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Sustainable Development as the Concept of World Economy Development from Contemporary Macroeconomics Perspective

Abstract: The paper focuses on the development of the global economy in the context of sustainable development as a key imperative of contemporary macroeconomics. The analysis is combined with a look at classic macroeconomic issues such as economic growth, inflation, unemployment, and the balance of payments in foreign trade. An added value of the paper is that it looks at the problem from the perspective of various schools of thought in contemporary macroeconomics. The authors seek to validate the hypothesis that sustainable development is a powerful paradigm for the development of modern economies and that various macroeconomic trends make it possible to adapt this paradigm to the needs of economies at different stages of development.

Keywords: sustainable economics, sustainable development, economic growth, unemployment, inflation, modern macroeconomics, institutional economics, neoclassical economics

JEL classification codes: E31, E32, Q560

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Introduction

The inspiration for this paper was the ongoing debate which revolves around the evolution of the concept of sustainable development. The direction of theoretical reflection in the history of economic thought was almost always determined by analysis of relevant current and foreseeable problems. Without a doubt the last global crisis in the global economy was one of the more important reasons to take the issues presented here. This is due to both the usefulness of these issues as well as the potential fertility of cognitive reflection which revolves around the global financial crisis and sustainable development. However, the history of economic thought despite of its breakthroughs always recognized the importance of the research achievements of the existing tradition. Therefore the article attempts to analyze the problem in the world economy after the global crisis combined with the classic problems of macroeconomics: economic growth, inflation, unemployment and balance of payments in foreign trade from the perspective of modern recognized macroeconomics schools. These problems always exist regardless of the adopted imperatives. Cognitive added value of the article is expressed both in combination in the analysis of many different categories of problem as well as in showing how such an analysis may be more or less successfully conducted from the perspective of different trends of thought in modern macroeconomics.

The paper presented is mostly of theoretical character. Theoretical reflections it contains may however be a useful contribution or foundation (as the authors think) to potential empirical studies on sustainable development (also those carried out by the authors in research grants). One of them deals with the paradigms of contemporary economics from the perspective of sustainable development. The authors of this paper represent a general view, that the sustainable development paradigm is becoming more and more important in terms of its relevance for designing the development of modern global economy. It should increasingly influence various macroeconomic trends in countries at different stages of their development

Sustainability Economics as Sustainable Development Science

The primary premise for the concept of sustainable development was the final Declaration of the UNO Stockholm conference on the Human Environment in 1972. It called forth the need of joint action and common rules for inspiring and leading the nations of the world to protect and improve the environment [CINTE, 1972]. A commonly considered "official" announcement moment of the concept of sustainable development falls in 1987 and refers to the famous report of the World Commission on Environment and Development presented by Gro Harlem Brundtland [WCED, 1987]. Since then, this concept has been subject to a significant evolution. Primarily, as one of the key research objectives of ecological economics the sustainable development meant the harmonization and integration of different orders (or deals making up the

human life. In particular, it embraces the social, economic and environmental orders with a key importance being attributed to the of sustainability of broadly understood natural capital¹.

In the context of sustainability, with respect to both natural capital and physical (man-made or anthropogenic) capital and their overall quantitative and qualitative constancy, one could observe an increasingly growing focus on the problem of justice within the sustainable development debate [Becker, 2009; Sober, 1986; Desjardins, 2005; Norton, 1987, 2005]:

- Intergenerational justice;
- Intragenerational (within a given generation) justice (it includes, among other things, the interregional justice);
- Interspecies justice.

The issue of justice is simply but precisely defined in the above mentioned report of Brundlandt – Commission [WCED, 1987]: *“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts: the concept of ‘needs’, in particular the essential needs of the world’s poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.”*

While the primary criteria to define sustainable development built on the research program of neoclassical environmental and natural resources economics, the further evolution of this concept has gone towards a research agenda of ecological economics in which the main emphasis is focused on the natural system balance. Maintaining the balance of this system is the boundary condition of economic processes and thus the development of individual economies at the local and global levels. The balance in question may achieved in different ways which is, among other things, connected with a complex structure of natural capital itself (see: footnote 2). For example, it can be done by the increase in the assimilative capacity of ecosystems and growth of their productivity since it results in a bigger potential of individual economies to grow without impairing or damaging the natural environment. In the debate on interpretation category of natural capital sustainability four main principles of sustainability have been worked out [Fiedor, 2002]:

- Restrictive principle of sustainability.
- Strong principle of sustainability.
- Sensitive principle of sustainability.
- Weak principle of sustainability.

