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# Advance Financing Innovations and the Radical Change Economic Development

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**Abstract.** The methodological searching the approaches to overcoming the current crisis phenomena is constricted by inability the mainstream economic theory to explain fundamental economic nature these processes. But the consequences from phenomena of radical change that causes current crises and economic measures to replying are like the causes of crises that are explained by theory of economic development of Josef Schumpeter. This article is aimed to reveal practical meanings of some apply findings of Schumpeter to improve the actual economic policy. The article presents analysis that demonstrate importance to recognize ‘Schumpeter’s innovations’ as a special factor for economic growth that generates the increasing the aggregated added value of a country separately from the processes related to productivity growth of the existing traditional resources. It allows to clarify the reasons current economic and financial crises with the Schumpeter’s theory of "advances-economics", where there is explanation the nature of financial resources for innovation development which acquire has got a shape of the artificial credit expansion. This extension of money supply is not the problem of economic growth but its mandatory factor. The article demonstrates the volume of production of innovative enterprises in Europe is in principle comparably with the value of GDP. The advance monetary resources could be presented by comparing the monetary aggregates M1, M2, M3 that allows to calculate the available monetary potential for advance financing for innovations. The given analysis confirms practical meanings of the proposed macro monetary analysis financial resources innovation development.

**Keywords:** *Schumpeter’s theory of economic development, Innovations, Advances-economics, Monetary policy, Economic crises.*

**JEL Classification:** O30, E32, E51.

## Introduction

The searching for a new contemporary economic policy that must give respond to the current crisis challenges remain do not effective due to the conceptual uncertainty of the fundamental economic nature these crises. Practically, the global crisis of 2008-2009, inventions of Industry 4.0, and current economic crisis caused by COVID-19 have not been predicted by mainstream economic theories as specific type of economic functioning. Moreover, actual iterations the real policies to find adequate answers the crisis challenges led to paradoxical, in term of mainstream theories, the practical decision makings and emerging the heretical economic categories: “helicopter money”, “free money”, “basic income” etc. These theoretical categories are revealed by practice through such conceptual actions of monetary policy as securitization traditional banking assets, the government borrowing, the active emission of money and intervention in capital markets. Many economists consider these phenomena as a new paradigm economic functioning that is not generate the significant inflation (Beddoes 2020). But in further inflation still increased (DeSilver, 2021). Two latest “great crises” – “Great recession” (2008-2009) and “Great reset” due to pandemic (2020-2021) have raised the significant problem of financial bubbles created by the real-estate market and the corporate earnings (Cogman and Dobbs, 2008). But the consequences from phenomena of radical change that causes current crises and measures to replying from economic policy are like the causes of crises that are explained by theory of economic development of Josef Schumpeter. That is why the development of theory and some practical function of Schumpeter`s approaches in this article are very actual.

Unsolved problems of overcoming the current crisis phenomena very closely related to inability the mainstream economic theory to explain fundamental economic nature these processes. Traditional neoclassical theories basically continue to follow methodological principle that money supply itself cannot stimulate an enlarge of national wealth (added value) if there is no corresponding increasing in the national product. In contrast to this, as it is following from our investigations of mentioned economic peculiarities, we can explain the reasons current economic and financial crises with the Schumpeter’s theory of “advances-economics”. This is one of the cores subjects of his theory of economic development has given us explanation of origins the financial resources for innovation development. Such resources acquire has got a shape of the artificial credit expansion was called Schumpeter as “advances-economics” (Schumpeter, 2010, Ch. III). He elaborated notion that this extension of money supply is not the problem of economic growth but the mandatory factor of it (Bazhal, 2017). To understand such processes, we need recognize ‘Schumpeter’s innovations’ as a special factor for economic growth that generates the increasing the aggregated added value of a country separately from the processes related to productivity growth of the existing traditional manufacturing resources. The Schumpeter’s methodological approach allows substantiating the possibility of accelerated economic development of a country without historically formed resource limitations. Such scenario can be implemented only with innovation-driven growth.

