it would be helpful to keep the memory of the past as well as to turn to the origins and the heritage of ideas left by great thinkers of our country. As mentioned above, for Nikolai Kondratieff the feasibility of plans was their main criteria. But nobody would listen to his voice at that time. The development of unbalanced plans would start and bring all the related consequences. Therefore, as Abalkin firmly believed, the duty and commitment of science is to say the truth in any cases and at all costs.

At the same time we must remember another warning originating from Nikolai Kondratieff's scientific heritage. Leonid Abalkin said that it would be wrong to look for ready answers to the raised questions in Kondratieff's works (even such answers are supposed to exist in science). Time is irreversible and each phase of historical development is unique and would give a key to the proper solutions. It is necessary to evade the doubtful temptation to treat all Kondratieff's writings as an absolute and final truth. Kondratieff does not need such treatment. Like any of us, he was a son of his time. Being a genuine scholar, he used to make search, have doubts and set forth original, but not ultimately proven hypotheses. By perceiving him as a contemporary and disputing with him as with a person alive, we would recognize his greatness. But, the more reliable is the support from the predecessors, the deeper is their insight in the network of economic and social processes, the more successful progress science will make. Therefore, the International Kondratieff Foundation concentrated its modest resources on continuation of studies in the least explored areas of his academic heritage. The Foundation is not focused on the long cycles of conjuncture, but rather on the problems of methodology, such as the dialectics of the reality and the must as well as the theoretical problems of the correlation between genetic and teleological approaches, as well as the correlation of planning, forecasts and theoretical bases of forecasting with the possibility of prediction. The achieved encourag-

ing results are presented on the website of the International Kondratieff Foundation.

One should say that Prof. Abalkin as the President of the International Kondratieff Foundation, while summing up the results of its activities for five, ten and fifteen years (respectively in 1997, 2002 and 2007), noted that the Foundation established a certain tradition in organizing readings and conferences. That is, discussions are centered on the issues, which, on the one hand, address comprehension of Kondratieff's theoretical heritage and school as well as that significant branch of the world economic science, to which he belonged. On the other hand, the agenda includes the attempts to find fundamental responses to the current problems that Russia faces within Kondratieff theory.

On October 20, 2011 the Russian Federation State Duma hosted a joint session of the International Kondratieff Foundation, Institute of Economics of the Russian Academy of Sciences and Anti-Crisis Academic Expert Council of the Analytical Division of the State Duma – 19th Kondratieff Readings on ‘Modernization of Russian Economy: Lessons of the Past, Risks and Chances’. Scholars from different research institutes and universities, as well as post-graduate and undergraduate students visited the Readings. Ruslan Grinberg, the Director of the Institute of Economics of the RAS and Corresponding Member of the RAS, who in 2007 by Abalkin's initiative was elected the President of the International Kondratieff Foundation, at the Opening session, said, ‘Today the International Kondratieff Foundation conducts its 19th Kondratieff Readings. During all its past years the Kondratieff Foundation underwent serious evolution. We should note that the themes announced for some or other readings or international conferences were always rather timely’ (Bondarenko 2012: 80). Then the convener of the session, A. N. Belousov, the Chairman of Anti-Crisis Academic Expert Council and the Director of the Analytical Division of the State Duma added, ‘It is most pleasant to see that now the Kondratieff Foundation holds its sessions at the State Duma, and the events held by the Foundation arouse such a keen interest. And, the discussion is very informative and future-oriented’ (Bondarenko 2011: 2). Closing and summing up the results of the 19th Kondratieff Readings, Prof. Dr. A. E. Gorodetsky, the Deputy-Director of the Institute of Economics of the RAS, started his presentation with comments on the Foundation activities and said that International Kondratieff Foundation continued its invariable glorious tradition of preserving and developing the theoretical and methodological heritage of the great Russian economist, and what is most important, of the creative application of his scientific paradigm and methodology in the interests of exploration, understanding and explanation of the current situation. This is evidenced by almost all presentations at the session (Bondarenko 2011: 2).

Finally, it seems worthwhile to state that Nikolai Kondratieff committed a feat of life and scientific creativity, while Leonid Abalkin, considering it as his duty, did everything to preserve historical memory, to share the memory of our great scholars with us, the current and future generations, as well as to restore the pride for our country, for its present and future. With all his other merits, this deed is already sufficient for our eternal recognition and appreciation of Leonid Abalkin's work.