The research program of ecological economics has adopted a restrictive and a strong principle of sustainability as the criteria for the natural capital management. In conjunction with the development of the justice category,

¹ By and large, it comprises the following components: exhaustible resources, renewable resources, environmental assimilation capacity and life supporting services of the nature.

it has opened the path for sustainability economics [Baumgartner, Quaas, 2010] otherwise known as sustainable economics or economics of sustainable development [Rogall, 2010]. It encompasses the challenges of ecological economics on the one hand and meets the expectations of enlightened anthropocentrism on the other. The latter seems to be quite close moderate biocentrism.

This eclectic fusion performed within the sustainable economics gives new meaning to the sustainable development paradigm. Sustainable economics shows that the postulate of sustainability can be implemented differently in different areas of the world depending on the individual condition of the socio – economic – ecological systems and the ability to build consistent consensus conditioned by nature, society and economy. This distinction stems from the situation in which there are different systems. However, there are also problems global in nature and in this case international agreements are required, in particular those relating to the previously mentioned principles of justice. Summing up this part of our deliberations on sustainable development, ten important features of it may be identified nowadays [Rogall, 2010]:

1. The principle of strong sustainability. It considers the economy a sub-system of nature with a limited substitutability of natural resources as production factors. As the result, the optimal resources management is needed to preserve them in sustainable way.
2. The principle of methodological pluralism. According to it, in coping with the sustainability problems the achievements of neoclassical environmental economics, ecological economics and other approaches to environmental issues in both economics and natural sciences may be used.
3. The principle of progress in mainstream economics and ecological economics in the direction of sustainable economics. It means the transdisciplinarity within these approaches. An example of this principle consists in replacing the concept of *homo economicus* by *homo cooperativus* concept, the repeal of consumer sovereignty and the dogma of unlimited freedom of trade in favor of a mixed economy with protective barriers and global order framework.
4. The principle of substituting the conventional growth (identifying it with increased per capita consumption) paradigm for the paradigm of sustainability. It will contribute to ongoing reduction of absolute level of resource use and natural resources intensity of growth (the so called decoupling of growth and natural resources consumption²). This means action in the direction of efficiency, consistency and sufficiency.
5. The principle of responsibility in economic activity. It contributed to the creation of ethics for sustainable development, combining the diversity of cultures in a universal context.

² For description of above mentioned phenomena the notion of the so called ecological footprint of economy is commonly used in the subject literature. See e.g. [Grazi et al., 2007].

6. The principle of transdisciplinarity. It implies the use of knowledge from other fields in cooperation with social, life and technical sciences.
7. The principle of institutional changes. It refers to achieving the benefits from the respect of the principles of sustainable development.
8. The principle of operationalization of sustainable development. It generates a system of measurement of indicators and targets for sustainable development.
9. The principle of balancing the market economy through an active political interference aimed at reduction of externalities (not only of environmental character).
10. The principle of global responsibility, involving the adoption of environmental commitments by some developed countries to foster the development of poor countries. Furthermore, under this rule proposes to adopt some solutions for reducing global environmental risks (charges for use of global environmental goods, ecology and social anti-dumping, the Tobin tax on speculative capital transfer, reduction of resource consumption in industrialized countries, etc.) have been proposed.

The above outlined rules interpret the concept of sustainable development from the perspective of sustainable economics. They depict it as an effective paradigm of modern management. Its effectiveness is expressed in the continuity of management, increasing productive power of production factors and thus their ability to create added value, improving the quality of life expressed in terms of various measures of economic activity. Moreover, the paradigm of sustainable development can fit to the original path of economic development of any country and to the potential embodied in its resources, especially in its natural capital. Additionally, in a globalized world economy can be a universal exponent of management processes allowing for compatibility and transfer of environmental costs similar to that which took place in economic history because of the comparative costs in relation to the then produced goods and services. An example is the global market for tradable permits to emit greenhouse gases.

Such management paradigm is an example of the practical ecological intelligence in creating value added generating processes. By the notion of ecological intelligence the authors understand a certain level of knowledge for efficient management. It means that management of natural resources exploitation is based on both economic and ecological principles [Goleman, 2009]. Using the conceptual apparatus of neoclassical microeconomic theory, a hypothesis can be put forward that an adequate level of ecological intelligence allows to navigate along a particular isoquant. Thus increasing levels of ecological intelligence allow to move to isoquants of higher altitude, creating this way conditions for real economic growth. Ecological intelligence has both quantitative and qualitative dimension. Creating a new quality of knowledge in this field, the ecological intelligence enables a given economy to change the location and shape of its production function within which the natural capital and knowledge are strategic production factors.

