



The Economy as a Nonlinear Complex System: In Search of a New Paradigm

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In Search of a New Paradigm

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Annotation

On the basis of a dialectical analysis of expedient activity, a decentralized economy is presented as a complex non-linear system organized according to a network principle, like many other systems of animate and inanimate nature. In such an economy, the general laws of the universe, which are studied by synergetics, are manifested in a specific form. This allows us to see many well-known economic phenomena in an unusual light and to discover in them what cannot be detected by standard methods of orthodox theory. The monograph presents a system of concepts, on the basis of which a fundamentally new interpretation of how the market economy functions and how it evolves from its inception to the present is given. It is shown that behind the external chaos of economic life hiding surprisingly ordered, symmetrical, deep structures that provide self-regulation of competitive market economy. Like all living systems, the economy evolves, resulting in the monopolization and financialization of the economy, and over time it loses the ability to self-regulate. Regulation becomes necessary, as a result of which the role of centralization of the economy increases. The search for new methods of regulating such an economy becomes inevitable.

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Dedicated to the heroic Ukrainian people

Foreword

Attempts to provide an unbiased scientific explanation of the processes taking place in the modern economy do not fit the neoclassical paradigm. It demonstrates a clear impotence to cope with the problems facing it. The economic mainstream was formed by different scientists in different periods of time. And although this was a necessary stage in the development of economic theory, it has long exhausted the scientific potential of its further development, and has now led the theory to a deadlock. One of the main reasons for the crisis of economic science is the inadequacy of its research methods. These methods need radical rethinking.

Modern science has accumulated enough knowledge to come closer to understanding how the market economy functions. But this knowledge is so dispersed across disciplines and scientific fields that it is difficult to see the links between them. Many philosophical and sociological doctrines and research programs, both already forgotten and relatively recently appeared, contain interesting ideas and methodological approaches that are ignored by the mainstream, but have great scientific potential for bringing economic science out of the deep crisis in which it found itself. These include the ideas of Hegel, I. Prigogine, H. Haken, T. Parsons, N. Luhmann, U. Maturana, F. Varela, H. Foerster and others. All of these scientists are united by a systemic vision of reality. But due to the fact that these ideas are scattered in the doctrines of various thinkers who have different, sometimes mutually exclusive worldviews, and are not linked to each other, they often remain outside the attention of economists. A methodological approach based on the synthesis of these ideas makes it possible to interpret economic reality in a new way.

Moreover, in the context of such methodological approach, many well-known economic ideas, both recognized by neoclassicists and rejected by them, also acquire new meaning. There are interesting logical touchpoints among these ideas which offer new perspectives on the operation and development of the market economy. In this regard, we can mention the ideas of K. Marx, L. Walras, L. Mises, F. Hayek, J. Keynes, P. Sraffa, P. Sweezy and others. Their ideas inspired this study. The ideas of these scientists, removed from the contexts of those sometimes incompatible doctrines to which they belong, and placed in the correct relationships, explicitly or implicitly underlie the proposed concept.

At the same time, we do not touch on those statements of these doctrines that are not used as constructive material for the proposed concept. We do not believe that all the ideas of

these scientists are acceptable for economic science. We simply do not touch upon these questions, as the purpose of the proposed study is not an interpretation or critical analysis of these theories. We mention these ideas only to the extent that it is dictated by the need for an adequate understanding of the concept we have proposed.

As is known, in the works of the classics, special attention was paid to the value theory, which indicates the exceptional importance of this problem. Many questions remain unanswered to this day. But the problem of value has turned out to be so complex that modern economic theory practically ignores it and puts all emphasis on the problem of price.¹ Initially, my scientific interests were concentrated on the problem of value. It has always seemed to me the central problem of economic theory, which can provide a clue to understanding other important problems. Several of my articles and special chapters in monographs are devoted to this problem, in which value is presented as a unity of utility and costs.² The study of the value problem gradually led me to the formation of a unified vision of economic processes, which is radically different from neoclassical dogmas.

As a result of the dialectical analysis of economic categories, the market economy is presented as a complex, non-linear, cognitive, organizationally closed and causally open system of economic actions. Complex nonlinear cognitive systems have unique properties, in the study of which synergetics, constructivism, second-order cybernetics, and network theory have achieved great success. This circumstance provides an opportunity to refer to the achievements of these scientific disciplines in the format of an interdisciplinary study of economic processes. As a result of such an analysis of a decentralized economic system, a fundamentally new interpretation of economic categories and the relationships between them, a new understanding of economic equilibrium and the mechanism of self-regulation of a market economy have been obtained.

In a market economy, subjects produce products for each other and exchange them. The satisfaction of one's needs is mediated by the satisfaction the needs of others. As a result, the actors are connected to each other by their actions and form a single system in which everything that is produced is consumed and everything that is consumed is produced. In such circumstances, the results of economic actions become the prerequisites for actions themselves. Each economic action gives rise to other economic actions, as a result of which

¹ "...the problem of value is not held in much esteem in contemporary economic thought. ... most economists today do not even see the need for a "theory" of value, as distinct from a theory of price, and would in fact be hard pressed to explain the difference between the two. ... the neglect of value does not remove the issue from economics but only leads to its covert appearance in harmful form; ... the questions raised by value are not antiquarian but perennial (and, I should add, not elementary but elemental); and that varying approaches to value, far from being mere pedagogical devices for periodizing the history of economic thought—classical political economy with its "labor theory" of value, postclassical with its "utility theory"—powerfully influence the constitution of economic thought itself by identifying different elements within the social process as strategic for our understanding of it." (Heilbroner, 1988, 104-105.)

² See Leiashvily P. «Towards the teleological understanding of economic value». // *International Journal of Social Economics*. Volume 23, Number 9, 1996. (p. 4 - 14); Leiashvily P. 2012. *Economic Activity: Teleological Analysis*. New York. Nova Science Publishers Inc.; Leiashvily, P. 2017. "The Relativity Theory of General Economic Equilibrium" // *American Journal of Economics*, 7(5): 216-229; Leiashvily P. "Macroeconomic Order from Microeconomic Chaos". *American Research Journal of Humanities and Social Sciences*, Vol 7, no. 1, 2021, pp. 1-15.

the economic system becomes an organizationally closed, self-reproducing system. The economic system is presented as an autopoetic system that generates the elements of which it consists.

The economy is an organizationally or operationally closed system. This implies that the functions performed by the various actions are interrelated and form a closed system in which the performance of each function is, in one way or another, conditioned by the performance of all other functions. More specifically, the circular organization of functions performed by various economic actions, gives rise to such a sequence of actions, which determines the reproduction of the very circular organization, that is, the operational closure. This operational closure of the system cannot be broken anywhere without destroying the system itself.