Based on these methodological approaches we concluded that a crisis manifestations appear when national economy slackens the pace of new added value generation, and processes of redistribution the existing national income become dominating. In this case a growth the traditional output (and related income) of some firm becomes possible only by reducing income of other production entity or industry. In the mainstream theory, this methodological approach has a very broad application called “opportunity cost”. Also, this situation of getting added value in one place at the expense of losing it in another one is called zero sum game. It leads to rise of income inequality and gives argument for the austerity policy. This approach also vitalizes the popular political speculation about the existence of “the world rent”, as if most of which is received by rich countries and vitalizes ideas of socialist revolutions (Albritton and Itoh, 2001). Such situation happens in the case of weakness of country’s innovation activities when the benefits of economic agents are result of redistribution the national income in about volume of previous periods. According to Schumpeter’s theory only innovations can generate the national extra added value that associated with economic growth.

The distinction of Schumpeter’s theoretical approach from Neoclassic lies in its recognition of the inner forces of the market system which determine the economic and financial crises. It is innovations resist the mentioned crisis processes, and that is why very important to develop financial institutions that create the advance financial resources for innovation. Schumpeter shows the main function of the money market, or capital market, becomes trading of credit to finance the innovation development. He referred to this economy of development as 'advances-economics'. In this article, we suggest considering a different but related conceptual dimension of this issue, presenting it through the analytical prism of the lesser-known theory of monetary conditions of financial and economic crises, the Schumpeterian growth paradigm, where innovation is considered the main factor of economic growth (Schumpeter 1983 [1934]).

## **Theoretical Framework**

Schumpeter referred to his theory of economic development as 'advances-economics'. Modern traditional neoclassical theories basically continue to follow methodological principle that monetary transactions alone cannot increase national wealth. The practical implementation of this vision for monetary policy, as we will show below, included measures to significantly reduce credit financial instruments in the money supply structure. However, Schumpeter argues that such an approach can be justified only in an economy without innovation, since the latter increases national wealth precisely by providing innovation processes with advance credit and similar monetary assets. It should be noted that the basic theoretical platform where canonical the classical dichotomy on the problem of "money neutrality" were formed was the problematic of the so-called Phillips Curve, from which the concept NAIRU logically

flowed. But this conceptual platform essentially denied legitimacy of the advance financing for the future development (Lucas, 1996).

Schumpeter's theory elaborated the new lending function that is fundamentally different from the traditional mainstream theories, namely the creation of new added value through the advance lending for innovations, i.e. new goods and services that were not previously produced and therefore did not generate income that could ensure the acquisition of these innovations. If new goods are bought by abandoning the old ones, then the amount of value added of the country might not change critically but rather only change its economic location structurally. This leads to the conclusion that the actual economic growth due to GDP growth is mainly based on innovation processes, which create new incremental added value (increase in the net material product) through the mechanisms of their advance lending.

Examining this mechanism in detail, Schumpeter concluded:

*'Thus, the main function of the money market, or capital market, is to trade credit in order to finance the development. The development creates and nourishes this market. During the development, it is assigned another, third function: it becomes a market for the very sources of income'* (Schumpeter 1983 [1934], Section III).

As it is following from our analysis of mentioned peculiarities to understand such processes we need proceed to recognize 'Schumpeter's innovations' as a special factor for economic growth that generates the increasing of the aggregated added value of a country. These processes realize separately from the productivity growth of the existing in previous period manufacturing resources. The Schumpeter's methodological approach allows substantiating the possibility of accelerated economic development of a country without historically formed resource limitations. Such scenario can be implemented only with innovation-driven growth. The Schumpeter's theory also can give us explanation of origins the financial resources for innovation development which has got a shape of the artificial credit expansion. Schumpeter elaborate conclusion that this expansion is not the problem of economic growth but the mandatory factor of it.

The main neoclassical theory statement refers to notion it is unlikely for economy of country to get these finance resources from inward market. And even if we do, it will be a simple redistribution of total value added between sectors, rather than economic growth. This mindset has led to the neoclassical conclusion that innovation development is not suited for poor or underdeveloped countries, as they lack the financial resources for this. However, the innovation development theory shows that even developed countries do not actually have such resources. However, it is still little known that Schumpeter's economic invention is that innovation itself creates the necessary financial resources. This is happening due to the credit mechanism to meet the new demand born of innovation. Such a financial resource eventually becomes a new added value, which is statistically recorded as economic growth.