Contemporary Macroeconomics Related to Sustainable Development Problems

Macroeconomic theory has had its ups in turning points in economic history of the world. Keynesian economics was born under the influence of events related to the Great Depression of 1929–1933. Monetarism [Friedman, Laidler, Parkin, Bruner, Waters] appeared as a response to the worsening unresolved problems in the sixties and seventies of the twentieth century: high unemployment, increasing inflation and slowing economic growth in developed countries using economic policies based on the Keynesian economics or Samuelson's grand neoclassical synthesis. New classical economics [Lucas, Sargent, Barro], and the real business cycle school [Prescott, Kydland, Plosser, Long] as its continuation, may be considered a response to the real conditions of the management process changes that had to be taken into account, both at the macro and micro level, in conjunction with huge supply and demand shocks which mature market economies started to experience since the decade of eighties. The new Keynesian economics [Stiglitz, Akerlof, Blanchard, Mankiw] emerged to address the market failures in the form of imperfect information, knowledge asymmetry and the incompleteness of markets, providing additional justification for state intervention in economic policy in order to foster the economic growth and development. It was noted that information barriers can also cause failure of the state in the sphere of the allocation, stabilization and redistribution.

Defining macroeconomics through the prism of its basic research problems, such as economic growth, unemployment, inflation and balance of payments in foreign trade, a conclusion may be drawn that positive solutions of these contemporary issues are inherent to the problem of sustainability of natural capital. Simultaneously, there appears a feedback mechanism. Rational management of natural capital requires optimal macroeconomic decisions. This raises the question about the essence of contemporary macroeconomics paradigm as perceived from the perspective of sustainable development. This question falls within the context of the main hypotheses being examined in the paper, that sustainable development is a powerful paradigm for the development of modern economies and various macroeconomic trends allow to adapt this paradigm for the needs of economies at different stages of their development.

In terms of methodology it might be asked why a paradigm is just the subject of analysis instead of a research program or Laudan's research tradition [Laudan, 1977, 1981, 1984]? It seems that a period of Kuhnian so called "*normal science*" [Kuhn, 1970] in relation to sustainable development came to the end of its continuity thus leading to the diagnosis of significant anomalies (crisis) and subsequently to a possible scientific revolution leading up to the new pattern of doing science (paradigm) in linking the ecological economics and macroeconomics. A new paradigm in its disciplinary matrix covers the entire constellation of beliefs, techniques and values shared by members of the scientific community. The so called copies of the paradigm

include the solutions of specific scientific problems in the discipline. Thus the practice of contemporary macroeconomics based on paradigms: new classical macroeconomics, monetarism, new Keynesian economics, post Keynesian economics, new institutional economics or on the basis of the Austrian research tradition raises the question about explanatory ability of trends identified in relation to research issues of ecological economics or its evolutionary successor which is the sustainable economics (otherwise known as sustainable development economics).

If we take as the starting point of contemporary macroeconomics mainstream neoclassical school which is a development of classical thought and nineteenth century classical economic orthodoxy such as contained in the work of A. Marshall [Marshall, 1920], we may say that the concept of sustainable development refers to the determinants of supply. In this respect, it can be concluded that the recommendations for rational management of resources and functions of natural capital positively determine the position of the aggregate supply curve causing a shift in market balance in the direction of increased product and a lower aggregate price level with other factors being equal. At the same time the inclusion of A.C. Pigou's theory of externalities into neoclassical analysis [Pigou, 1941, 1943, 1947] resulted in including the social costs or benefits of the aggregate supply. In this way, the supply function is a function of marginal social cost and can lead to a reduction of production volume balancing markets.

Contemporary neoclassical growth theory proves that the capital expenditures per unit of effective labor is the main economic growth factor [Solow, 1956, 1957], with the second one being the technological progress. The latter was treated originally as exogenous and then, through the development of endogenous economic growth theory [Temple, 1999] by P. Romer [Romer, 1986, 1990, 1994], R. Lucas [Lucas, 1988] and others, endogenously as depending on the level of expenditures for research and development sector and human capital investments [Dokurno, 2009].

In accordance with the sustainable development concept, growing demand on environmental functions related to the natural capital stock (as defined earlier in this paper; see footnote 2) will lead to changes in structure of GDP, finally resulting also in the increase of added value based on natural capital. Consequently, it can be concluded that the neoclassical Solow growth model can be transformed to the form in which classically understood physical (man-made, anthropogenic) capital is strongly substituted for natural capital and as a result the rate of economic growth would be also determined by natural capital expenditures per unit of effective labor. In this way the production function is transformed to the form which follows the path of sustainable development and not only equilibrium (steady-state) economic growth.