As a result of this approach, it becomes clear that the self-organization of a market economy is carried out with the help of recursive processes (commodities are produced by commodities, prices are formed on the basis of prices, actions give rise to actions, satisfaction of needs gives rise to new needs, etc.). Recursive processes in the economic system, as well as in other complex nonlinear systems, give rise to "eigenvalues", or, in the language of mathematicians, "fixed points". Equilibrium prices of goods are such «fixed points» to which, as a result of recursive processes, actual market prices of goods tend, and thus ensure the system itself strives for general economic equilibrium.

Since the market economy is both an organizationally closed and a causally open system, it strives simultaneously for equilibrium within the system (between intrasystem processes) and disequilibrium with the external environment. Equilibrium and stability within the system are necessary to maintain the integrity of the system, and disequilibrium and instability in relation to the environment are a necessary condition for the development of the system. Therefore, the economic system has the ability of homeostasis and, at the same time, can develop, change its state and structure, respond to environmental influences and adapt to it.

In the process of evolution of a market economy, competition gives rise to monopolies. Over time, the economic power of private monopolies increases, which makes it necessary to increase the regulatory role of the government. Market self-regulation is increasingly being replaced by government regulation. The history of economic development shows that the share of the competitive sector in it is decreasing, while the share of the regulated sector is increasing. In the monopolized sector, as a private regulated segment of the economy, the distribution of society's income is carried out in favor of a group of private monopolists. And in the public sector, there is a process of reverse redistribution of income for the benefit of society. A monopolized sector increases economic inequality in society. But as long as the government is under the influence of large monopolies, it is unable to neutralize the monopolistic distribution of national income. The consequence of this is a tendency towards a decrease in the purchasing power of society relative to its production capabilities and a lag in demand from supply. Demand has to be artificially supported by economic policies that create credit expansion. The economy faces systemic problems and, over time, the replacement of market self-regulation with government regulation based on economic models and digital technologies is inevitable.

At present, the neoclassical paradigm is discredited, while the new one does not yet exist. That is, a kind of vacuum of fundamental ideas has arisen in economics, shared by the overwhelming majority of economists, on the basis of which the normal development of this science could continue. This creates huge problems both in economics itself and in economic education and economic policy. But at the same time, the current situation frees scientific thinking from neoclassical dogmas, creates motivation and an intellectual atmosphere for enhancing scientific creativity and searching for non-standard approaches to solving scientific problems.

We cannot understand how the modern monopolized economy functions if we do not first understand how the competitive economy functions; we cannot understand how the economy should be centrally regulated if we do not understand the self-regulation of the decentralized economy; we cannot understand the market economy at all if we do not understand the functioning of the subsistence economy at the subjective level; we will not be able to know what value and market prices are if we do not first know subjective values and subjective valuations etc., etc. This study presents my vision of these problems.

In conclusion, the proposed study focuses not so much on criticism of the existing paradigm as on the search for alternative approaches in the interpretation of economic reality.

“We cannot solve our problems with the same thinking we used when we created them.”

A. Einstein

“The difficulty lies, not in the new ideas, but in escaping from the old ones...”

J. M. Keynes

Introduction

1. The search for truth at the intersection of different sciences is particularly effective in the current fragmentation of scientific knowledge. Interdisciplinary research is carried out in orthodox economics. However, the achievements of related disciplines or the scientific results of various research programmes attract the attention of mainstream representatives only when they do not contradict neoclassical dogmas. The impression remains that they are conducting such research not so much for the knowledge of economic reality, but for the «scientific» substantiation of their dogmas. But the unwillingness of the orthodox to critically rethink apparently outdated ideas leads to self-isolation from modern science. “But no branch of human inquiry has cut itself off from the whole – and from the other social sciences – more than economics. ... Today’s professional economists, by contrast, have studied almost nothing but economics. They don’t even read the classics of their own discipline. Philosophy, which could teach them about the limits of the economic method, is a closed book. Mathematics, demanding and seductive, has monopolized their mental horizons. The economists are the *idiots savants* of our time.” (Skidelsky, 2016.) Such an arrogant and disrespectful attitude towards other sciences during the many decades of its existence has led the neoclassical theory to a dead end. Neoclassicists are not ready to receive unexpected new knowledge, to revise the basic ideas of their theory. But without taking into account the latest achievements of modern science, economic theory will not be able to overcome the crisis in which it found itself due to the "reinforced concrete dogmatism" of the neoclassicists.

2. Due to inadequate methodology, mainstream gives a false explanation of economic reality and contains many logical inconsistencies. Neoclassical theory does not take into account that market economy is a complex dynamic system, for the study of which, as a methodological basis of research, empiricism, formal logic and linear modeling are insufficient. Today, these methods have become shackles that prevent the further development of economics. The use of empirical methods and formal logic is a necessary stage in the development of various sciences. But at a certain stage in the development of

science, these methods exhaust their possibilities of cognition, and it becomes necessary to use new methods for synthesizing the accumulated scientific material into a new paradigm. In this context, the emergence of synergetics is significant as a new direction of interdisciplinary research and, like dialectics, has acquired the significance of a general scientific method of cognition.

3. Synergetics. As an independent discipline, economics was formed at the end of the 18th century, i.e. in the era of Enlightenment, when physics and mathematics were considered the ideal of science. The successes of classical physics determined the dominance of the Newtonian paradigm and the mechanistic worldview in science. It was believed that the laws of Nature and causality that exist in the Universe determine the possibility of absolute prediction of all phenomena. It was believed that there is no chance in Nature, that there is a linear relationship between cause and effect, that the Universe is in an equilibrium state, stable and predictable, and uncertainty was considered a consequence of simple ignorance of the laws of nature. Of course, classical political economy was strongly influenced by the ideas that prevailed in its era. But the further development of economic science could not get rid of the deterministic understanding of economic reality. New opportunities for scientific knowledge of economic realities are provided by synergetics, which studies the laws of functioning and development of complex systems. “For the past 150 years, economic theory has viewed agents in the economy (firms, consumers, investors) as perfectly rational decision makers facing well-defined problems and arriving at optimal behavior consistent with — in equilibrium with — the outcome caused by this behaviour. ... Complexity economics sees the economy ... as not necessarily in equilibrium, its decision makers (or agents) as not superrational, the problems they face as not necessarily well-defined and the economy not as a perfectly humming machine but as an ever-changing ecology of beliefs, organizing principles and behaviours. The approach, which has now spread throughout the economics profession, got its start largely at the *Santa Fe Institute* (SFI) in the late 1980s. But the basic ideas of complexity economics have an even longer history in economics. Even before Adam Smith, economists noted that aggregate outcomes in the economy, such as patterns of trade, market prices and quantities of goods produced and consumed, form from individual behaviour, and individual behaviour, in turn, reacts to these aggregate outcomes. There is a recursive loop. It is this recursive loop that makes the economy a complex system. ... Whichever the case, complexity asks how individual elements react to the current pattern they mutually create, and what patterns, in turn, result.” (Brian, 2021, 136.)