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14
M. I. Tugan-Baranovsky
(The Main Features of His Scientific
Worldview)¹

Nikolai D. Kondratieff

Editors' note

The present essay by Nikolai Kondratieff is published on the occasion of the 150th anniversary of the birth of Mikhail Tugan-Baranovsky. It gives an opportunity to evaluate the many-sided personality and works of Mikhail Tugan-Baranovsky who is best known to the reader for his ideas about 'periodic economic crises'. Kondratieff gives an opportunity to understand the personality of the scientist, the foundations of his worldview, his ability to respond the major challenges and problems of his time; the common and different points with Marxism, and many other things that give us a much deeper understanding of Tugan-Baranovsky's heritage. Besides, the criticism of weak points of Tugan-Baranovsky's views allows us to understand where Kondratieff maintained continuity with his teacher's views and in which points he significantly diverged.

Mikhail Ivanovich Tugan-Baranovsky has passed away. He was an outstanding Russian scholar, a master spirit among Russian intellectuals, the most humane and unique person, an outstanding representative of the highest achievements of contemporary culture. [...]

The most striking thing about Tugan-Baranovsky was his rich spiritual genius. But his talent would not always shine with an even and steady light. His talent was intuitive to the uttermost degree and would flash out especially brightly at the moments when intellectual work became rather easy for him, more a play than work. [...]

The intuitive character of Tugan-Baranovsky's talent makes a bright impact on all the aspects of his personality. Being an intuitional mind, he had no pro-

¹ This is a translation of the article (under the same title) published in Кондратьев Н. Д. / Н. Д. Кондратьев. Суздальские письма; редкол.: Яковец Ю. В. (пред.) [и др.], с. 776–798. М.: Экономика, 2004. [Kondratieff N. D. / Kondratieff N. D. Kondratieff's Letters from Suzdal / Ed. by Yu. V. Yakovets *et al.*, pp. 776–798. Moscow: Ekonomika. 2004]. Originally published as a booklet in 1923. Reference style has been left as in the original.

pensity to develop a scientific *system*. Mikhail Ivanovich was too responsive to the needs of the moment; thus, in his academic works he accurately reflected the society's changing moods and demands. His talent would quest within the academic research framework and he would take up the problems which were really urgent at the moment and would subject them to a comprehensive and purely academic study. [...]

Tugan-Baranovsky lived in the times of prosperity of capitalism with all its difficulties, peculiarities and attributes. Therefore, it is not surprising that just the study of peculiar outcomes of the capitalist system development – we mean markets and crises of the capitalist system – were a starting point for Tugan-Baranovsky's investigation. His first prominent and outstanding work, 'The Periodic industrial crises' (1894), was devoted to these issues. However, Mikhail Ivanovich lived in Russia. He lived in the situation of evolving Russian capitalism, in the atmosphere of hot debates on the future and opportunities of the evolving capitalism in Russia. It is not surprising that absorbed with the debates, his second major work 'The Russian factory in the past and present' (1898) was also devoted to this issue. But later the society's demands and interests changed. Therefore, the crisis of Marxism and a fierce struggle between revisionists and orthodox historians had become the main topic of his works. Despite his prior adherence to Marxist ideas, Mikhail Ivanovich finally began to criticize Marxism and wrote 'The Theoretical Foundations of Marxism'. [...]

World War I brought to the fore a number of theoretical and practical issues. In particular, the first period of war aggravated the problem of money, more exactly, of paper money. With his characteristic sensitivity, Mikhail Ivanovich addressed this problem and wrote 'Paper money and metal' (1917). However, the society and Tugan-Baranovsky as well, remained concerned with issues of ethics and public ideal. The started Revolution only escalated this interest. And the last words of Tugan-Baranovsky as a scholar and ideologist were published in 'Socialism as a Positive Doctrine' (1917) and in the paper 'On the cooperative ideal'.

Thus, there is a close relation and correspondence between the field of Tugan-Baranovsky's academic and ideological activity and the demands of the society. In this regard he was a responsive man abreast of the thought of his time. [...]

Tugan-Baranovsky's social views were developed on the basis of Marx's ideas and materialistic understanding of history. But the views of Tugan-Baranovsky were also influenced by other social ideas, and in a more or less complete form they were profoundly different from Marx's views. According to Tugan-Baranovsky, 'a society consists of individuals each seeking to satisfy his

own needs', 'which are inherent in human nature and which ultimately determine our behavior'.² [...]

These needs and inclinations are the driving forces of social development. The needs make people search for the means to satisfy them. 'The set of human actions directed at the external world and aiming at creating the material conditions necessary for satisfaction of the human needs' is the economy which holds the leading position in social life and serves as its basis and foundation. [...]

However, after all, it is not the economy in general but its material aspects that have a determinant (but not exceptional) influence on the structure and forms of social life, on the extent and the character of satisfaction of needs. [...]

Thus, M. I. Tugan-Baranovsky generally follows the Marxist understanding of society.³ But his interpretation of the objectives of economy is wider (the economy, according to Tugan-Baranovsky, serves to satisfy not only the material needs, as Marx and especially Engels argued) and he substitutes the concept of material factors of the economy for the Marxist concept of productive forces. [...]