In conjunction with the proceeding analysis, one should raise the following question: how to transform human needs to make them consistent with sustainable development criteria. A positive answer to this question leads, on the

one hand, towards Keynesian macroeconomics and, on the other, to institutional economics and new institutional economics. Measures to stimulate demand which aim to restore the activity level of an economy at its production capacity can be effective under certain assumptions. First of all, those measures have to lead to investments in areas with high potential value added and therefore to the production factors with a large potential for production³. In the context of sustainable development, the following arguments seem to be important when it comes to investments:

- Investment demand should be based on substantive goods and those whose production costs are disproportionately low in relation to the benefits received by society as a result of their ownership [Musgrave, 1975 Stiglitz, 2006]. The absence of such goods in a society brings significant losses delaying its development. The examples are: public education services, public health (focused particularly on preventive health care), public forests, etc.
- Investment demand should take into account the accumulation of natural capital, basing on the assumption that this type of capital has a high potential for power production both in terms of created goods and generated services including: assimilation capacity of ecosystems to eliminate pollution, biodiversity, guarantee the preservation of dynamic equilibrium of ecosystems or the functions of the environment as a source of recreation services [Kontoleon et al., 2007].
- The scale of certain investments in natural capital, both because of their size and value, requires the involvement of large companies of various ownership types: private, state –owned or public – private partnerships. In this context Keynesian approach presents itself as a highly useful.

Activities in the area of investment demand ultimately affect the aggregate supply function. But how to persuade buyers to change their preferences concerning their willingness to pay for delivered goods and services? In this regard it may be helpful to base more (then hitherto) the tax system on direct taxes because they directly affect the purchasing power of consumers. Apologists of classical economics may plead for the suppression of individual freedom. The question, however, arises what are the limits of contemporary freedom in the sphere of consumption bearing in mind the need of sustainable development relating to the justice both between and within generations? Lower tax rates for goods and services that meet the need of sustainable consumption in line with the principles of sustainable development can be financed by higher tax rates for goods and services not meeting the criteria of sustainable development. A classic example here is the differentiation of tax rates of final energy carriers depending on their environmental impacts.

³ The history of economic thought among others demonstrated in the work authors such as Smith [Smith, 2007], Ricardo [Ricardo, 1957] confirmed that the determinant of goods value on the one hand is its scarcity on the other hand its utility. The utility category is characterized by utility relating to the internal needs of an individual person and the utility relating to the needs of the average consumer which affect the exchange value of the good determined the market price.

In the long run, it might lead to evolutionary change of consumer preferences for sustainable development.

Threat to above mentioned system of income redistribution is the potential tendency of the state to transfer funds raised for purposes not related to sustainable consumption. However, this is a question relating to the quality of the political system of a given country. By and large, the crucial significance here is whether or to what extent the sustainable development goals and criteria are present in different state policies: public regulation, fiscal policy, trade policy and different sectoral (industrial agricultural, transport and others), and horizontal (ecological, regional, scientific and others) policies. Secondly, of equal important is actual commitment of political elites to the concept of sustainable development as a new paradigm of socio-economic development. The last but certainly not the least, the evolution towards sustainable consumption patterns, being in fact the transition from resource overexploiting society to resource conserving society, depends very much on to what extent the whole idea of sustainable development is internalized in commonly shared social values, behavior patterns and mental models.⁴

The importance of institutional school in economics expresses through inter alia in the fact that it focuses not so much on the action of the market mechanism but on the problem of the formation and development of markets and the problems of decision making in areas where market activity is limited. Operation of the market mechanism depends on whether people are willing to accept the logic and effects of the market. This matter is the domain of new institutional economics (NIE). This trend stems from the belief characteristic to the institutionalism that institutions determine the behavior of individuals and are as the result of economic system. Institutions are the rules of human behavior in society created in order to structure human interaction and reduce uncertainty. The institutions are divided into formal (legal acts, etc.) and informal (moral norms, customs, beliefs, attitudes, etc.). The importance of informal institutions lies in the fact that the same formal rules introduced in different societies give different results [North, 2004]. Complementing the

