
WORLD CRISES: PREDICTION OR TENDENCY

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Abstract:

The aim of the paper to close the answer on a paradox question: world crises have a tendency or they are chaotic and unpredicted in their nature? Research goals are: 1) to consider the chronology of crises and its theories in the history; 2) to consider main economic indicators over long time period and to investigate its nature; 3) to use mathematical approach for testing causality effects between main economic indicators and main "initiators" of crises from the historic perspective point of view. Expected results are to show the main impact of USA economic situation on the world economic cycles. Our belief is that crises are important for the economic existence of humanity as the cardiogram for human being living.

Key words: *crisis, causality, chronology, Granger test*

1. Introduction

Crises accompany the history of humanity. At the very early periods it appeared as the crisis of underproduction of agricultural products (it is believed that the first global financial crisis dates back to the first century BC) (RIA News, 2008). From the middle of XIX century it resulted in the unbalance between industrial production and effective demand. Over the centuries crises began to gain strength, power and diversity of its manifestations: political, economic, financial, environmental, social. There is a question: *would we stay on the threshold of the crisis of the Earth?*

The magnitude and consequences of each crisis are getting out worse for many countries and their populations. History shows the constant desire of human being not only to learn how to overcome the dramatic effects of crisis, but most importantly get the ability to anticipate and understand the prerequisites for the occurrence of another crisis. Humanity is looking for the sense of a threshold so called "crisis point of no return". Our history, especially of economics, speckles with prophets and false prophets, and crises theories and false theories, the emergence of different types of indicators and indices having to give a signal that we should stop and hold before slipping into a pit next crisis. But crises are repeated, their amplitude increases. If the economic crises of the XX century were limited outside of one or several countries, in the XXI century the globalization helped "a virus" of crises to overcome national boundaries and acquire an international character.

2. Chronologic line and chronologists of world crises.

Despite the ocean of scientific papers, researches, books dedicated to the crises in all its vectors, we propose to look at the crises history from the logic of chronologic line.

First of all we consider the chronology of crises and the margins of its effects (Table 1):

Table 1: Chronology of world crises XVIII-XXI centuries.

Years	Crises	Countries
1788–1792	Economic crisis in France	France
1820–1825	First international financial crisis	England, Latin America
1836–1843	Stock crisis in England	England
1846–1847	Stock crisis in Europe	England, Germany, Holland
1857-1860	1-st global economic crisis	USA, England, Germany, France, partially Latin America
1861-1865	Currency crisis in USA	USA
1873	2d global economic crisis (the longest in the history of capitalism crisis)	Austria, Germany
1907-1908	Economic crisis	USA, UK, France, Italy
1914-1918	International financial crisis	USA, UK, France, Germany
1920-1922	Global bank and financial crisis	Denmark, Italy, Finland, Netherlands, Norway, USA and UK
1929-1933	The Great Depression	USA, UK, France, Germany
1957-1958	The first post-war global economic crisis	U.S., UK, Canada, Belgium, the Netherlands and some other capitalist countries
1973-1975	The first energy crisis (oil crisis) and economic crisis	USA, Japan, the FRG, UK, France, Italy
1987-1991	"Black Monday", stock crisis	United States, Australia, Canada, Hong Kong, South Korea
1994-1995	Mexican crisis (crisis of the banking system)	Mexico
1997	Asian crisis (Stock Market crisis)	Countries of South Eastern Asia
1998-1999	Russian crises	Russia
2008-2011	The global financial and economic crisis	United States, Western Europe, Russia, Ukraine

Source: authorial computation on the base of Karvatska (2011), RIA News (2008)

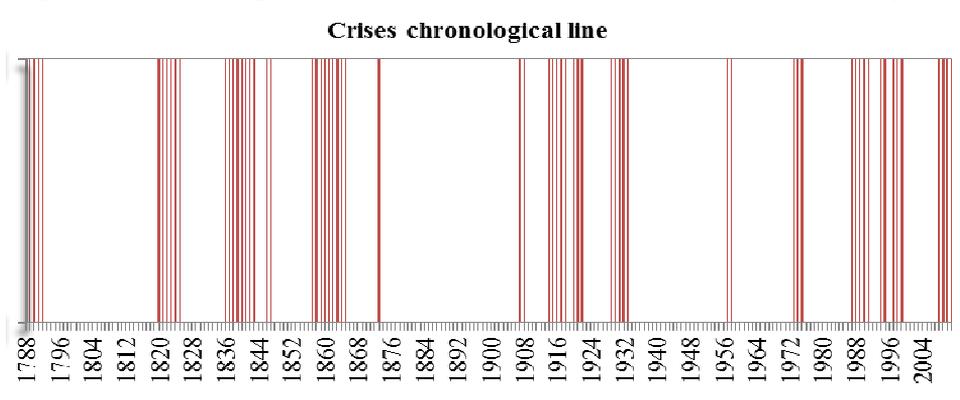
Table 1 helps clearly track 2 facts:

- U.S. participation in nearly all of the crises,
- Increasing of the frequency of the crisis, there is almost no plateau in the last century.

Latter said provoke a very logical question: *is the appearance of the crisis a natural phenomenon or a reaction to the growth of economic activity and the opening of borders?* What if the crisis lies in the development of humanity as a cardiogram of heart beat in a human being life - peaks and drops are necessary for human existence. If there is straight line, it means no life in this body any more. Maybe same for the

Economics: straight line of growth rates can be a sign of economic motor failure (sign of shutdown of given social system)? From other side, the chronology of crises appearance looks not so dramatic itself (Figure 1), the only concern is the increasing of the frequency of crises in recent years:

Figure 1: Chronological line of crises appearance from 1788 till 2011 years



Source: authorial computation

Figure 1 appeared very optimistic fact of stable plateau existence – years between crises activities, which we consider three times during the analyzed period. And there could be a forecast of the same stable phase after 2015 or approximately this period for 20 years or so.

As the next step, we propose to consider the chronology of main crises theories and scientific works dedicated to this phenomenon (some of those that nowadays are considered the classic pieces of crisis theories) (Table 2).

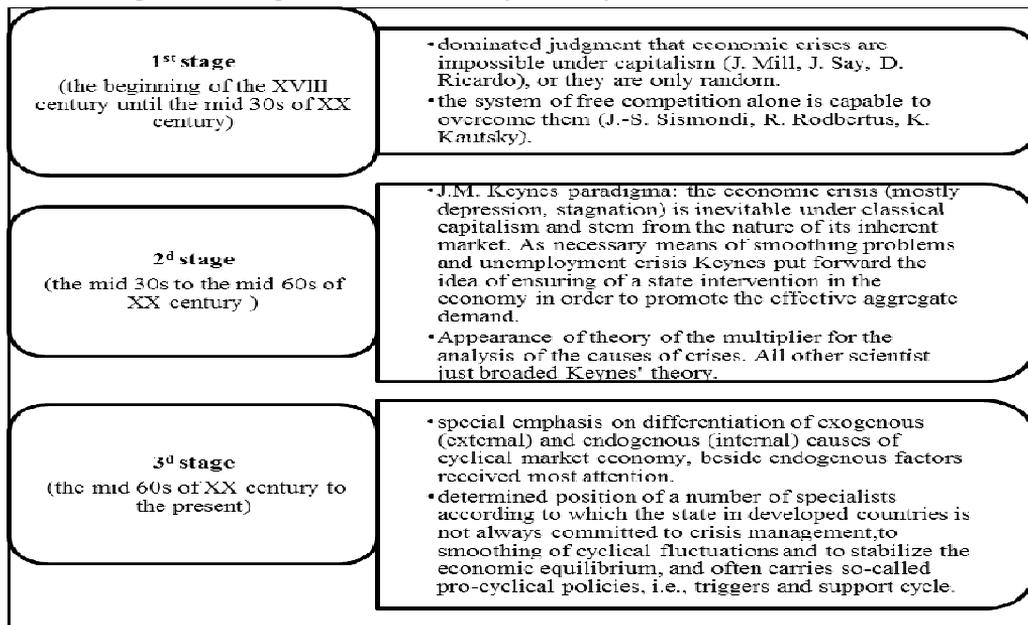
Table 2: Chronology of world crises theories at the XXI-XXI centuries.