As modern neo-Schumpeterian theories show, financial 'bubbles' are formed precisely because the advance financial instruments are not followed up by innovation,

i.e., do not turn, in this case, into a real money supply and a corresponding increase in GDP. If such advance financial instruments are being accumulated in the form of fictitious capital, they turn into financial 'bubbles' that expand, burst, and lead to a financial and economic crisis. It can be exited only through the activation of innovation processes of the new technological paradigm (Perez 2002).

Our research (Bazhal 2017) has shown that the main feature of Schumpeter's theory of innovation in the context under consideration is its ability to independently create added value in the country's economic system, i.e., to act as a separate factor of economic growth. This means the total cost of innovative products is a contribution to GDP growth. If a country's economy operates without innovation or its extent is limited, then the economy, according to Schumpeter, will not grow but reproduce the amount of value added that existed before. Innovative countries have a larger volume of nominal GDP due to larger volumes of innovative products, which leads to a higher level of GDP per capita. However, the problems with this indicator in the post-crisis period, in our opinion, are also associated with a decrease in innovation activity in these countries.

The innovative development model is used as the basic concept of the national socio-economic strategy in most successful countries. The European Union has identified this model as the economy of the 21st century and used it as the basis for its official strategies such as the EU Lisbon Strategy (Lisbon European Council 2000) and the Europe 2020 Strategy, where the first priority becomes "the smart growth", that means developing a knowledge-based economy and innovations (Europe 2020, 2010). However, the results of implementing these strategies in practice turned out to be debatable in terms of their performance criteria. Quite a significant negative macroeconomic shock for this policy was caused by the global financial and economic crisis of 2008-2009, when the growth rate of money supply in many countries plummeted. We believe this to be one of important reasons for the persistence of stagnant processes in the post-crisis period for most European countries, which has led also to increasing social tensions.

## **Literature Review**

The conceptual ideas about the nature of advance financing economic development we can find in the historical context by the reputed economic theories of Keynesians and monetarists (the mainstream). John M. Keynes convincingly proved (and this has become a canonical point in all modern basic textbooks on macroeconomics) that the Great Depression in the United States occurred due to an unexpected decline in aggregate demand (Keynes 1964 [1936]). Milton Friedman attributed the Great Depression to declining money supply due to the stock market crash, tight administrative policies of the Federal Reserve System, the bankruptcy of thousands of banks, restrictions on the 'gold standard', etc. (Friedman 1990). These are factors influence the suppression the supply of money. Consequently, these famous economists saw the way out of such a crisis in the application of the opposite fiscal and

monetary policy, i.e., through an increase in both the advance aggregate demand and money supply.

It should be noted that these classical books recommendations were not fully considered during the last crisis of 2008-2009, either in the European Union or in Ukraine. This was partly the case in the United States (Korablin 2018). On the contrary, the policies of suppression of both aggregate demand and money supply (austerity) have become widespread. This has incited a fundamental debate among scholars, both in terms of methodology (Blyth 2013) and assessing the actual consequences of controversial types of crises exit policies (Tridico 2017). In this paper, we suggest considering a different but related conceptual dimension of this issue, presenting it through the analytical prism of the lesser-known theory of monetary conditions of economic development, namely the Schumpeterian growth paradigm, where innovation is considered as the main factor of economic development (Schumpeter 1983 [1934]).

The Schumpeter's theory of economic development and the advance financing of innovation was formulated more than a hundred years ago in the early twentieth century. However, its actualization occurs only today, when the economies of many countries have experienced and are experiencing two major global financial and economic crises, when futures financial transactions and securitized assets have become huge and cause both these crises and radical changes in economic theory and policy. The latest, the 12th edition of the world-wide textbook on the theory of money and monetary policy, *Economics of Money: Banking and Financial Markets* (Mishkin, 2018), has new major sections on these new issues. Interest in the interdependence of monetary and macroeconomic policies has increased (Cochrane and Taylor, 2020). Recent crises have led to a new look at the theory and practice of public debt policy (Dalio, 2020). However, it should be noted that neither Schumpeter's theory of economic development nor Schumpeter's category of innovation is mentioned in the main conceptual works on this topic (Ball, 2011).