But Tugan-Baranovsky paid little attention to sociological issues. And the focus of his scientific and ideological work is not laid on these subjects. Most of his work is devoted to the study of economy which he considered the key phenomenon of social life. We already know the notion of economy as interpreted by Tugan-Baranovsky. Now let us consider his understanding of major categories of economic life.

According to Tugan-Baranovsky, the logical categories of economy are the value and the cost. He lived in the epoch of the struggle between the Austrian school's theory of value and the theory of labor value. He also tried to develop a synthetic theory of value and to combine Ricardo's theory with the theory of marginal utility. He considers labor and marginal utility as an objective and subjective factors of value. He admits that the value of goods is equal to their marginal utility. But he also considers that the marginal utility of goods depends on the labor costs, and it is directly proportional to the labor costs of these goods.

This brings us to the category of costs. Most economists do not acknowledge the cost as an independent category. Contrary to them, Tugan-Baranovsky strongly insists on the necessity of such an acknowledgement.⁴ According to him, the value is one aspect of economy while the cost is another side of economy. On the one hand, an economy pursues certain aims, inter-

² See 'Theoretical foundations of Marxism' Edition 4, p. 36. [«Теоретические основы марксизма», изд. 4, стр. 36].

³ *Ibid.*: 107–108.

⁴ See 'Theoretical foundations of Marxism' p. 54. [«Основы», стр. 54 и сл.]

ests, profit, and this aspect is associated with the category of value; on the other hand, the economy resorts to certain means, costs, efforts and this aspect is represented by the category of costs. That is why Tugan-Baranovsky interprets the cost as economic expenses made to purchase some utility supplies. [...]

It is evident from what is said the above, that if economic goods have some value, not all of them have a cost. It is also clear that the synthetic formula of value, developed by T-B, has no general meaning and, in any case, applies only to the economic goods that have some cost. [...]

And it becomes evident that Tugan-Baranovsky strongly denied Marx's theory of value. He criticizes Marx who had actually developed a theory of the last category but not the theory of value, and thus, encountered insuperable contradictions with reality. [...]

According to Tugan-Baranovsky, for the commodity economic system, the historical categories of economy are goods and exchange value, while for the capitalist system, which serves as a completion of the commodity system, these categories also include capital and surplus value. [...]

If Tugan-Baranovsky bases his definitions of commodity and capital on the Marxist theory, then it becomes evident that having developed his own theory of value, he had to present another explanation for the concept of exchange value and surplus value which would differ from Marx's explanation. From his point of view, the exchange value is not the ratio of labor values of exchanged goods but is *just* an abstract possibility to receive in exchange for the given commodity a certain amount of other commodities, an abstract possibility, whose concrete and direct expression (which was not typical of Marx's theory) is the price. Thus, the gap between the value (in particular, the exchange value) and the price is eliminated; and that was the gap that had undermined Marx's theory. In this respect, Tugan-Baranovsky considered the surplus value not as a part of the value gained by the capitalist (as a socially necessary labor crystallized in the commodities), but as the value of surplus product, appropriated by the capitalist.⁵ Meanwhile, the notion of the surplus value as an indicator of capitalist relations and as expression of social relation of exploitation is still preserved. Its nature consists in the fact that under capitalism a certain category of people has to yield a part of products of their labor that, of course, has a certain value, to the owners of the capital. In other words, the essence of the problem passes from the framework of the *category of value to the category of absolute cost*. From Tugan-Baranovsky's point of view, it would be more correct to speak not so much about the surplus value but about

⁵ See "Theoretical foundations of Marxism" p. 68, 'Theoretical foundations of Marxism' ch. VII–VIII [«Основы», стр. 68 и сл., «Теорет[ические] основы марксизма», гл. VII и VIII].

the surplus product which, of course, possess some value.⁶ This statement will become quite clear for us if we refer to Tugan-Baranovsky's views on the problem of distribution of national income to which the study of the surplus value brings us. [...]

With respect to wages and profit he put forward a peculiar *social theory* of distribution. According to this theory, the problem of distribution does not depend on any theory of value: the solution of the problem of distribution cannot be worked out of any theory of value. The net national product or income⁷ is distributed, that is the whole social product, excluding the means of production spent in the process of production. And since the issue concerns wages and profit, their level is defined, first, by the productivity of social labor, and, second, by the social force of the working class and capitalists. Hence it becomes clear, the more productive is the social labor, the more advanced is the technological development and the higher, *ceteris paribus*, are profits and wages. [...]