⁴ The essence of Keynesian approach is the economy equilibrium development in conditions of production possibilities [Keynes, 1985]. Disturbance of this balance often results from excessive levels of savings. Classical economics solves this problem pointing out – *ceteris paribus* – to a reduction in interest rates on the capital market resulting in an increase in investment. Keynesian economics suggests however psychological factors influencing the propensity for risk and thus to make investment decisions. These psychological tendencies are not strictly objective rules on the model accuracy from the world of physical science how would the representatives of the current monetarist [Frenkel, Johnson, 1976]. Thus in such moments of investment capacity collapse the state may be effective subject which through fiscal policy forcing the economy generates a new investment demand. Objection is, of course the effect of crowding out. However the effectiveness of this criticism depends on assessing the viability of public sector investment. An example of Scandinavian countries in Europe consistently shows that a strong public sector can be profitable and efficient and is able to provide the appropriate level of goods that meet consumer expectations. It should be stressed that this is culturally conditioned and thus leads to the analysis in terms of institutional economics and new institutional economics (NIE).

institutional foundation is the degree of compliance with the rules depending on the procedures for law enforcement, social stigma and internal discipline of individuals. Conduct of the formal and informal institutions favors a situation in which the benefits of compliance outweigh the costs of their implementation. As a result an absolute classic assumption about the rationality of human behavior boils down to the relative rationality defined in a specific socio cultural context. The complexity of human choices in combination with limited possibilities of the human brain there are the reasons for repealing the assumption of unlimited rationality.

Institutional economics stresses that the economic system characteristics is culturally conditioned. The conditions of creation and the redistribution of added value are determined – in wide meaning – by culture, including institutions like laws, regulations, property rights, customs, habits, trust (social capital) etc. They lead to the formation of particular system of institutional equilibrium which refers to the interests and influences of various social groups. The ability to evolve such system assigns its development capabilities and ability to create a rent resulting from the management. In case the existing system is very strong the ability to create a rent is often priced out by rent seeking and therefore the actions that have to change the existing system of added value redistribution. As a result it leads to the equilibrium collapse – in long term – being the contribution to the change. The opportunity cost of the transition process is always the problem and the transaction costs are subject the political culture of the system.

As far as the concept of sustainable development is concerned, institutional perspective is fundamental to highlighting the issue of institutional equilibrium for sustainable development. First of all, institutional equilibrium is ever a dynamic process. Secondly, one can speak of various stages of that equilibrium (strong, weak and others). In general, institutional equilibrium (or its lack), and its durability, depends on how or to what extent formal and informal institutions, as well as the so called institutional governance, are consistent or contradict each other from the point of view of sustainable development goals. With reference to the North's recognition of formal and informal institutions, it must be stressed that these are the latter which make a given economy's and society's path towards institutional equilibrium easier (more probable) and less costly in terms of transaction costs (smaller costs of regulation and law enforcement). Not going into a detailed analysis of this issue, we confine ourselves to a following statement. When formal (law and regulation, first of all) and informal (commonly shared system of social values and behavior patterns in particular) institutions comply each other from the standpoint of the nature and objectives of sustainable development, the institutional equilibrium for it is both durable and characterized by low transaction costs. The equilibrium in question may also be achieved by the inconsistency of these two kinds of institutions, but it will be less likely and durable, and transaction costs will be for sure higher.

The system quality determines the adaptive efficiency. This is not the classical allocative efficiency in terms of optimizing the relationship between outputs and inputs. The adaptive efficiency is expressed by the flexibility of institutional structure and disclosed as long-term ability to create forms of collaboration and creative attitudes leading to the welfare growth [Colander, Landreth, 2005]. As D.C. North explains: *“Adaptive efficiency is associated with this type of rules that shape the way the economy is growing over time. This refers both to the society willingness to acquire knowledge and learning, encourage innovation, risk taking and creative activities of all kinds as well as solve problems and remove limitations on the development path”*. [North, 2004].

Contemporary macroeconomics strongly focusses on inflation and unemployment problems. Monetarism criticized the current substitution of these problems in a long term by making modifications to the classic Phillips curve and formulating the thesis about the money neutrality [Friedman, 1972; Phelps, 1967, 1990]. Therefore monetarism emphasized that the real capacity to eliminate unemployment in the long term resulted from supply side forces in the economy and not because of expansive monetary policy. The question arises in what way the concept of sustainable development promotes monetarist thinking in relation to these issues. Under assumption that the source of added value in the economy based on sustainable development is mostly the natural capital then the rate of economic growth should substantially correspond with the rate of renewability (constancy) of this capital. Estimates of the natural sciences seem to suggest a discounting rate of natural capital at the level between 3–5%. As the result stimulate economic growth referring to the limits of physical productivity of economic systems is the source of potential supply side inflationary impulses in economy. Thus the inflation problem can be seen in terms of information based on the energy [Włodarczyk, 2011]. The energy interpretation first refers to direct explanation in terms of thermodynamic data. Energy flows are the foundation of all real processes and their efficiency can be measured by energy units. In similar way the measure of management processes efficiency is based on monetary units. As the result more energy intensive economies are potentially more inflationary.