It should be noted that the basic theoretical platform where canonical positions on the problem of "money neutrality" were formed was the field of the so-called Phillips Curve, from which the concept NAIRU logically flowed. In 1958 a famous article by A.W. Phillips was published (Phillips, 1958) where by means of empiric data was shown the inverse relation between the level of money wages and rate of unemployment. According to the neoclassical views the wages increase under the conditions of macroeconomic equilibrium should increase unemployment and, thus, slow down economic growth. Even though numerous empiric studies conducted till the mid-1970s proved the presence of the Phillips curve (Lipcey, 1960; Gordon, 1972), leading theoreticians almost unanimously decided that the facts observed in this aspect relate to temporary fluctuations from the equilibrium value (Akerlof et al, 2000). Samuelson and Solow in their well-known article (1960) proposed to evaluate the Phillips curve phenomenon through changing the parameter of wages to the inflation index and, thus, renewed the neoclassical views on the invariability of actual wages under the conditions of long-term macroeconomic equilibrium: employment excess



going over the natural level, according to these views, leads to the inflation of demand. Important influence on this theory had had the known concept of the rational expectations theory of E.S. Phelps (1967; Lucas & Sargent, 1978). It should be noted that the current crisis monetary problems have begun to "soften" this orthodoxy (Mishkin and Eakins, 2019). A thorough review of this issue was performed by Bullard (1999). It is worth noting a deeply research the processes of departure from orthodox views in these areas that performed recently (Vary, 2021).

Most of the researchers, in explaining latest crisis phenomena, have relied on Hyman Minsky's theoretical platform (Minsky and Whalen, 1996; Minsky, 1992) that has been searching for recipes to counteract the artificial credit expansion as the main cause of the Great Recession. However, the introduction of an appropriate the scarcity policy has not only not solved the problem in principle but has initiated the process of maturing of the new crisis, to which all experts have been expecting permanently, and which has now emerged. Moreover, the most incomprehensible phenomenon was that all of this happened simultaneously in the context of the deployment of the Industry 4.0 processes and providing the "helicopter money" policy.

### **Innovation as Main Separate Factor of Economic Growth**

The theory of economic development according to Schumpeter is a theory that denotes fundamental changes to the current state of affairs: a leap into a new quality (new combination), which is mostly impossible to foresee. Hence, it is important to focus particularly on the fact that the country's long-term economic growth more and more is determined by efficiency of the new smart structural policy on a base of innovation technology, rather than transform traditional production. Today the numerous research have given evidences the economy which focuses on recovery and development of traditional production patterns, i.e. on distribution of available resources, cannot significantly increase its wealth and social wellbeing in the long run because the development of traditional competitive markets eventually restricts the formation of a new added value.

In our opinion, lack of attention to the Schumpeterian category of innovations in the main macroeconomic theories can be explained by the fact these theories did not identify innovations as a separate isolated specific factor of production in models of economic growth. But the Schumpeter's theory of economic development directly supposed innovations as main factor for development. Various theoretical approaches interpret visible phenomena of innovations as components of traditional factors in the aggregate production function: Labour (L), Capital (K), and Total factor productivity (TFP). In conceptual economic literature, it is mainly believed that innovations influence economic development either through the increase of productivity of the factor Labour (L) or through an increase in the amount of productivity of the factor Capital (K) through its accumulation.

However, even extraction in the neoclassical production function of a separate variable, which reflects the characteristic of changes in productivity of factors L and K, which was

named Total Factor Productivity (TFP), essentially left the traditional production factors L and K as the main endogenous variables of resources for economic development both in the neoclassical models of economic growth and in the imagination of many experts. It is also possible to mention that TFP as factor and as exogenous variable of production function cannot exist independently from factors L and K that present the proportions of the initially derived aggregate production function, because TFP reflects the changes in productivity of these factors (Aghion & Howitt, 2009).

According to Schumpeter the innovations are a new separate isolated factor of production which promotes economic growth, creating new added value through materialization the advance credit resources for innovation processes. This separate factor of production exists regardless of the initially available factors  $L_0$  and  $K_0$  that were before the implementation of the innovations. Schumpeter innovations create a new production function, in which the proportions of production factors are already qualitatively different ( $K_{in}$  and  $L_{in}$ ), and the nature of their interaction in the new production function changes. In this case, innovations become a separate factor of country's economic development as the factor that creates new value and thus increases the Wealth of Nations.