4. Synergetics explores how, in complex dynamic systems, random and chaotic movements of many of its individual elements can be transformed into order in the entire system and determine the trajectory of its development? That is, how do processes occurring at the micro level determine macro processes and vice versa? This is precisely what is still an unresolved problem in the theory of the market economy. How is economic order born out of the chaos of independent actions of agents? How does the "invisible hand" of Adam Smith work? This issue is the focus of this study. The purpose of this work is to propose a concept of a new non-linear economic paradigm that will more adequately explain economic realities and can become the basis for the development of more effective applied models and economic policy.

5. Pioneers in the development of non-linear economic theory is the *Santa Fe Institute*. The works of this institute are of great interest to scientists. At the same time, their concept takes as a basis the neoclassical economic paradigm, which was created by economists on the basis of a linear worldview. “Because its assumptions are a widening of the neoclassical ones, complexity economics is neither a special case of equilibrium economics nor an addition to it¹³⁷. On the contrary, it is economics done in a more general way. This broadening of principles is not due to a shift in ideology. It is due, I believe, to new tools becoming available to economics: methods to think about decision making under fundamental uncertainty and to deal with nonlinear dynamics and nonlinear stochastic processes. Above all, it is due to computation¹³⁸, which makes it possible to model arbitrarily more complicated and more realistic behaviour.” (Brian, 2021, 143.)³

Research at the *Santa Fe Institute* enriches neoclassical economics with insights from complex systems theory. However, these studies still take neoclassical theory as a basis, which, in itself, is linear, and expand its premises and principles (which became possible due to the fact that “new tools became available in economic theory”). Therefore, the neoclassical theory itself is presented as a special case of the new theory. In other words, in the paradigm of the neoclassical theory taken as a basis, nonlinearity is introduced from the outside. Our concept proposes not an extension of the prerequisites and principles of the already existing theory, but a fundamentally new paradigm, obtained on the basis of dialectical rethinking of the basic economic categories and the links between them.

6. From the beginning, neoclassical theory was created on the basis of linear thinking and formal logic. In contrast, dialectical logic presupposes non-linear thinking. The dialectical rethinking of fundamental economic categories already initially assumes the nonlinearity and complexity of the new paradigm, according to which the economy is presented as a complex nonlinear system of social (economic) actions organized according to a network pattern. Despite the differences between dialectics and synergetics, the similarity of many provisions and conclusions regarding the functioning of the economy is due to their understanding of the economy as a non-linear system. This concerns the processes of evolution of the economic system, due to the introduction of historicity into the analysis;⁴ the role of positive and negative feedbacks in explaining the mechanisms of self-regulation; the cyclical nature of the functioning of the economy as a complex system; processes of interaction of the economic system with the external environment, etc.

³ “Complexity economics is not a special case of neoclassical economics. On the contrary, equilibrium economics is a special case of nonequilibrium and hence complexity economics. Complexity economics, we can say, is economics done in a more general way.” (Brian, 2015, 32.)

⁴ “One of the main strengths of political economy is its sense of history, of historical time—time that makes a real, irreversible difference, and that continually creates new structures. By contrast neoclassical economics handles time poorly (Smolin, 2009, 2013). At equilibrium an outcome simply persists and so time largely disappears; or in dynamic models it becomes a parameter that can be slid back and forth reversibly to denote the current outcome (Harris, 2003). This has made many economic thinkers uncomfortable (Robinson, 1980). In 1973 Joan Robinson said famously, “Once we admit that an economy exists in time, that history goes one way, from the irrevocable past into the unknown future, the conception of equilibrium . . . becomes untenable. The whole of traditional economics needs to be thought out afresh. Certainly, in rethinking this issue of time, complexity economics accords with political economy. . . . The economy at all levels and at all times is path dependent. History again becomes important. And time reappears.” (Brian, 2015, 23.)

7. At any given moment, the actual state of the economic system is determined by the interaction of two oppositely directed processes - 1) its striving for a state of absolute equilibrium, i.e. to its absolute integrity, and 2) destabilizing influence of the external environment, aimed at destroying the integrity of the system and its removal from the equilibrium state. Accordingly, complexity economics implies a constant striving for an equilibrium that is never reached. It is always in the process of finding an equilibrium, self-completing the missing parts to maintain the integrity and synchronization of intrasystem processes that the external environment seeks to mismatch. The economy is always in the process of self-reproduction, self-development and "creative destruction" (Schumpeter). "It is a different way of thinking about the economy. It sees the economy not as a system in equilibrium but as one in motion, perpetually "computing" itself—perpetually constructing itself anew." (Brian, 2015, 24.)

8. In the studies of the *Santa Fe Institute*, much attention is paid to the most important processes that determine the nonlinearity of the economic system and are determined by the openness of this system and its interaction with the external environment. In this study, openness and disequilibrium in relations with the external environment, of course, is assumed, but attention is focused mainly on the study of the economic mechanism of self-regulation, which ensures not itself the *equilibrium* of the system, but only the *striving* for it. This is important to understand because the striving for equilibrium ensures the ability of the economy to homeostasis. Without this, we will not be able to understand the functioning of either the competitive market economy or the modern monopoly economy; we will not be able to answer a number of questions such as - Why did a competitive economy transform into a monopolized economy? Why did the financial sector acquire hypertrophied significance and size? Why do economic crises occur? Why is economic inequality increasing within and between countries? Why has a decentralized economy historically tended to become more centralized? Why is market self-regulation increasingly being supplanted by regulation? How should economic policy react to these processes?

9. In the proposed concept, the economy of pure competition is presented as a system of economic actions that has a network organization, in which each action is connected with other actions. Due to this, various positive and negative feedbacks are formed in the network of economic actions. "Positive feedbacks in fact are very much a defining property of complex systems—or I should say more accurately, the presence of positive and negative feedbacks acting together is. If a system contains only negative feedbacks (in economics, diminishing returns) it quickly converges to equilibrium and shows "dead" behavior. If it contains only positive feedbacks, it runs away and shows explosive behavior. With a mixture of both it shows "interesting" or "complex" behavior. With positive feedback interactions add to each other and cause structure, in time to be offset by negative forces and dissipate. Structures then come and go, some stay to be further built on and some lead to further structures. The system is "alive." " (Brian, 2015, 17.)