Year	Title	Author
1862	Des Crises Commerciales Et De Leur Retour Periodique En France.	C. Juglar
1867	Capital	K. Marx
1868	On Credit Cycles and the Origin of Commercial Panics. Transactions of the Manchester Statistical Society 1867–1868	J. Mills
1871	The Theory of Political Economy	W. Jevons
1891	Problems of Poverty	J. Hobson
1911	The theory of economic development : an inquiry into profits, capital, credit, interest, and the business cycle	J. Schumpeter
1912	The Theory of Money and Credit	L. von Mises
1920	The Economics of Welfare	A. Pigou
1922	The world economy and its environment during and after the war. Vologda Regional branch of the State Publishing House. Chap. 5	N. Kondratiev

1922	Cycles and Trends in Economic Factors	J. Kitchin
1926	The Trade Cycle	R. Hawtrey
1930	Secular Movements in Production and Prices. Their Nature and their Bearing upon Cyclical Fluctuations	S. Kuznets
1936	The General Theory of Employment, Interest and Money	J.M. Keynes
1941	The Pure Theory of Capital	F. von Hayek
1959, 1964	Theory and history of economic crises and cycles in 3 volumes.	L. Mendelssohn
1963	Monetary crises of 1821-1938.	I. Trachtenberg
1979	Long Waves: A Selective Annotated Bibliography	K. Barr
1980	Long Waves of Capitalist Development	E. Mandel
1983	The Long Wave in Economic Life	J. J. Van Duijn
1992	The Long Wave in the World Economy	A. Tylecote
1999	The Asian crisis turns global	M. Montes, V. Popov
2006	Introduction to Social Macrodynamics: Compact Macromodels of the World System Growth	A. Korotayev, A. Malkov, D. Khaltourina

Under the assessing of Table 2 it should be noted that the views on crises, its cyclicity and its causes, were modified over time according to changes in the socio-economic reality. Given this, it is worthy to sum up three mainstream stages (Gryaznovoy, 1998; Samuelson, 2010) in the change of views on economic cycles/crises (Figure 2):

Figure 2: Stages of crises, its cyclicity and its sources, theories



Source: authorial computation

And the most reasonable conclusion of Table 1 and Table 2 analysis is that scientist failed over a few centuries to forecast and model crises and cyclicity due to mitigate its impact on social-economic situation of the world and states, particularly.

3. Data analyses

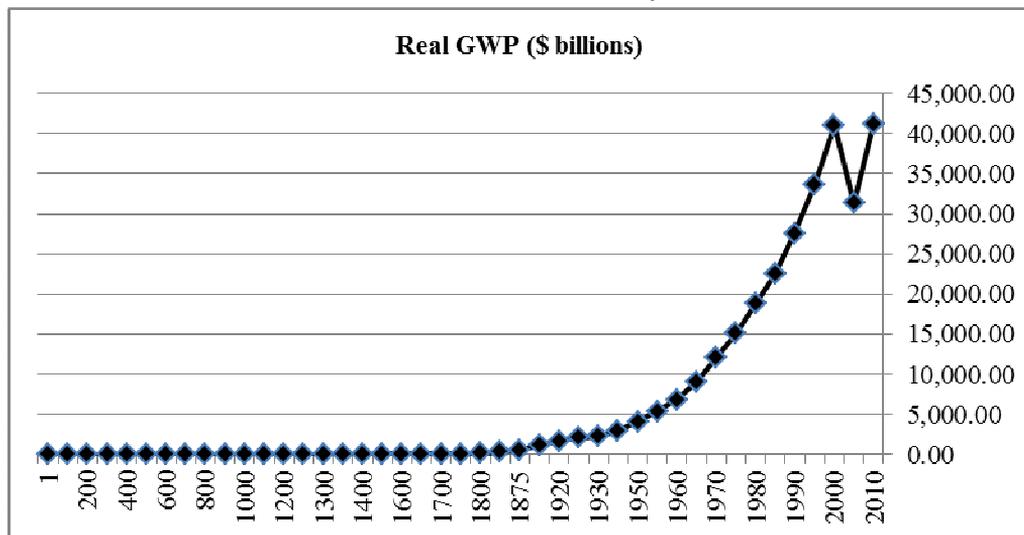
Latter rhetorical questions and conclusions stimulated the formulation of such a working hypothesis H¹: crises are natural, the question is only in the ability of the economy and society "to surf" on these waves.

Data analyses of Figure 3 and 4 resulted in 2 main conclusions:

1) despite all crises, cycles and waves, there is sure global world development from the beginning of our era till 2000. But new millennium seems had broken the tendency and rules of development (Figure 3);

2) dynamics of main development indicator - GDP - for the period of 1960-2011 shows ups and downs (crises effects) and synergy through the years and mostly during crisis years for the data of world, EU and USA (Figure 4).