In publications belonging to the mainstream economic theories, the phenomenon of innovations is considered primarily as novelties, which help to increase the productivity of the existing production resources ( $L_0$  and  $K_0$ ). However, analyzing in this perspective, they often make a reservation that these novelties could fail to increase the wealth of the country, if the unemployment caused by those novelties rises and, paradoxically, they can even cause an economic and financial crisis caused because the relative overproduction. Such an influence of innovations drew attention of many researchers, starting with the classics: David Ricardo's labour theory of value and respective analysis on influence of machinery on economy (Ricardo, 2004 [1821], Ch. 31); then the K. Marx with his The General Law of Capitalist Accumulation (Marx, 1992 [1867], Ch. 25), other Classic economists, and then Neoclassic, Keynesians, etc. Now again several newest influential approaches interpret innovations as the potential threat of unemployment. For example, this is the worldwide-recognized conception of "Industry 4.0" (Schwab, 2016), and in Ukraine there are analytics who recognize embedded innovations as a source of economic crises (Ryaboshlyk, 2014).

The main doctrines of Political Economy and Economics mainly considered this last type of impact of innovations on economy when the productivity of existing production resources increases. Therefore, the mainstream theories did not associate the growth of country's wealth with the Schumpeter innovations as a specific production factor that exists independently and different from the traditional production factors L and K. Their proportions were derived using retrospective data analysis to construct aggregate production functions. The history of economic theories demonstrates that in this methodological framework, without the Schumpeter innovations, the crises of economic theory itself always appeared. The mainstream theories, changing one another, without involving the factor of Schumpeter's innovations quickly exhausted their explanatory capacity and practical value. But exactly Schumpeter's innovations have been causing appearance of new resources and products, and related new production functions.

However, current empirical studies and facts of real economy prove the correctness of the methodological considerations of the Schumpeter's economic development theory, showing more and more evidence that Schumpeter's innovations have crucial meaning in forming the volumes of main macroeconomic output. The results of our analysis present in Table 1, they give evidence to this conclusion. This Table demonstrates the specific weight the turnover of innovative enterprises in volumes of the total turnover of enterprises and GDP in selected groups of innovation countries in 2018. Classification the selected European countries by level of innovation development was done using methodology of The European innovation scoreboard (European Commission, 2021). This rating recognizes four groups: Innovation leaders, Strong innovators, Moderate innovators, Emerging innovators.

Table 1. Comparing Turnover of innovative enterprises with Total turnover of enterprises and GDP for selected group of innovation countries in 2018.

	Total turnover of enterprises, billion euro	Turnover of Innovative enterprises (IE), billion euro	Total turnover to GDP	IE turnover to total turnover	IE turnover to GDP
<b>Innovation leaders</b>					
Switzerland	968	723	1,56	0,75	1,16
Belgium	635	518	1,38	0,82	1,13
<b>Strong innovators</b>					
Germany	4 903	4 402	1,46	0,90	1,31
Austria	464	394	1,20	0,85	1,02
France	2 591	2 044	1,10	0,79	0,86
<b>Moderate innovators</b>					
Italy	2 048	1 654	1,16	0,81	0,93
Slovenia	55	40	1,20	0,72	0,86
Portugal	223	156	1,09	0,70	0,76
Spain	1 297	886	1,08	0,68	0,74
Greece	152	120	0,85	0,79	0,67
<b>Emerging innovators</b>					
Bulgaria	90	51	1,60	0,57	0,91
Hungary	211	122	1,55	0,58	0,89
Poland	727	434	1,46	0,60	0,87
Slovakia	135	78	1,51	0,57	0,87
Croatia	53	38	1,01	0,72	0,73
Romania	208	61	1,02	0,29	0,30

Source: Author calculations from Eurostat (2021).

The Table shows that the volume of production of innovative enterprises in Europe is in principle comparably with the value of GDP and constitutes on average 70% of the volume of production of all enterprises. In developed countries, this share is estimated at 80-90%. These data fully confirm the conclusion of Schumpeter's theory that innovation by its economic nature is a separate and main factor of economic growth, which forms national added value independently of traditional factors of production, and the scale of such generation of added value can be seen into Table. Also, these data explain the connection between the level of innovative development of a country and its wealth, which is measured by the gross national product (GDP) category. It is innovative products that form a larger volume of GDP, and the share of the volume of products of innovative firms is greater in developed innovative countries.