Feedbacks are a necessary condition for self-regulation in nonlinear dynamic systems. Such systems are subject to cyclic processes of self-excitation and decay, which, in the economic system, take the form of economic cycles. Such systems are subject to cyclical processes of self-excitation and attenuation, which, in the economic system, take the form of

economic cycles. These and other properties of living dynamic systems have been studied in synergetics, complexity economics, constructivism, and the theory of neural networks. However, all these theories, as a methodological basis for economic research, can become relevant only after the economic system itself is presented as a complex non-linear system of economic actions. And this is possible only on the basis of dialectical analysis. This is exactly what we tried to do in this study.

10. **Dialectic.** Neoclassical theory, as it exists today, found its contours in the intellectual environment of empiricism, positivism, and pragmatism. Naturally, the methods of scientific research used by the economists who laid the foundations of the modern mainstream were mainly due to the corresponding philosophical ideas, in sharp contrast to the ideas of dialectics. Dialectical research methods were categorically unacceptable for all those economists on whose ideas the neoclassical paradigm was built. Moreover, in general, in modern Western science, of which the economic mainstream is also a part, a negative attitude towards dialectics dominates. It is not superfluous to mention, also, that the views of the post-positivist Karl Popper played a significant role in shaping such an attitude of modern economists towards the dialectic. One of the influential philosophers of science of the 20th century, who had a great influence on the worldview of the Western intelligentsia and enjoys great prestige among economists, he spoke sharply negatively about dialectics, and about the philosophy of Hegel and Marx in general.⁵ K. Popper was by no means the only influential scientist who had such a disrespectful and even hostile attitude towards dialectics. Such a unanimous rejection of dialectics in the scientific community of Western economists was reflected in the development of economic science, which for many years has been in a state that cannot be called otherwise than a "crisis of science".

11. To paraphrase M. Blaug, we can say that "dialectic is too serious a thing to be left only to philosophers". At the same time, it should be noted that the interest of Western economists in the doctrine of K. Marx and, accordingly, in dialectics, is beginning to grow. But in general, dialectical research methods have not yet received the attention they deserve. One of the goals of the proposed study is another attempt to once again draw the attention of economists to the scientific potential of dialectical research methods.

The dominant methods of cognition in the mainstream, based on formal logic and empiricism, are diametrically different from those based on dialectical logic. These are fundamental differences that show up in all key aspects of the methodology. However, the central point of disagreement is their understanding of the "law of contradiction". Formal

⁵ In the acclaimed treatise *The Open Society and Its Enemies*, long considered a reference book for Western intellectuals, he writes: "But as far as Hegel is concerned, I do not even think that he was talented. his style is 'unquestionably scandalous'. And as far as the content of his writing is concerned, he is supreme only in his outstanding lack of originality. There is nothing in Hegel's writing that has not been said better before him." (Popper, 2013, 246) And further, referring to Schopenhauer and agreeing with him, he writes: "Schopenhauer, who had the pleasure of knowing Hegel personally and who suggested 13 the use of Shakespeare's words, 'such stuff as madmen tongue and brain not', as the motto of Hegel's philosophy, drew the following excellent picture of the master: 'Hegel, was a flat-headed, insipid, nauseating, illiterate charlatan, who reached the pinnacle of audacity in scribbling together and dishing up the craziest mystifying nonsense. This nonsense has been noisily proclaimed as immortal wisdom by mercenary followers and readily accepted as such by all fools,..." (Ibid, p. 247)

logic states: "everything is identical to itself, or nothing contradicts itself". Dialectical logic states: "nothing is equal to itself, or everything contradicts itself". Without contradiction, this unity of opposite definitions in the essence of things, there is no emergence, change, movement, life, development, etc. "Contradiction is what moves the world in general and it is ridiculous to say that contradiction cannot be thought." (Hegel, 2010, 285.)

12. Contradiction is the source of activity of everything that contains irreconcilable, mutually exclusive opposites. Each of them is the supplement of the opposite side to complete a specific integrity and create that unity, outside of which none of them can exist. In economic reality, production and consumption, product and resource, utility and cost, etc. cannot exist without each other. At the same time, they are a direct opposition to each other and, in this sense, there are irreconcilable, mutually exclusive opposites. Each of the sides is not just something "other" in relation to its opposite, but is "its other" and, consequently, is "its other" of "its other". But together, they form an economic action, an economic good, an economic value, as independent wholes.⁶

In various spheres of reality, the emergence and resolution of contradictions manifest themselves in various specific forms. Since in the economy all subjects, their actions, their relations to objects and the objects themselves, are a unity of irreconcilable opposites, they all contain a contradiction in themselves. These are existential contradictions inherent in the very essence of these phenomena, which determine their internal instability, variability and finiteness. Polar opposite sides do not withstand the "tension" of internal contradiction within the integrity of one and the same something. They strive to "break out" of it and unite with "their other", which exists in something else, in another integrity. This is what leads to the interaction of things, in the process of which the interacting wholes are destroyed, and a new one is created.⁷ The resolution of the contradiction causes "creative destruction", the disappearance of some and the emergence of other structures. And this is just movement in one form or another. But as a result of this movement, reality changes, in which a new configuration of interacting forces (interests, needs, tendencies, properties) arises, and again

⁶ "Difference in itself is essential difference, ... Because each is for itself insofar as it is not the other, each shines in the other and is only insofar as the other is. The difference of the essence is thus the opposition according to which what is differentiated does not have an other in general but instead has its other opposite it. That is to say, each has its own determination only in its relation to the other, ... and the same holds for the other. Each is thus the other's own other." (Hegel, 2010, 182-183) "With the positive and the negative, one thinks that one has an absolute difference. Both, however, are in themselves the same and one could, for that reason, name the positive also the negative and, vice versa, the negative the positive. In this way, too, assets and debts are not two particular types of assets, obtaining for themselves. The same thing that in the case of the one, as debtor, is something negative is, in the case of the other, the creditor, something positive. Positive and negative are thus essentially conditioned by one another and only are [what they are] in their relation to one another. The north pole on a magnet cannot be without the south pole and the south pole cannot be without the north pole. If one cuts a magnet in half, one does not have the north pole in the one piece and the south pole in the other." (Ibid, pp. 184-185)

⁷ An analogy arises with the interaction of various pieces of a magnet. Each pole of a magnet tends to separate from its opposite in a given piece of magnet, and reunite with the same pole of another magnet. As a result of the interaction, both magnets cease to exist independently, but a new single magnet with opposite poles appears.

polarization of the interacting parties occurs. Accordingly, new contradictions arise, which are also resolved, and so on. This process cannot stop and goes on infinitely.