In Tugan-Baranovsky's theory of distribution the naturalistic motive instead of the axiological one appears more prominent, and we have already seen the indicators of this when speaking about the concept of surplus value as a surplus product. At the same time, there is a connection between Tugan-Baranovsky's concept and theories of productivity in terms of the solution of the problem of distribution.⁸

Indeed, Tugan-Baranovsky's concept of the origin and possibility of profit is purely naturalistic.⁹ In his opinion, as we have seen, the problem of distribution is solved irrespective of the theory of value. Just a certain multiplication of social product together with a certain surplus is needed for the profit to become possible. [...]

Yet, presenting a considerable scientific interest and being characterized by simplicity and persuasiveness, the theory of Tugan-Baranovsky, however, leaves unresolved and obscure the question of the naturalistic approach to the problem of distribution and to the axiological point of view on the distribution. Meanwhile, this problem is far from being too simple and obvious to be ignored. In particular, despite all his attempts to disprove his critics,¹⁰ the question remains unresolved if the natural growth of social product through the inclusion of a surplus product means a simultaneous increase of *value* of social

⁶ See "Theoretical foundations of Marxism". Part IV, Chapter VII [«Основы», отд. IV, гл. VII].

⁷ Foundations p. 392, 467 [«Основы», 392, 467ff.]. See «Sociale Theorie der Verteilung».

⁸ See 'Foundations'. Ch. IV, Part. III и VII [«Основы», отд. IV, гл. III и VII].

⁹ See "Theoretical foundations of marxism". Ch. VII, 'Foundations' Ch. IV, Part VII [«Теорет[ические] основы маркс[изма]», гл. VII, «Основы», отд. IV, гл. VII]

¹⁰ See "Foundations" p. 451. See Peter Struve 'Economy and price'. Chapter II, Issue I, p.15 ff. [«Основы», стр. 451. См. Петр Струве, «Хозяйство и цена». Часть II, вып. I, стр. 15 и сл.].

product. And one more question: why is the profit impossible (from the axiological point of view) even without surplus product, and due only to social economic factors?

Tugan-Baranovsky considers the problem of distribution, as *sui generis* problem of the capitalist system. Unlike many others, he refused to reduce it to the problem of exchange. Within the sphere of exchange he subjected to the analysis one of the most difficult and mysterious phenomena of commodity capitalist economy – that of the money.¹¹ He came to the conclusion that none of the existing monetary theories, including Tooke's monetary theory, which Tugan-Baranovsky called commodity-based, as well as the quantitative theory, fully developed by Irving Fischer, gives a satisfactory solution of the problem of money.

And nevertheless, both theories contain certain reasonable arguments. Money is an entirely social phenomenon, the result of spontaneous national economic processes. The amount of money is a relatively minor factor. And the quantitative theory could be applied only in the sphere of paper money circulation. Only with respect to this limited sphere of circulation this theory is valid. As for the basis of currency circulation – metal money – one should search for the explanation of the problem of value of money in the commodity market, and Tooke was right here. However the value of money, contrary to Tooke, is represented not by the function of prices of certain goods, but by the function of the state of a general economic conjuncture and its cyclic fluctuations. This is the main idea of Tugan-Baranovsky's theory of money – the theory which he called conjunctural. But having put forward this extremely original idea, he unfortunately failed to give it a consecutive development and justification, did not find the mechanism connecting the fluctuations of conjuncture with the value of money.

However, to some extent this gap is filled by earlier and, undoubtedly, outstanding in their scientific value studies of conjuncture performed within his theory; we mean his theory of markets and crises. No doubt, those earlier studies were a starting point for his conjunctural theory of money.

Within the capitalist system the market is considered as the central node where complex threads of economic relations interweave and the results of economic activity are summarized spontaneously. The characteristic feature of capitalism is that it creates a prevalence of supply over demand, which leads to the pursuit for the markets and fight for them. To find markets for goods, to sell goods is a great challenge for a private-owned factory. The task of economic theory is to understand the nature of these diffi-

¹¹ See 'Paper money and metal'. Petrograd 1917 [«Бумажные деньги и металл». Петроград, 1917 г.].

culties and of the development of market relations as well as the ways to overcome the difficulties.

Tugan-Baranovsky considers the problem of market, first of all, through the application of the method of schematic consideration of a national economy as a whole; one can trace the elements of this method already in Quesnay's works and it was further developed by Marx.¹² And such schematic consideration leads him to a number of the following ingenious conclusions. The size of the capitalist economy market is not defined by the amount of public consumption because the social product consists not only of consumer goods, but also of means of production. Therefore, with a proportional distribution of production hardly any reduction of consumer demand can cause an excess of general supply over demand, and there are no obstacles for the victorious development of capitalism. In other words, the size of market under a proportional distribution of production is defined by the amount of production itself. And it is clear that a general overproduction of goods can *never actually* occur; only a partial overproduction is possible.

By considering the nature of capitalism, he tries to prove and explain in analytical terms these paradoxical conclusions.