Table 1 also demonstrates why the advance financing of innovations do not lead to inflation and creates a new real added value. Demand-side inflation occurs when aggregate demand exceeds aggregate supply. Advance financing of innovations would lead to inflation if this financing did not create new innovative products (new supply). But we can see by showed figures the scale of such new production.

### **Advance financing innovations and economic development**

The theory of innovation development can also give a convincing answer to traditional sharp question of the neoclassicism followers about sources the financial resources for innovation activity. Which sectors of the economy should be deprived of the previously have being used resources to redistribute them in favour of innovation? According to the neoclassicists, the answer is that there is nowhere to get these resources from inward economy, and if we do, it will be a simple redistribution of total value added between sectors, rather than economic growth. This mindset has led to the already mentioned neoclassical conclusion that innovation development is not suited for poor or underdeveloped countries, as they lack the financial resources for this. The Schumpeter's economic invention is that innovations are to themselves create own financial resources. This is realizing due to the credit mechanism to meet the new demand born of innovation. Such a financial resource eventually becomes a new added value, which is statistically recorded as economic growth.

To statistically represent the volume of the mentioned advance monetary resources as potential for innovation development we used the indicators of the monetary aggregates dynamics and GDP monetisation of the four Central European countries that neighbour Ukraine and have kept their own currency system: the Czech Republic (Czechia), Poland, Hungary and Romania, and an aggregate group of euro-area countries that cannot have their own monetary policy and are directly subordinated to the single policy of the European Central Bank. For comparison, we also use the relevant indicators for Ukraine. These comparisons have considered the structure of money supply and identify their structural dynamics in the pre-crisis, crisis and post-crisis years (2004-2018).

This macro monetary analysis is based on the following conceptual hypothesis. Cash-in-advance monetary resources can be represented by comparing the monetary aggregates M1, M2 and M3. This comparison allows us to calculate the available monetary potential of advance innovation financing. These will be the resources that accumulate in the banking system more than the required money supply for current operations, i.e., one that meets the transactional demand for money. The latter is mainly reflected by the monetary aggregate M1 and partly by M2. Then the “advance” monetary resource can in principle be represented quantitatively as the difference between monetary aggregates M3 and M1 (M3-M1).

It can be assumed that the M1 aggregate does not contain these advance monetary resources for future periods, as it directly serves the transactions that have already taken place and formed GDP. Components of the M2 aggregate that are additional to M1 include time deposits and transferable deposits in foreign currency, which may also partially form the advance credit potential, including through the multiplier effect. Components of the M3 aggregate that are additional to M2 include long-term deposits and securities and can be considered as a full-fledged existing monetary potential for the advance financing of innovations.

To conduct a comparative analysis of the dynamics of monetary aggregates between countries, we used the indicators of the change of these macroeconomic characteristics, since absolute values do not allow this. The Diagram Comparison of the Difference of Annual Rates of Change of M1 and M3 presents the comparative dynamics of the annual difference of rates of change of M1 and M3 (M3-M1) aggregates for 2004-2018 for the countries selected for analysis.

Negative figures for the rate difference (M3-M1) indicate a faster growth of the M1 money supply against the M3 aggregate and a relative reduction in the advance monetary potential of the future innovation financing (M3-M1). Obviously, such a reduction ought to negatively affect the country's economic growth, which, according to Schumpeter's theory, primarily depends on the intensity of innovation processes. The diagram clearly shows that the main devastating blow of the crisis of 2008-2009 on the monetary support of economic development was inflicted on the potential of the advance financing of innovations (M3-M1). The data of such calculations for the selected countries and period are presented in Table 2. Marked cells have positive sign, i.e., when  $M3 - M1 > 0$ . Figure 1 visualizes these processes for the Eurozone countries and Poland, the country that have own currency.