13. In the economy, the emergence and resolution of contradictions gives rise to economic actions, the totality of which is economic activity. Economic actions are expedient actions and, therefore, first require decision-making, the essence of which always comes down to a choice between means and results, resources and products. And the choice as such always contains the opposition of interests. The clash of opposing interests gives rise to a contradiction, the resolution of which is the adoption of a decision, followed by action. But the results of actions give rise to new opposing interests and new contradictions, and so on.

Consider an elementary act of a market transaction between a seller and a buyer. Each side has what the other side needs. One side has goods and the other side has money. Potentially, they can get what they need from each other. This is *an accordance of interests*. But to do this, they must give them what they have and also need as a medium of exchange, providing them with alternative opportunities for market exchange. Therefore, everyone wants to achieve a favorable proportion of exchange. But what is profitable for one side is unprofitable for the other. But that's *a conflict of interests*.⁸ Thus, the relationship of the parties is the accordance of conflicting interests, otherwise, the unity of mutually exclusive opposites. This is the contradiction.

In order for the exchange act to take place, the contradiction must be resolved, i.e. the parties must come to an agreement, followed by an action - an exchange. If agreement is not reached, then the search for other counterparties will continue and everything will be repeated. If an agreement is reached, then the seller of the goods will remain with the money, turn into a buyer and enter into interaction with another seller. And the buyer will remain with the goods and turn into a consumer of this goods and, therefore, into a producer of another goods. Consequently, in the future, he will also interact with the buyer of the produced goods. Thus, what appears as a result of the resolution of the contradiction is again opposed to something else. Every action gives birth to another action; as a result of action, reality changes; a new conflict of interests arises; a new decision is made; it is followed by a new action and everything repeats.

14. In any case, the decision-making process is always associated with the resolution of the contradiction and the implementation of new economic actions. This applies not only to decisions about the acts of exchange discussed above, but also about other economic actions, including consumption and production. For in the final analysis, both production and consumption are also *exchange*. Of course, production and consumption can be different actions of different subjects, when one of them consumes what the other produces. But they can also be one and the same action of the same subject, if he produces one good by consuming another. In this case, both production and consumption are different aspects of the same process of converting resources into products, or, in other words, there is an exchange

⁸ Thus, each side relates to the opposite side at the same time, both positively and negatively. But this is a contradiction. Exchange means that what one side gives, the other side receives. It is in the interests of each to receive from the opposite side as many goods as possible and give as little as possible. But the act of exchange implies this or that exchange proportion. Parties cannot give each other more and receive less from each other. The agreement of the parties is the resolution of this conflict of interests.

of resources for products. At the same time, the subject wants to create as many products as possible, but, at the same time, spend as few resources as possible. That is, there is also a simultaneous positive and negative attitude towards produced and consumed goods. Again there is a contradiction of interests of the subject. And again, the decision on each specific project will either be accepted or rejected. One way or another, the contradiction is resolved and the tension is eliminated. But in any case, the resolution of a contradiction gives rise to new contradictions, which must also be resolved and give birth to new actions, etc.

15. The economic mechanism for the emergence and resolution of contradictions also operates at the macro level and sets in motion the system of economic actions as a whole. Thus, opposite processes take place in the market of final products and the market of primary resources. In the market of final products, entrepreneurs sell final products for money, and in the market of primary resources they buy primary resources with this money. But consumers, on the contrary, in the final products market buy what entrepreneurs sell, and in the primary resource market they sell what entrepreneurs buy. At the same time, goods that, from the producers' point of view are *products*, from the consumers' point of view are *resources*. But the goods, which from the point of view of the former are *resources*, from the point of view of the latter are *products*.

They are symmetrical, mirror-opposite relationships between two opposite sides. They have opposing interests, which are satisfied by the exchange of goods for money in one market and the reverse exchange of money for goods in another market. But if we abstract from the "money veil" and consider market processes in their pure form, then from the point of view of the entire system, there is an exchange of final products produced by entrepreneurs in the production sector for primary resources reproduced by the owners of production factors in the consumption sector. As a result of the exchange, the contradiction is resolved, eliminated. Each party in the exchange receives at its disposal what it needs. But another contradiction arises.

As a result of the exchange, producers become owners of primary resources, and consumers become owners of final products. Both need these goods to satisfy their needs. But as a result of satisfying production needs, final products are produced, which are needed, again, for exchange for primary resources. And as a result of satisfying consumer needs, primary resources are reproduced,⁹ which are also needed, again for exchange for final products. Everything is repeated and cannot stop as long as this system of economic relations exists.

16. The actions of agents, as opposite sides of economic interaction, not only differ from each other, but are also opposite. At the same time, the *actions* of the parties together constitute one and the same act of *interaction*, and do not make sense without each other. Each side of the opposition both posits and denies the other side, relates to it both positively and negatively, and therefore, constitutes a whole opposition or is opposite to itself. This opposition to itself is just a contradiction. This contradictory unity of counter and mutually exclusive interests gives rise to a complex system of interactions between actors, which is the economy as a system of economic actions.

⁹ This process will be explored in more detail later.

17. Be a producer, consumer, product, resource, etc. - all this is not the inalienable properties of subjects or objects, but the functions that they perform. Man produces not because he is a producer. On the contrary, he is a producer because he produces, because he performs this function. But it performs not only this function. Therefore, he is not only a producer. When performing various functions, he becomes, respectively, a consumer, a seller, a buyer, an investor, a saver, etc. A similar statement is true also for other economic phenomena. Moreover, the various functions performed by subjects, objects, processes are interconnected, all the time transforming into each other, appearing and disappearing. These are the invisible "threads" that bind them together, forming the integrity that we call the economy. At the same time, to ensure the integrity of the economy, it does not matter at all who exactly, or what exactly performs this or that function. The main thing is that all those functions that are necessary for the normal functioning of the economic system as a whole be fulfilled..

18. The sequence of emergence and resolution of contradictions is organized into a circular pattern, and is endlessly repeated, being a source of ongoing activity and economic interaction of subjects. For the resolution of these contradictions implies not only the *actions* of the subjects, but the *interactions* between them. Since, each subject produces goods for others, and for this he consumes goods produced by others. But this circumstance, in turn, makes market exchange necessary. When one contradiction is resolved, a new one is born, and so on. Moving in a circle, economic contradictions cannot be finally resolved, therefore, they arise again and again in the same sequence, repeat, which manifests itself in the form of incessant economic activity. But over time, as a result of evolution, the economy is transformed from a competitive economy to a monopolistic one, and then to a financial monopoly economy, as a result of which the economy comes to a dead end of stagnation. A systemic problem appears when the mechanism for resolving economic contradictions that arise within the system ceases to work smoothly.