Capitalism is an antagonistic system of national economy. And while under conditions of commodity economy the goods are somewhat spiritualized and they become masters of a man, and that is the fetishism of the commodity economy, capitalism makes a thing of a person himself. From here also originates the above-mentioned paradox of the capitalist system. Not the consumption controls the production, but the production determines the consumption; it is not the production for the sake of consumption, but production for the sake of production, for the sake of the greatest profit, not the capital for people, but people for the capital. From here originates the above mentioned fetishism of the capitalist economic system.

So, if capitalism is able to organize a more or less proportional distribution of production, it can also solve the problem of market and can develop its hidden productive potential. However, capitalism with great difficulty determines this condition of proportional distribution of production. It finds itself in a certain unstable state, and it is struck periodically by crises, which are typical phenomena of the developed capitalist system. So, why? What are the reasons of crises and how can one formulate these reasons? Tugan-Baranovsky tried to give answers to these questions in his theory of crises¹³, which is based on his theory of markets. Having awoken socioeconomic initiative and having created

¹² See 'Periodical industrial crises'. Part II, Chapter IV [«Периодические промышленные кризисы», ч. II, глава IV].

¹³ See *Ibid.*, Chapters V–VI.

opportunities for getting and increasing profit, capitalism served as a vigorous impetus for the growth of business activity. That was the origin of the capitalist system striving to expand and develop the production for the sake of profit; therefore, we observe a fast development rate of productive forces and a constant pressure of the supply upon demand. But capitalism is not an organized system, and it is basically spontaneous. Therefore, one can see the strivings and sometimes failures to solve the problem of proportional distribution of production, *i.e.* a problem of the market. Thus, there arises the need for crises. The lack of proportional distribution of production like an elastic bandage restrains the aspirations of capitalist forces to expansion, sometimes causing their sharp shock. This shock is perceived as a crisis, as a situation of general overproduction which is manifested in the general fall of prices, decreasing profit rate, increasing number of bankruptcies, reduction in production, etc. The credit that has developed within the capitalist system on an extensive scale, intensifies the shock. However, as has been stated above, the general overproduction is actually impossible, only a partial overproduction of goods is possible. But due to the connection of some goods and commodity prices with others, this partial overproduction tends to be transferred to other goods and thus, there appears a sort of general overproduction because the market starts to experience partial overproduction as a general fall of prices and as a general excess of supply over monetary demand. The above-said reveals the inherent reasons and the general character of the need for crises. But crises repeat periodically, and the course of economic conjuncture gives an image of a rather regular alternation of three phases – the rise, crisis and depression. To completely understand the crises, it is necessary to give the reasons of this rhythm, the reasons of the periodical character of crises.

While examining the fluctuation of conjuncture and prices of certain goods, one can easily observe an especially strict compliance between the general movement of conjuncture and the iron prices, or in other words, the prices of the main type of raw materials needed for the production of new means of production and new capital stock. And it is clear, why. The upswing phase is the period, first of all, of speculative promotion, the period of construction of new enterprises, new railroads. Therefore, the upheaval of speculative promotion in the first place contributes to a prominent increase of iron prices. But the speculative promotion and revival in primary branches of industry also cause the revival in other branches of national economy. There starts a general rise. Why does this rise happen periodically and finish indispensably with a crisis? In order for the rise and speculative promotion to start, the accumulation of free capital is needed. The capital is accumulated not only in industry. There are many public groups whose income is independent from the fluctuations of industrial-capitalist conjuncture: these are the recipients of ground-rent, the state

securities owners, officials, and pensioners. During the period of stagnation, a considerable capital is accumulated here by means of large and small shares, which are allocated usually in banks and which, having accumulated in a sufficient amount, set in motion industry and cause the rise of industry first of all in major branches and thus, acts similar to steam in a steam-engine when it puts the forcer in motion. But in the course of the further rise, the free capital becomes exhausted at larger rates. The discount percent increases. The upward movement of the market rates ceases; sometimes the stock crisis bursts out and the credit starts to show the signs of strain, a panic arises, and a general crisis starts. That is why a rise inevitably leads to a collapse followed by a depression period. Then, the same work on capital accumulation begins, and the signs of new economic rise appear and the cycle of conjuncture repeats.