Figure 3: Real gross world product (GWP) (\$ billions), (figures are in 1990 international dollars)



Source: authorial computation on the base of data set of J. Bradford DeLong (2013)

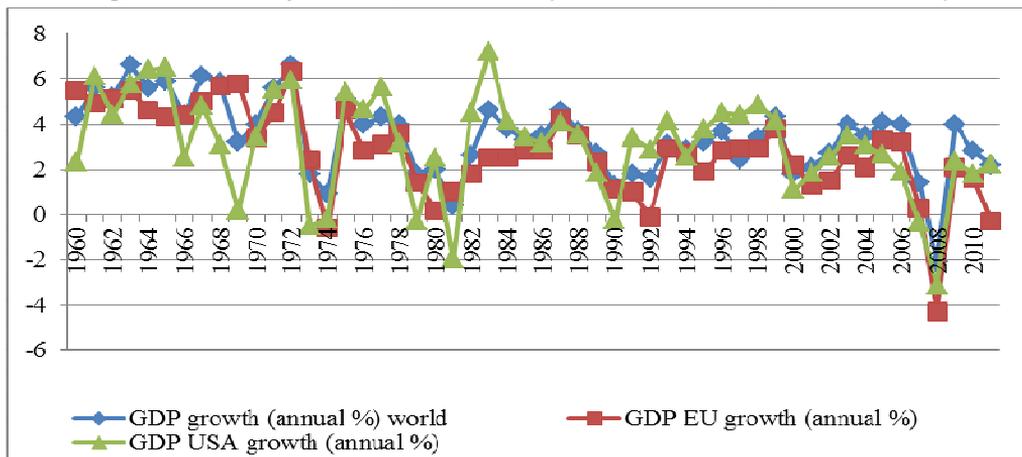
Figure 4 demonstrates 5 small waves (Kharlamova, 2013): 1960-1974; 1975-1982; 1982-1992; 1992-2001; 2002-2008 and 4 cyclic bigger waves with bottoms at approx. 1974, 1982, 1992, 2008. However 2008 is an incomparable with other bottoms – it is bright demonstration of heavy crisis.

Investigation of cycles and its bottoms – crises – should be based on the understanding of term “wave” (mostly its physical nature). Wave is a change of the state of the environment or the physical medium (disturbances), delivered or unstable in time and space and in phase space. The variety of wave processes leads to the fact

that there is no absolute general properties of waves can be selected. This is the basis of physics approach, so same can be concluded to the economy: no unified general properties of economic cycles and crises, if so, can be proposed and discovered. Every epoch and social-economic situation have its own specific features and circumstances that can provoke rapid crises, and increasing frequency of waves.

However physicists believe that there is one of the common signs of wave action – close-range interaction, which is manifested in the relationship of disturbances in neighboring points or the medium of environment, but can generally be absent as well. This explains why we can consider so called “packages” of crises and then some plateau (Figure 1). So according to latter said, it is quite sophisticated to forecast the reasons and the date of beginning new crises in the future, but quite possible while having one year crises to make our best to stop close-range interaction. Especially in aspect of “domino effect”, when one neighbor country (as we see from the history – USA mostly (Table 1)) feels like crises state, other states can mobilize their forces to stop or mitigate negative close-range interaction effect on domestic economies.

Figure 4: GDP dynamics, 1960-2012 (dataset for world, EU and USA)



Source: authorial computation on the base of Eurostat dataset, World Development Indicators (WDI), October 2013

Since the wave processes are determined by fluctuations of common elements of the dynamic system (oscillators, elementary volumes), they have the properties of oscillations of its elements and properties of the aggregate fluctuations. So for the possibility to analyse and in some extent to formulize crises effects in the world economy (with further aim to produce adequate and valuable forecast), the dynamic model can be used and give the most appropriate results: i.e. VAR models.

For the testing H^1 hypothesis we use such mathematical modelling approach and strategy:

- 1) analyse data on the stationarity – to receive the answer on such questions:
 - can the time series be predicted?
 - are there some inside tendency in the time series?