When, as a result of monopolization, financialization and increased inequality, this mechanism breaks down, the economy ceases to function normally. The economy falls into an attractor funnel from which it is impossible to get out and inevitably approaches a systemic crisis. The contradiction already arises between the economic system and the external environment (social, political, cultural, natural, etc.), the resolution of which implies the death of an obsolete economic system and the birth of a fundamentally new one. This is the culmination of development, which marks the death of one and the birth of another economic system.¹⁰

19. If we want to not only describe but also understand how the economy functions, then we must perceive the economy as a complex dynamic system. For reality itself is not a frozen set of phenomena, but a living process in which these phenomena are interconnected,

¹⁰ The self-regulating decentralized market economy is being replaced by a centralized, systematically regulated economy. But this will not mean a complete rejection of self-regulatory mechanisms and their replacement with Soviet-style planning. In a transformed form, the consumer market (and, until full automation of production is achieved, also the labor market) is likely to remain an integral part of the regulated economy, as an economic mechanism for revealing consumer preferences. Thus, elements of decentralization and self-regulation will be retained in one form or another.

mutually transform into each other according to certain laws, and in this mutual interweaving they form a single economic organism. This means that also the theory that reflects these phenomena and processes must be a single system of internally interconnected concepts. That is, economic categories should be as fluid and flexible, passing into each other, organically interconnected (and not frozen categories, artificially “glued” to each other), as are the economic phenomena and processes themselves. But to reveal and understand these interrelations is possible only with the help of the dialectical method.

20. We have shown the different relation of formal and dialectical logic to the law of contradiction only to illustrate the differences between formal-logical and dialectical methods of explaining economic realities. But this, of course, does not exhaust the differences between these research methods. These differences are manifested in almost all key methodological problems - be it the understanding of historicism, the relationships between essence and phenomenon, whole and part, possibility and reality, freedom and necessity, etc. Differences in the understanding of these problems radically change the interpretation of economic reality. Accordingly, the conclusions drawn from the study of the economy by dialectical methods differ radically from the neoclassical interpretation of how the market economy functions and how equilibrium and economic cycles are formed in it. According to their methodology, neoclassicists study only economic phenomena and external, visible connections between them. But such an eclectic theory cannot cognize the invisible inner connections between phenomena. Accordingly, it cannot cognize the essence of the economy and those deep structures that determine the integrity of the economy and the laws of its functioning.

By direct observation, it is impossible to perceive the economy as a single system, since economic facts are often perceived as independent of each other, and, in some cases, as opposite and even mutually exclusive. Of the many connections that exist between phenomena, by external observation it is impossible to distinguish random connections from necessary, system-forming ones. The study of an economic system implies the study of just internal, backbone relationships between phenomena hidden from external observation. Their study is possible only by dialectical methods, which are completely ignored in neoclassical theory. Inadequate research methods are one of the main reasons for the current crisis in economics.

21. **Constructivism.** A close connection exists not only between synergetics and dialectics, but also between it and constructivism. However, synergetics studies complex open systems in general, while constructivism concentrates on the study of living cognitive systems. In synergetics itself, the processes of life and cognition are only applied aspects of research.

According to constructivism, a person does not receive knowledge about reality directly from objective reality, but he himself “constructs” reality in his mind. Therefore, such knowledge depends not only on the properties of the cognized object, but also on the values, meanings, motives for cognition of the subject and on the language of description, on

the tools of cognition. At the same time, knowledge is not born in separate individuals, but is constructed by society.¹¹

For example, *understanding* a phenomenon usually implies that what we do not know is reduced to what we know. That is, we associate it with other, already known phenomena, we consider it in a wider coordinate system.¹² “A completely different “understanding” is characteristic of social things (this term also covers human actions). In this case, it is not enough to relate the fact under consideration to other facts and things. I cannot understand a social thing without reducing it to the human activity that created it and relating this human activity to the motives from which it arises. I will not understand an instrument without knowing the purpose for which it was created; a sign or symbol without knowing what they stand for; an institution if not familiar with its aims; a work of art, if I do not delve into the artist's idea, which is embodied in this work.” (Schutz, 2003, 104.)

22. Man perceives the physical properties of objects. Although there may be differences in the perception of observers, they can be explained by objective reasons. This reality is what the constructivists call reality of the first order. But there is another aspect of reality. These are the meanings and values that man himself assigns to these objects. This world of meanings and values constructivists call the second-order reality. Unlike first order reality, here objects do not possess objective properties. This world is the result of communication processes, the result of social construction.¹² (Cm.: Watzlawick, 1997.)

For example, the physical properties of gold refer to first-order reality. Experiments can be used to determine these properties. But gold also has economic value and its value has nothing to do with its physical properties. As an economic value, gold exists in a completely different dimension and is perceived by a person as a second-order reality, that is, as a reality constructed by him in his mind. This is the world of meanings and values that are created by man, that is, a social reality that exists not in the physical, but in the intersubjective space. These are collective representations that are constructed in the minds of people by their joint efforts in a network of interactions and communications. But outside of consciousness, in physical reality, there is no economy, no politics, no culture.

23. Through the senses, a person perceives the external facts of reality, forms ideas about them in his mind. But the sense organs cannot directly perceive the causal relations between them, they cannot directly distinguish the essential connections between phenomena from the non-essential, accidental ones. He must logically complete these connections himself in his mind and, thus, construct a mental model of reality. Without the logical conjecture of these connections, external reality cannot be perceived as a whole, consisting of parts, as a system consisting of elements, and, therefore, cannot have any meaning for a person. For “the truth is the whole” (Hegel). Only in this way can he create a holistic picture

¹¹ “The social world, in which I am bound by various relationships with others, is for me an object subject to semantic interpretation. It makes sense to me, but I'm sure it also makes sense to others. Moreover, I believe that my actions directed towards others will be understood by them in the same way as I understand their actions directed towards me. More or less naively, I assume the existence of a common coordinate system for my actions and the actions of others.” (Schutz, 2003, 109).

¹² «... giving a new form of expression to Shakespeare's remark, "There is nothing either good or bad, but thinking makes it so." The aspect of reality in the framework of which meaning, significance, and value are attributed is called reality of the second order.» (Watzlawick, 1984, 237-238.)

of the world that is understandable to himself, which will allow him to more or less effectively coordinate his actions and realize his goals.