Energy interpretation of inflation phenomenon may also be indirect. If we accept that as the result of inflation money loses its purchasing power then it can refer to the phenomenon of energy dissipation in natural systems. This purchasing power dissipation is associated with economic systems equilibrium. If the economy is unsustainable in the long term it appears the risk of purchasing power dissipation brought about by the inflation. Adoption of the sustainable development criteria in the economy helps reduce this risk. An example here might be the interpretation of the ongoing global economic crisis which was very largely due to the global macroeconomic imbalance. The attempt at restoring macroeconomic balance resulted in many economies in inflationary pressure increase.

While trying to explain the most important economic phenomena, of key importance are also information flows. The information can be expressed in units of structures complexity arising from the management. Every good or service being the embodiment of added value contains a specific piece of data. Interpretation of information can have both direct and indirect character. Direct explaining consists in examining the information contained in specific economic magnitudes. If the product is the technology its information interpretation is playing an important role in assessing its value. In this case money becomes a carrier of information. Indirect interpretation of inflation phenomenon in terms of information volume refers to the analogy between the transmission of money and transfer of messages of certain information content. The flow of financial assets in the global financial markets is a transfer of information from various local markets determining the level of risk in relation to the assets. Then the evolution and increasing complexity of socio – economic systems and subsystems, such as monetary system, is the result of the interaction of physical and symbolic system which is the monetary system. One direction and the relative irreversibility of money flows and inflation trends, along with disturbances caused by the dematerialization of money (which can be metaphorically seen as a carrier of a particular type of energy or information), leads to an analysis of the phenomenon of inflation in terms of thermodynamics and information theory, and specifically the category based on entropy interpretation of L. Boltzmann, C. Shannon, R. Clausius. The transfer of information in sustainable development could contribute to the selective growth which would mean economic growth based on the development of sectors which are environmentally friendly (or less harmful than others).

Another macroeconomic problem is unemployment. The monetarist solution of this problem is based on the lower social standards that reduce the level of the minimum wage to the level of balance in terms of voluntary unemployment. Supplementing these activities is the simultaneous reconstruction of the economic structure towards the liquidation of structural unemployment. Mainstream monetarists' answer may, however, not be satisfying in the short term when there is the need for stronger and faster pulses to prevent the emergence of the social opportunity cost. The answer to this problem comes from the new Keynesian economics in the analysis **of nominal and real rigidities**. The nominal rigidity occurs when something prevents nominal prices from being in full alignment with demand disruptions. The real rigidity occurs when some factor prevents real wages in alignment with demand disruptions or if a certain wage is rigid in terms of another one. [Snowdon et al., 1994]. The same refers to the prices. Sources of rigidities due to: imperfect competition, heterogeneity of labor, incomplete markets and asymmetric information. The lack of flexibility on the labor market refers to changes in the environment that generate changes in the labor demand is often the result of pre-established wage agreements and the mobility lack on the labor market. The solutions to decrease unemployment proposed by new Keynesian economics focused

on higher flexibility in wage contracts and the using of efficiency wages or on models that suggest adjustments to increase the intensity of the exchange of information on the labor market resulting in a more heterogeneous workforce adjustments to existing jobs [Romer, 1996; Pissarides, 1985; Howitt, 1988; Hosios, 1990; Dokurno, 2011].

From the sustainable development perspective, the unemployment cutting out focuses on the aspect of supply side through the production of goods and services to meet the environmentally friendly properties and thereby generate manufacturing sectors producing these goods and services in the sustainable way. The condition for the efficiency of these solutions is the demand structure that generates demand for goods and services produced according to the sustainable development principles. The degradation of natural capital resulting from the lack of management based on the sustainable development criteria is one of the causes of potential shocks that shape the course of the business cycle. It is rather a long-term disruption because rebuilding the stocks or properties of ecosystems lasts for years and thus alters the course of the development path of the economy. As the result, the economic growth declines, and unemployment and inflation increase. The achievements of macroeconomic schools solve this problem by focusing on the reaction to the cyclical disruption in the economy. Nominal rigidities may be temporarily helpful protecting certain sectors against unemployment at the expense of low unit wage levels. In the case of economic downturn, nominal rigidities contribute to partial reduction of the amount of labor by reducing the daily or weekly limits of working time. Nowadays, it is emphasized that those changes, and the reduction of working hours within one week in particular, may be expected in highly developed economies because economic growth is not characterizing by increasing demand on labor. By and large, it is connected with substituting labor for capital due to the rapid dissemination of manufacturing methods which intensively use the achievements of modern information and communication technologies.