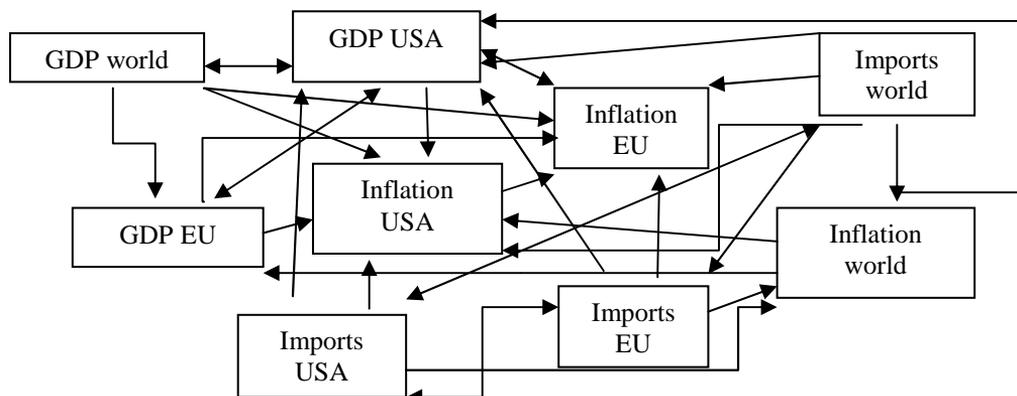
2) analyse main indicators that depict the crises tendency on Granger causality. We pushed off the following theory that correlation does not necessarily imply causation in any meaningful sense of that word. The econometric graveyard is full of magnificent correlations, which are simply spurious or meaningless. The Granger (1969) approach to the question of whether X (independent variable) causes Y (depended variable) is to see how much of the current Y can be explained by past values of Y and then to see whether adding lagged values of X can improve the explanation (Green, 1993). This approach helps us to understand what the main development indicator and of what state can cause the crises tendencies and can be the best indicator of its happening.

As the data set, we choose main economic development indicators of 3 groups: world statistics, USA and EU statistics. Latter we mentioned that USA is an actor (sacrifice) of mostly all world crises, so quite natural to suppose the result of its main impact on other considered indicators of states under analyses. Main indicators are following (for the period of 1960-2012): GDP growth (annual %); Inflation, GDP deflator (annual %); Imports of goods and services (% of GDP).

Step 1. Using ADF test in EViews we came to the conclusion that GDP growth and inflation are stationary time series and can be used for modelling and forecasting. This data set is represented by not chaotic data. Import vectors are stationary only in 1st differences that approve the theory of trade and market equilibrium (import volumes are the result of not just tendency of previous periods but behavioral and other trade factors). The results give a hope to have the potential ability to find exact technique and mathematical approach in future to forecast global GDP declining and if so possible future crises rather exactly and with high significance.

Step 2. Implementation of Granger causality test in EViews settled such link directions for data under analyses (Figure 5):

Figure 5: Granger analysis result: test on causality for GDP, Inflation and Imports of goods and services time series, 1960-2012 (dataset for the world, EU and USA)



Source: authorial computation

The most valuable for our research results are:

- there is mutual co-causality only between couples: GDP of USA and GDP world; GDP USA and inflation rates in EU; GDP EU and GDP USA; imports of USA and world; imports of USA and EU; imports of USA and inflation in EU; import of USA and inflation in USA;
- proved flexibility of EU indicators on USA fluctuation in main indicators;
- there is mutual co-causality between GDP USA and GDP world but the one-way direction between GDP world and GDP EU (Figure 5). We cannot reject the hypothesis that GDP EU does not Granger Cause GDP world but we do reject the hypothesis that GDP world does not Granger Cause GDP EU. Therefore it appears that Granger causality runs one-way from GDP World to GDP EU and not the other way. It proves mathematically that USA is a main player on world scene, and that EU is a “follower” of world tendencies. So logically we can suppose that the crisis in EU would not impact USA and the world definitely, but USA problems would not stay aside EU and the whole world.

4. Conclusions

Despite the fact that in the last decade, the international community set up mechanisms for the prevention of global crises (strengthening state regulation of economic processes, the creation of international financial institutions, monitoring, etc.), the history of the world economic disasters shows evidence that still it is not possible or accurately predict crises, or prevent them. We applied the mathematical method to test our hypothesis, and validated our original assumptions. We put all crises, their theories and real data set on chronological line to analyse the logic of its appearance and contradiction. Mathematic approach proved the potential possibility to forecast waves and their fluctuations in economic dynamics and to consider in this aspect the USA as a potential player and actor of global crises events. Our analyses gives evidence of main role of the U.S. economy for the crises prophylactic over the whole world.

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