The theory of markets and, in particular, the theory of crises developed by Tugan-Baranovsky, in an original and profound way, has put and solved the problem and brightly revealed the nature of capitalist national economy in its whole and it was generally confirmed by reality; thus, deservedly, it brought him the world fame. This concept served as basis for a whole school which in some ways was adopted by prominent Western economists, including Spiethoff, Eulenburg, Pohle, Schmoller, Lescure, *etc.*¹⁴ It has generated a number of publications in favor and opposed to it. Even its opponents like Werner Sombart, recognized it as ‘an extraordinary step forward and, undoubtedly, the highest form of theories of crises’.¹⁵ Of course, this does not mean that the theory of Tugan-Baranovsky causes no objections and needs no further improvement. On the contrary, its weak points are evident in the same way as its prominent value in economic science is indisputable. In particular, one of the basic statements of his theory of crises, namely, the idea of accumulation of some free, not invested capital, is disputable: in fact, does such capital really exist? Moreover, in his theory of markets and crises Tugan-Baranovsky assumes a self-contained and purely capitalist national economy. The reality is much more difficult. It is obvious that here emerges the direction of and necessity for the further improvement and complication of the theory.

While studying the theory, it is easy to note that it was developed under the influence of intersecting ideas and in the first place under the influence of the Say–Ricardo theory, and also the related ideas by Marx and Engels. But there is no doubt, that the most valuable contribution to the creation of the theory was the author’s creative skill enriched by an attentive study of the capitalist reality and primarily of the history of English crises.

¹⁴ See Jean Lescure ‘General periodical industrial crises’. Sankt-Petersburg, 1908, p.435 and *passim*.

¹⁵ See ‘Schriften des Vereins für Socialpolitik’. B. 113. «Verhandlungen der Generalversammlung im Hamburg». 1904.

Putting forward the theory of markets and crises, Tugan-Baranovsky resolutely broke off with former theories, which to a greater or lesser extent identified the causes of crises in the discrepancy between production and consumption. At the same time, his theory threw a new light on the problem of development and future of capitalism.

Marx and Engels' school to which Tugan-Baranovsky was close in many respects and from which his theories so often originated, as we know, argues about an inevitable crash of the capitalist system. The basis for this concept were two main ideas: 1) first, it is the concept of the growing and persistent scarcity of markets and, therefore, of the increasing and insuperable for the capitalist system obstacles to the development of productive forces and, second, the idea about the falling profit rate in the process of development of capitalism, the idea about the growing weakness of this mode. Tugan-Baranovsky, as we have seen, rejected both these theses. And as a result he had to recognize that 'capitalism will never die a natural death',¹⁶ and that it is intrinsically capable to continuous development. However, crises will shake it. But these crises are not a symptom of coming death, but only sharp and painful means to correct the development pattern of capitalism. [...]

The contemporary socioeconomic mode provokes a great number of unnecessary tensions and waste of public forces and it is far from being perfect. But we see that in spite of being imperfect it has all prerequisites to exist and, moreover, to develop.

It cannot die a natural death: 'only human thought and will can strike a mortal blow to it'.¹⁷ And such a blow should and will be stricken because capitalism is in itself the main and inherently deep defect and contradiction. This contradiction is that capitalism turns a human into a means, into a slave of things, and at the same time it leads to the distribution and strengthening of public and moral consciousness which considers a personality as the supreme value of social life.¹⁸ This most profound contradiction should inevitably increase both the mass discontentment and disappointment with the present, and the aspiration to the future social ideal; it should also increase the organization level and an organized conscious aspiration to change the present for the sake of the future. [...]

Thus, we have finished the analysis of Tugan-Baranovsky's main scientific and ideological views. And we see, these views were developed not only due to the influence of the public environment surrounding Tugan-Baranovsky but also due to the impact of scientific and ideological concepts of the past.

¹⁶ See 'Theoretical foundations of marxism', p. 195.

¹⁷ *Ibid.*

¹⁸ *Ibid.*: 194.

The theories of Marx and Ricardo, the Austrian school and the Windelband–Rikkert school, the ideas of Kant and Dostoyevsky, all become determinant in this respect. The ideas of Quesnay, Word, and Fouillée are of less and partial importance. But Tugan-Baranovsky was not a unilateral follower, not a pupil of every mentioned theory. In his studies he proceeded from them. But as a creative mind and a talent he aspired to be in advance and surpass them¹⁹ – and he really did it – and he introduced much of his own. This promoted him to the prominent place which he deserves in the history of development of social sciences and especially in the history of the Russian social thought.

To justify the last statement we would like to give the following arguments. In scientific and ideological schemes of Tugan-Baranovsky many things are disputable and stereotyped. But alongside with them there are many ideas and thoughts which are already or will be acquired, with certain modifications, by the academic and ideological social thinking. This refers to his researches in the field of the theory of markets and crises, development of capitalism and the theory of distribution, the studies of socialism and cooperation. Many of these ideas will survive him both in Russia and in the West.