There are well-known charts of constant positive dynamics of monetary aggregates during the period under review, which do not show a statistical interruption of long-term, almost linear, upward trends. However, as the analysis shows, this was mainly due to the growth of the M1 aggregate. At the same time, we see substantial stagnation of the components of 'quasi-money', which perform (or can perform) the function of the advance financing of innovation processes.

Table 2. Comparison of the difference between the annual rates of change of units M1 and M3 (M3-M1) as a definition of the potential of "advance" financing of innovations in selected countries, percentage points

	Eurozone	Czechia	Poland	Hungary	Romania	Ukraine
2004	-2,1	0,9	-7,7	8,0	12,8	1,7
2005	-3,1	-2,3	-6,2	-9,8	-99,7	7,5
2006	1,9	-1,1	-9,1	1,4	-30,2	9,5
2007	8,4	1,0	-8,2	2,2	-30,2	4,4
2008	3,5	3,9	14,2	11,6	1,7	6,3
2009	-13,1	-5,6	-2,9	4,3	23,3	-9,3
2010	-4,6	-12,2	-6,9	-4,1	4,0	-1,3
2011	0,1	-3,6	8,3	-4,0	1,3	7,4
2012	-3,8	-3,9	0,9	-4,0	-0,9	8,9
2013	-4,6	-1,8	-8,4	-14,1	-3,9	-1,2
2014	-2,7	-5,6	-0,9	-18,2	-9,9	-8,2
2015	-5,7	-2,7	-5,1	-17,5	-16,7	-4,5
2016	-4,0	-3,8	-8,2	-13,8	-10,6	-1,3
2017	-4,2	0,6	-9,7	-4,9	21,1	-6,7
2018	-2,5	-3,5	-6,2	1,0	2,7	-10,1

Sources: Author calculation from: World Bank - World Development Indicators, IDB Aggregates (<http://data.isdb.org>), European Central Bank, The Global Economy.com (<https://www.theglobaleconomy.com>), FRED Graph Observations.

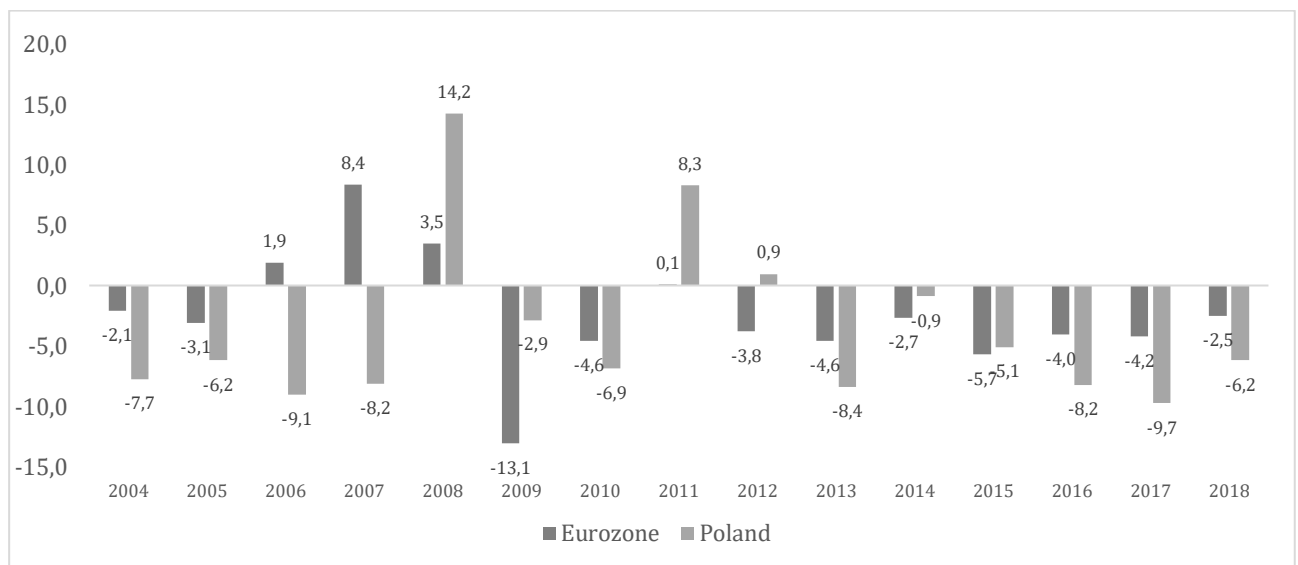


Fig. 1. Visualizing the data of Eurozone and Poland from Table 2.