24. Since consciousness cannot go beyond its own ideas, and since there are no objective criteria for knowledge, a person is forced to turn to indirect methods of verifying his knowledge. For example, 1) the results of actions carried out on the basis of this knowledge must be consistent with the goals; 2) the results of observations must be confirmed in various acts of observation; 3) the results of observations by different observers must match each other; 4) different observations and different models must confirm each other and fit logically into a single system of world perception. Also, one or another concept can be recognized as "true" on the basis of mutual agreement of observers. In this case, the sharing of the same concepts makes it possible to coordinate the actions of various actors and achieve common goals.

Dialectics, synergetics, and constructivism, as a methodological basis for the scientific study of economic reality, organically complement each other.

Section 1.

Purposeful activity

Since economic activity is one of the forms of manifestation of purposeful activity in general, it is obvious that research should begin with the primary element of activity - action. All actions mutually condition each other, forming the activity as a complex nonlinear system of actions.

1.1. Goal

1. "Everything flows and moves, and nothing remains," Heraclitus claimed. Reality is changeable and contains various possibilities of its transformation. But which of these possibilities will be realized - it depends on a random combination of circumstances. Possessing reason, a person cognizes these possibilities and the laws of nature, according to which these transformations take place. Having known these possibilities, he has a desire not to leave these changes of reality to chance, but to realize those of them that correspond to his needs and purposefully create the desired reality. The very knowledge that he has the ability to bring reality into line with his needs gives rise to dissatisfaction with the existing reality and a desire to change it. In other words, a contradiction arises in the mind of a person between him and reality, between what is and what should be according to his understanding, that is, between what *is* and what *should be*. This contradiction between what is and what should give birth to a goal. And the goal is the desire to satisfy the need and resolve this contradiction. "Need and drive are the examples of purpose lying closest at hand. They are the *flit* contradiction that takes place *within* the living subject itself The *satisfaction* produces the peace between the subject and object, ..." (Hegel, 2010, 277.) At the same time, it should be taken into account that the need underlying the goal is not a contradiction between the existing reality and a person's ideas about what should be, but between the very ideas about what is and what should be in his mind, "within the living subject itself". For the existing reality is given to the subject only as a system of representations, a mental construct in his mind. He does not know what reality really is outside of his consciousness.

2. However, the knowledge of possibilities generates only *potential needs*. Their implementation requires practical actions. And for this you need to own the appropriate means. The subject's will must extend over objects so that he can, by influencing them, change reality in the desired direction. Potential needs are transformed into actual needs only

when the subject owns the real means of satisfying them and, therefore, when only from his will, from his decision will depend which needs to satisfy, and which ones to abstain. For the means are limited, and reality contains many possibilities for its transformation. But different possibilities give rise to different needs. Some are more desirable, others are less desirable, and some are contradictory and mutually exclusive. A person must make a choice. For the choice of one alternative means the rejection of others.

Having made a choice, the subject sets a goal, finds means and implements it, and as a result receives the realization of the chosen possibility of transforming reality. But this realized possibility is a new reality, and as such, contains new possibilities that give rise to new potential needs, and everything is repeated. The choice of goals and actions of a person are aimed at changing reality in such a way that it contains more opportunities to satisfy his future needs and would provide him with more freedom of choice.

3. For making a decision and choosing a goal, as well as for its implementation, strong-willed efforts are needed. "Of two things both of which he cannot have together he selects one and gives up the other. Action therefore always involves both taking and renunciation." (Mises, 1996, 12) It is impossible to choose one desired good without giving up other desirable goods. But to make such a decision and abandon them requires a will effort. In other words, these are efforts associated with *abstinence* from satisfying alternative needs. In addition, the achievement of the goal is also associated with the *risk* of losing means. For the results will be obtained only after spending the means. But results are not guaranteed. If the results do not match the goals, then the funds will be lost forever. The presence of risk also necessitates volitional efforts to achieve the chosen goal. The presence of risk also requires a determined effort to achieve the chosen goal. "The will will make such decision only after approval of reason which, in the course of motivation, is guided not by casual, momentary, but by the general, reasonable needs of the "Ego." Accordingly, decisions accepted by the will are based not on accounting of feeling of the comfort or discomfort, but on the arguments and estimations of reason which is based on the general interests of subject. These are rational decisions." (Leiashvily, 2012, 15-16.)

1.2. Means

1. To achieve the goal, means are needed. They are part of existing reality and are objects defined through goal. The goal is something external to the object itself. Therefore, objects in themselves are not means. They are means only in relation to goals. "A means is what serves to the attainment of any end, goal, or aim. Means are not in the given universe; in this universe there exist only things. A thing becomes a means when human reason plans to employ it for the attainment of some end and human action really employs it for this purpose. Thinking man sees the serviceableness of things, i.e., their ability to minister to his ends, and acting man makes them means. It is of primary importance to realize that parts of the external world become means only through the operation of the human mind and its offshoot, human action. External objects are as such only phenomena of the physical universe and the subject

matter of the natural sciences. It is human meaning and action which transform them into means.” (Mises, 1996, 92.).

Goals and means are correlative concepts. The goals can be real only if appropriate objects are found that can serve as means for these goals. Goals without means are not actual goals, but only *potential goals* that will become actual only after the appearance of means. Also, objects can be perceived as means only if there are actual goals for the realization of which they are needed. There is no goal without means or means without goal.

2. The fundamental property of means is that it “*is such a means by virtue of its vocation that it be used*”. (Hegel). In the process of achieving goals, means are sacrificed (wear out, destroyed). This means that the realization of goals and the satisfaction of needs must be “paid for” by means. In this sense, we can say that every action is an “exchange” of means for results.

The ability of means to serve goals and satisfy needs is utility. But, as a result of this “exchange”, along with the means, its utility is also lost. This lost utility is perceived by the subject as a *cost*. In other words, both utility and cost are the *subjective attitude* of a person to objects that serve as means, respectively, before and after satisfaction of a need (realization of a goal). “The limited nature of objects, serving as means, compels the subject to make thrifty use of them, and after their use to consider them as costs, to take into account these costs and compare them with size of the needs satisfied with them. If that which is necessary for realization of ends is not limited, then it is not considered as means any more, and not perceived as costs, the attitude toward it is not careful. This already is not a means, but is a condition of activity. The limited nature of means necessitate to compare the expenses of means with the received results, what can not be said concerning conditions. Realization of ends depends only on presence of conditions. But quantitative definiteness of conditions is not taken into account because of their limitlessness.” (Leiashvily, 2012, 17-18)

Since useful means have to be sacrificed for the sake of goals, the subject treats the means thrifitly¹³ and economically. This implies abstaining from the satisfaction of less important needs. But, as noted, abstinence requires strong-willed efforts. This confirms that purposeful activity is impossible without volitional efforts associated with *risk* and *abstinence*.