The last point allows us to take a different approach to the evaluation of Tugan-Baranovsky's heritage. We would like to emphasize resolutely and definitely his significance as a *Russian scholar in the field of economic theory*. Unlike in other branches of science and culture, the Western thinking ignored the development of economic theory in Russia. One can safely assert that in the field of economic theory Tugan-Baranovsky was the first who made the European thinkers to consider carefully the progress in this sphere made in the east of Europe, in Russia. We have already mentioned it above, and it increases the national significance of Tugan-Baranovsky. He succeeded to achieve the level of the epoch and the level of scientific and economic thought of the advanced countries, and moreover, he succeeded to contribute to this progress, and thus, more than anyone else he tried to bring the Russian economic science into line with the European one. The power of a nation in various spheres of life is determined not only by far and even not so much by its physical forces, but considerably by its spiritual forces. From this point of view, Tugan-Baranovsky is a personage who indicates the growing power of the Russian economic thinking and at the same time he is its agent. While in the field of art, music and belles-lettres, Russia has already made a great contribution, in the field of science and, in particular, economic science it just starts to enter the historical scene and there is much to be done here.

However, there are other things that define the national importance of Tugan-Baranovsky's works. In his works the study and analysis of various (and

¹⁹ See 'Kant and Marx', the article in 'To better future'.

even general) issues bears the features especially familiar to us, Russians. While analyzing the problems, even in their general bases, he rather frequently emphasizes the features that these problems gain in the conditions of the Russian reality, he exemplifies them by the Russian experience. This also refers to his idea about the development of capitalism and about the destinies of the small-scale pre-capitalist industry, and also to his theory about small labor agriculture and large-scale capitalist agriculture, about cooperation and socialism. Tugan-Baranovsky was alien to the spirit of national isolation. His perspective was wider. But this fact more significantly designates his character and significance as a *Russian academic economist*.

Finally, the significance of his works lies in the fact that with his interest in theoretical issues and questions of social ideal, with his continuous search and with his colorful and often inspired essays, he was constantly awakening the Russian thought, in particular the thought of the younger generations. And in this regard Tugan-Baranovsky produced an enormous impact. He did not and could not create a whole 'school': he was an academic economist educated in an extremely European manner so he could not get isolated within his own system (and a creation of scientific self-contained systems is, undoubtedly, an indicator of an infantile condition of a given field of knowledge), he had a very intuitive and developing mind to commit to the accepted ideas. M. I. Tugan-Baranovsky did not create a 'school', but hardly any school can and will avoid the influence of his ideas.

IN MEMORIAM

George Modelski (1926–2014)*

*William R. Thompson, Barry K. Gills,
Robert A. Denemark, and
Christopher K. Chase-Dunn*

George Modelski, born in Poland in 1926, passed away on February 21, 2014 in Washington, D.C. at the age of 88. He is survived by his wife of many years, Sylvia Modelski. Trained at the London School of Economics (BSc. in Economics) and the University of London (PhD in International Relations), he was Professor Emeritus at the University of Washington and had been a professor of political science there between 1967 and 1995. His main earlier appointment had been as a Senior Research Associate at the Institute of Advanced Studies, Australian National University. Visiting appointments at various points were held at the University of Chicago, Princeton University, Harvard University, the Netherlands Institute for Advanced Study, the University of Stockholm, and the University of Catania.

Throughout his career, George contributed to an impressive number of different research questions. His dissertation, completed in 1954 and published in 1962 as *a Theory of Foreign Policy*, was a very early attempt to treat foreign policy issues theoretically, as opposed to the then standard reliance on descriptive accounts. No doubt reflecting in part his Canberra position at the time, Modelski wrote several monographs in the early 1960s on Southeast Asian international relations. But he also wrote around this time early analyses of the international relations of internal war, Kautilya's international relations, the differences between agrarian and industrial systems, and the communist international system that were conspicuous in their attempt to treat these questions in a theoretical fashion. They also underlined his very early interest in comparing the types of international systems.

His main contribution to the study of international relations, nonetheless, has to be founding a research program on leadership long cycles. Modelski began developing this original perspective around 1974 (the first conference paper) and published the first article in 1978, following a slightly earlier effort to begin developing a systemic interpretation of world politics (*Principles of*

* This text is based on 'In Memoriam: George Modelski (1926–2014)' published at <http://www.isanet.org/News/ID/2534/In-Memoriam--George-Modelski/> on September 12, 2014.

World Politics, 1972). Responding to the destabilized international system of the 1970s, George constructed an interpretation of world politics that was based on the emergence of lead economies, their rise and fall, and implications for global war and order. His core writings on these processes, some co-authored, came out at about the same time (*Exploring Long Cycles*, 1987; *Long Cycles in World Politics*, 1987; *Sea Power in Global Politics, 1494–1993*, 1988; *Documenting Global Leadership*, 1988; and *Leading Sectors and World Power*, 1996). It is fair to say that the perspective that emerged over time came to be one of the leading schools of thought in world systems analysis.