As an aggregate, euro-area countries failed to reach the positive values of the indicator (M3-M1) after 2009. Countries outside the euro-area under consideration have also largely remained in the similar conditions. Although both Romania and Ukraine had two positive (in terms of our indicator) years after the crisis, the wide

range of fluctuations in the monetary potential of the advance innovation financing in them has rendered active long-term innovation processes impossible. Poland's two positive years (2011-2012), in my opinion, contributed to the economic innovation processes that gave it the reputation of a country that has best survived the crisis years. Hungary managed to reach a small positive difference in the rate of change of monetary aggregates under consideration (M3-M1) only in 2018. However, the overall picture of the post-crisis period, assessed by the suggested criterion, remains disappointing and threatening concerning the creating new financial support of the future growth through innovations.

This assessment was made by us primarily from the standpoint of Schumpeter's innovative theory of economic development. That is, limiting the financial resources of the innovation process leads to its inhibition and slowdown of economic development. This conclusion can be confirmed by the dynamics of change in the main indicator of economic success of the country, GDP per capita. After the crisis, many EU economies virtually stopped growing by this criterion.

## **Conclusions**

The Schumpeter's theory of economic development gives evidence the important function of the money market, or capital market, is to trade an advance credit to finance innovation activities. He considered such innovation development economy as "advances-economics". In contrary to that the mainstream of economic theory continue to follow principle of "the classical dichotomy" and "neutrality of money". The practical implementation of this vision for monetary policy, were implemented with measures to significantly reduce the credit advanced financial instruments. In contrast to that, Schumpeter's methodological notions have given vision that economic development in macroeconomics view can be ensured only by supporting innovation processes with "advance" credit and similar monetary assets.

The "Schumpeter's innovations" provide for the overcoming the crisis trends and they have been crucial to recovery and follow economic growth. This factor always has been remaining in the shadows when the means to overcome economic and politic crises were forming on the base of mainstream theory. Schumpeterian approach elaborates important conceptual idea overcoming crisis conditions by creating innovation industries that will absorb advance credit resources that are generated by banking system.

The article demonstrates the volume of production of innovative enterprises in Europe is in principle comparably with the value of GDP and constitutes on average 70% of the volume of production of all enterprises. In developed countries, this share is estimated at 80-90%. These data fully confirm the conclusion of Schumpeter's theory that innovation by its economic nature is a separate and main factor of economic growth, which forms national added value independently of traditional factors of production.

Schumpeter's theory elaborated the new lending function that is fundamentally different from the traditional mainstream theories, namely the creation of new added value through the advance lending for innovations. This leads to the conclusion that the actual economic growth in terms of GDP growth is mainly based on innovation processes, which create new incremental added value through the mechanisms of their advance lending.

It can be assumed that economic and financial crises are formed precisely because the advance financial instruments are not followed up by innovation, i.e., do not turn, in this case, into a real money supply and a corresponding increase in GDP, or innovation activity declined because insufficiency resources for advance financing of innovation processes. If such advance financial instruments are being accumulated in the form of fictitious capital, they turn into financial "bubbles". It can be fixed only through the activation of innovative processes of the new technological paradigm.

The Schumpeterian theory promotes the innovation model of economic development focusing on the creation of new knowledge resources to produce innovations. The proposed approach forms findings that the R&D and the technological innovation sphere of a country is not so much the result as the key factor of economic development. Readiness to innovations becomes the main competitive advantage of national economies, determines its position in the world competitiveness ranking, and becomes the main capability to reaching the well-being of countries.

The given analysis confirms practical meanings of the proposed macro monetary analysis. The "advance financing resources" can be evaluated by comparing the monetary aggregates M1, M2, M3. This comparison allows to calculate the available monetary potential of advance money to finance innovations. These will be the monetary resources that accumulate in the banking system more than the required money supply for current operations, i.e., one that provides the transactional demand. The latter is mainly realized by the monetary aggregate M1 and partly by M2. Then the advance monetary resource for innovations can in principle be represented quantitatively as the difference between monetary aggregates M3 and M1.

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