Another issue is the real rigidity arising from coordination disability and strategic complementarity. These problems are related to the inability of operators to effectively coordinate their activities due to lack of incentives for individual enterprise brought about by the inaction of other enterprises [Mankiw, 1994].

In the overall appraisal of modern macroeconomic thought, the real business cycle school [Kyddland, Prescott, 1990; Plosser, 1989] seems to be of special significance from the perspective of sustainable development. It should be noted that the natural capital degradation is one of the key causes of real supply shocks. The deterioration of continuity in the access to natural capital resources changes the development path of the economy. However, technological progress, especially when treated endogenously in connection with human capital investments in all sectors of economy and taking shape of environmentally friendly innovations, may bring about a positive supply shock based on the sustainable development criteria and shift the production function curve position towards increased efficiency direction.

From the perspective of real business cycle theory, we can look at the intertemporal work substitution hypothesis [Lucas, Rapping, 1969] and transform it to the hypothesis of intertemporal natural capital substitution. This means that the rational management of this capital, particularly in relation to non-renewable resources, implies the natural capital accumulation during periods when its market price is undervalued and then is used during the downturn. Moreover, the concept of sustainable development is based on the precaution principle which applies for the exploitation of resource whose future (in terms of the explored deposits, application technologies etc.) is not known or hardly predictable. The principle concerned is fundamental to ensure the continuity of natural resource management.

Economic Dimension of Sustainable Economics Applications in Relation to Development Problems of the World Economy

The contemporary world economy faces the following main challenges:

- Developmental asymmetry of the regions.
- The increasing stratification of foreign trade benefits.
- Disastrous burden of environment resulting in the degradation of local ecosystems, as well as numerous external costs related to health loss, decline in quality of life etc.
- Resource rate of exploitation inadequate to their sustainability (in the case of renewable resources) and substitution (in case of non-renewable resources).
- Growing energy resources shortage.
- The drawing up of financial sector crisis.
- Disadvantageous demographic trends which might negatively affect the dynamics of economic development in the future.
- Impacts of economic processes on the global ecosystem equilibrium which may lead to the changes harmfully affecting the economy.
- Political instability in many regions causing a risk of regional conflicts (such as Libya, Egypt, etc.).

One can assume that the program of sustainable development set on a global scale by the Agenda 21, and then adopted by the countries participating in the UNCED in Rio de Janeiro in 1992, creates a basis to formulate a research program for sustainable economies which has been developed during the next earth summits (2002 and 2012). The program refers to the following application principles of sustainable economics [Rogall, 2010]:

- **The principle of economic – social – cultural equilibrium** while maintaining the ecosystems' assimilation capacity instead of maximizing growth and profit principle. This principle shows how much the balance of ecological systems may determine the stability of socio – cultural systems. At the same time, there is functioning a feedback mechanism. It makes economically efficient culture which is able to socially inject the respect for

the environment which enhances the ecosystems stability thus creating conditions for long – term economic development.

- **The principle of intergenerational and intragenerational justice**, combined with the principle of responsibility and appropriate measurement of economic activities with regard to the use of ecosystems. Policy which implements those principles sets the direction for sustainable economic development and its continuity and dynamics. Besides that, it helps to solve the problem of differences in the pace of regions' and countries' economic development. Of course, under assumption that developed countries perceive a common interest in the development of all countries.
- **The principle of sustainability in all economy sectors**. It leads to the production of added value based on sustainable development rules. Implementing this principle requires such a structural reconstruction of domestic economy which allows for maintaining and even expanding the assimilation capacity of ecosystems making them operating in accordance with socio – economic conditions of equilibrium in a specific cultural context.

The above mentioned rules are not overly problematic. However, their practical implementation requires a major political transformation both at the level of individual countries, as well as through international or even transnational agreements. Directions of activities in this area would include the creation of standardized instruments, direct and indirect control in the management of sustainable development, as well as identification of necessary policy measures in different economic sectors: transport, agriculture, construction, energy, etc.