Some of George's other work were highly complementary to the long cycle interpretation. *Transnational Corporations and World Order* (1979) focused on MNCs while *North/South Relations* (1983) examined dependency reversal processes in international political economy. The co-edited *World System History: The Social Science of Long-term Change* (2000) reflected the interest he and others had developed in the 1990s to push the study of world politics back to its origins. In addition to an edited special issue of *International Studies Quarterly* (1996), *Globalization as Evolutionary Process* (2008), also a co-edited work, highlighted his commitment to harnessing evolutionary perspectives to the study of long-term international processes. Another major venture in this vein was his effort to develop a better empirical and theoretical understanding of historical urbanization processes, as reflected in *World Cities, –3000 to 2000* (2003). Written after he had retired, this book represents a major contribution to the data base on city sizes in the ancient world, which he viewed as indicators of an evolving city network that undergirded world economic growth. The long-term trend towards democratization was another special interest, culminating in several articles on the subject.

George Modelski contributed to the International Studies Association in various ways. He was President of the ISA-West in 1982, a long-time member of the IPE Section's World Historical Systems group, and winner of the Susan Strange Award in 2006. He also chaired the University of Washington's Pacific Northwest Colloquium on International Security from 1982 to 1991. In 2012, he was awarded a bronze medal by the International Kondratieff Foundation and Russian Academy of Sciences for his contribution to social sciences. Throughout a long and distinguished career, George Modelski emphasized the need to bring together theory, evidence, and history in the unraveling of world political processes. Although never widely cited or known in IR circles, his contributions were always distinctively different and original.

Contributors

Lucas Bernard, Dr., is a financial economist and professor of business at the New York City College of Technology of the City University of New York. He is interested in the ways in which Economics blends together human values, politics, rationality, and irrationality; more specifically, how this interplay reveals itself in society at large. His doctoral dissertation, concerning endogenous models of credit default, was written at the New School for Social Research; he also holds graduate degrees in both Mathematics (City University of New York) and Computer Science (New York University's Courant Institute of Mathematical Sciences). Dr. Bernard's publications have appeared in *The Journal of Credit Risk*, *The Journal of Economic Behavior and Organization*, *Risk and Decision Analysis*, and others. Together with Willi Semmler, he is co-editor of *The Oxford Handbook of the Macroeconomics of Global Warming* (2014), published by Oxford University Press.

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Kondratieff Waves: Juglar – Kuznets – Kondratieff 2014 410–415

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Philippe Jourdon is an independent researcher and translator in economics, a member of the editorial committees of *Online Review of Middle East Studies*, and *Entelequia*. His current research interests include Institutional Economics, Kondratieff cycles and world system studies, European macro policies and economic history. He is the author of over twenty scholarly publications including six monographs, for example, *Monetary History, Methodology and Epistemology for Sustainable Development*.

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Level Games (2011, Stanford University Press), *Globalization and Global History* (2006, Routledge), *Strategic Rivalry: Space, Position, and Conflict Escalation in World Politics* (2008, Cambridge University Press), and *Puzzles of the Democratic Peace: Theory, Geopolitics and the Transformation of World Politics* (2005, Palgrave-Macmillan). He has also received the World Society Foundation's Award of Excellence in World Society Research, the International Global Research Association and Moscow State University's V. I. Vernadsky Gold Medal of Honor (for contribution to global studies), and the International N. D. Kondratieff Foundation and Russian Academy of Natural Sciences' Silver Kondratieff Medal (for contribution to the social sciences).

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KONDRATIEFF WAVES

GUIDELINES

Preparation of manuscripts. Articles should generally be no longer than 9000 words, review articles should not exceed 2500 words, and brief reviews should be no longer than 600 words. A separate sheet should give the author's name, academic affiliation, information on the author (100–200 words), the title and a short abstract of no more than 150 words. All contributions, whether articles or reviews, should be clearly typed on one side of A4 paper or American Quarto, double-spaced and with wide margins throughout (including footnotes and bibliographical references).

Footnotes should be kept to a minimum. Essential notes should be presented in a typed list at the end of the article, double spaced.

Bibliographical references should be given in parentheses in standard author-date form in the body of the text: (Lee and Devore 1968: 236). A complete list of references cited, arranged alphabetically by author's surname, should be typed at the end of the article along the following lines:

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Thomson J. E. 1995. State Sovereignty in International Relations: Bridging the Gap between Theory and Empirical Research. *International Studies Quarterly* 39(2): 213–233.

Hewitt M., and Petrov K. 2009. Money Supply and Purchasing Power. URL: <http://www.financialsense.com/fsu/editorials/dollardaze/2009/0223.html>

McCall D. F. 1975. The Hornbill and Analogous Forms in West African Sculpture. *African Images: Essays in African Iconology* / Ed. by D. F. McCall, and E. G. Bay, pp. 268–324. New York – London: Routledge.

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