Sustainability criteria should also be applied to trade. The source of today's comparative advantages in international trade often becomes a transfer of externalities, especially the external costs. Imports of resources and raw goods by rich countries to avoid or limit the production of environmentally harmful goods toss related problems on the ecosystems of developing countries, leading to huge and often irreversible damage within their ecosystems. On the other hand, in order to enhance the trade competitiveness extraction of those goods in developing countries is based on the undercutting technological and environmental standards. In this way the rich European and American countries exist at the expense of many countries in Africa, Asia or Latin America. The introduction of appropriate tariffs reflecting the environmental costs of goods concerned in the WTO could allow for the internalization of international (or even global) environmental effects thus contributing to the increase in comparative advantages of poorer raw material exporting countries in international trade. Another relevant issue here is the pollution caused by excessive transportation associated with transfer of goods. Considering it from the perspective of common goods theory, a solution may be proposed that special taxation regimes, depending on the type of mobility in this area: air, maritime and road transport, should be introduced in order to raise funds for programs supporting the enhancement of ecosystems in developing countries.

Summation

The analysis of various forms of economic activity has been ever a source of cognitive reflection on the nature, origins and causes of economic phenomena and processes. Irrespectively of theoretical, cognitive and methodological aspects, economic thought has been also ever an attempt to address practical problems related to them. Current economic and financial crisis showed that some natural interrelationships between financial sector and real economy have been interrupted. It also proved that the latter sphere requires structural changes leading to a new paradigm of management. The concept of sustainable development was originally entered in environmental economics and then in ecological economics. Finally, it found its complement in sustainable economics. Sustainable economics directs the management paradigm toward the equilibrium of economic, social and ecological systems with a strong emphasis on the principle of sustainability of natural capital embedded in political system based on participatory democracy. However, the assumption of the universality of this system on a global scale raises some doubts about the cultural context and historical and political traditions in different regions of the world. Compatibility on the global scale opposes some common views relating to the way of understanding natural capital at the level of individual countries.

Since its outset, economics as a science was, more or less, a behavioral science dealing with economic aspects of individual actions, including also such aspects of human activities in non-economic spheres of social life (law, politic, culture and technology). Those actions may result in the growth of wealth or welfare but also may lead to long-term stagnation, economic and social conflicts, including the internal armed ones. Peace seems to be the undisputed superior value to guarantee the continuity of development. However, it has one of its fundamental origins in production and redistribution systems of added value where everybody is posing conditions for the realization of their fundamental rights and aspirations. The concept of sustainable development is prudent in its attempt at answering the question: How in the respect to our cultural differences to build a common understanding in global scale through the shape of economic systems that respect the laws of nature?

Sustainable economics research program is part of an existing theoretical and practical research traditions in macroeconomics in the sense that it can provide their creative metamorphosis. The result is a classic solution to macroeconomic problems presented in a new perspective, taking into account sustainability criteria. This is both qualitative and quantitative change inherently associated with the transformation of human behavior.

European intellectual tradition emphasizes that history is a teacher of life. And next to this crisis, that is a real threat it can also be an opportunity for some structural changes. How much we learn from history it depends how often we will have to make up for the same lessons. In this case the global economic

crisis is such a powerful lesson and the concept of sustainable development is an attempt to respond to the challenges brought by it.

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ZRÓWNOWAŻONY ROZWÓJ JAKO KONCEPCJA ROZWOJU ŚWIATOWEJ GOSPODARKI Z PERSPEKTYWY WSPÓŁCZESNEJ MAKROEKONOMII

Streszczenie

W artykule przedstawiono problem rozwoju światowej gospodarki z perspektywy zrównoważonego rozwoju, jako kluczowego imperatywu współczesnej makroekonomii. Ponadto problem rozwoju światowej gospodarki połączono z klasycznymi problemami makroekonomii w postaci: wzrostu gospodarczego, inflacji, bezrobocia oraz bilansu płatniczego. Płodność heurystyczna przedstawionych badań wyraża się zarówno w połączeniu klasycznych problemów makroekonomii w kontekście zrównoważonego rozwoju, jak i z perspektywy różnych współczesnych szkół makroekonomicznych. W swoich rozważaniach autorzy dążą do potwierdzenia hipotezy głoszącej, iż zrównoważony rozwój jest płodnym heurystycznie paradygmatem w rozwoju współczesnej makroekonomii, zaś różne kierunki rozwoju współczesnej makroekonomii pozwalają na przystosowanie koncepcji zrównoważonego rozwoju dla potrzeb programów rozwojowych gospodarek znajdujących się na różnych stadiach rozwoju.

Słowa kluczowe: ekonomia zrównoważonego rozwoju, zrównoważony rozwój, wzrost gospodarczy, bezrobocie, inflacja, współczesna makroekonomia, ekonomia instytucjonalna, ekonomia neoklasyczna

Kody klasyfikacji JEL: E31, E32, Q560