1.3. Result

1. The result is a realized goal, otherwise, a satisfied need. As a goal, the idea was embodied in reality and the contradiction between what is and what should be resolved. Thus, the mind generates ideas, and the will realizes them, transforms reality, connects the world of ideas and the real world, creating the world of artifacts, the world of culture. At the same time, we recall that the contradiction between what is and what should exist only in the subject’s mind in the form of a *subjective contradiction between his ideas* about what is and what should be. However, the end result of resolving this subjective contradiction is a real change in reality. For realizing his goals, a person brings into interaction real objects of reality (one of which is

¹³ Thrift should not be confused with greed. Unlike the greedy, the thrifty does not pay only for what he does not need, but for what he needs, he always pays.

the body of the person himself), thereby initiating empirical processes leading to the desired result. “Reason is as *cunning* as it is *powerful*. The cunning consists generally in the activity of mediating, which, by letting the objects, in keeping with their own nature, act on one another and wear themselves out on one another, without meddling immediately in this process, achieves *its* purpose alone.” (Hegel, 2010, 281.)

Man, like the culture he creates, is a "crossing point" of the real and the ideal, the objective and the subjective. It is the unity of spirit and body.¹⁴ The human body is subject to his mind and will.¹⁵ The human body, in which his mind is embodied, is itself one of the objects of the physical world. The mind treats the body as a means to its goals. Through will, a person forces his body, like ordinary objects, to interact with other objects, realizing the set goals.

2. At the same time, the very interaction of objects that serve as means of achieving the goal takes place according to the universal laws of nature. From the point of view of the laws of nature, the processes provoked by the human will, and the processes generated by chance, do not differ from each other. Therefore, knowledge of the laws of nature is a condition for achieving the goal.

“Man is in a position to act because he has the ability to discover causal relations which determine change and becoming in the universe. Acting requires and presupposes the category of causality. Only a man who sees the world in the light of causality is fitted to act. In this sense we may say that causality is a category of action. The category *means and ends* presupposes the category *cause and effect*. Where man does not see any causal relation, he cannot act.” (Mises, 1996, 22.).

The result differs from the effect only in that it was generated by the purpose of a person, his mind and will, and not by natural causes manifested through chance. Natural reality contains countless possibilities for the development of processes. And all of them are consistent with objective laws. But which of these possibilities will be realized - it depends on a random combination of circumstances. Purposeful human activity is a kind of matrix superimposed on this causality of nature and channeling cause-and-effect processes in accordance with his needs. Therefore, purposeful activity does not and cannot contradict the objective laws of nature. It only displaces randomness from nature with reasonable goals, thereby consciously choosing the direction of changing reality from many other possibilities. 3. Just as every effect is the cause of other effects, so every result is a means for new ends and for obtaining other results. “The purpose attained is thus only an object that is also in turn a means or material for other purposes and so on ad infinitum.” (Hegel, 2010, 281.)¹⁶ It

¹⁴ Man is a connecting link that combines the spiritual and physical principles. The spirit of man is the unity of knowledge and feelings, the unity of his intellect and will. The intellect cognizes the world, the will transforms it.

¹⁵ “... the soul ... must master its body, create from it a malleable and convenient instrument of its activity, ... The body is the environment through which I generally come into contact with the outside world. Therefore, if I want to fulfill my goals, then I must make my body capable of translating this subjective into external objectivity.” (Hegel, 1977, 208)

¹⁶ “All objects in which an external purpose is realized equally are, therefore, only a means of purpose. Anything which is intended for the realization of a purpose and is taken essentially as a means, is such a means by virtue of its vocation³⁷ that it be used up.” (Hegel, 2010, 666) “Every goal achieved immediately becomes a means to a new goal, which in turn becomes a means to a new goal,

turns out that every result is a means for obtaining other results, moreover, every result is a realized goal, and the goal, in turn, exists only if there are means that are results themselves. That is, the goal, the means and the result are reflective concepts that are endowed with meaning only through each other, and without each other they have no meaning.

4. In their desire to satisfy their needs, individuals interact, coordinate their actions to achieve joint goals and meet needs that can be satisfied only by joint efforts. In the interaction of individuals, the *results* of the purposeful actions of each individual are *means* for other individuals. Thus purposeful action takes the form of *social action*,¹⁷ which underlies the *division of labor*.

The division of labor is linked to specialization. Separate spheres of collective activity arise – material production, science, education, culture, etc. Each subject produces material, social or spiritual goods for others, while he himself consumes goods produced by others. Feedback occurs. At the same time, under the conditions of the division of labor, everyone specializes in the production of one good, and for this he consumes many different goods, each of which is produced by others, who also produce one good and consume many other goods, etc. This form of organization of connections between the subjects' actions forms a closed system of social actions that has a *network* pattern, in which everyone produces goods for other and consumes the goods produced by others. Satisfaction of one's needs becomes possible only by satisfying the needs of others. The result of collective actions is society as a complex, non-linear system, which, thanks to the feedback described above, is capable of self-regulation, has its own laws of functioning and development.

and thus the kingdom of means stretches on without end. On the other hand, every goal is achieved by the application of a multitude of means, which serve the goal and turn into means, so that the subject uses himself and wastes himself as little as possible. In this inventive prudence, which makes objects work and spend instead of personality, consists, as Hegel says, "the cunning of reason." (Fischer, 1902, 569.)

¹⁷ "We shall speak of "action" insofar as the acting individual attaches a subjective meaning to his behavior – be it overt or covert, omission or acquiescence. Action is "social" insofar as its subjective meaning takes account of the behavior of others and is thereby oriented in its course." (Weber, 1978, 4.) "Thus, money is a means of exchange which the actor accepts in payment because he orients his action to the expectation that a large but unknown number of individuals he is personally unacquainted with will be ready to accept it in exchange on some future occasion.) The economic activity of an individual is social only if it takes account of the behavior of someone else. Thus very generally it becomes social insofar as the actor assumes that others will respect his actual control over economic goods. Concretely it is social, for instance, if in relation to the actor's own consumption the future wants of others are taken into account and this becomes one consideration affecting the actor's own saving. Or, in another connexion, production may be oriented to the future wants of other people." (Ibid., 22.)

1.4. Value

a) Fractality of action

1. The action has a fractal character, that is, it has the property of self-similarity. Action at any level has the same teleological structure, consisting of goal, means and result. A means is anything that serves to achieve a goal. The results of some actions are means to obtain results in other actions. But results are objectified actions. Accordingly, some actions are means for the implementation of other actions, for larger, more distant goals. "Human life is an unceasing sequence of single actions. But the single action is by no means isolated. It is a link in a chain of actions which together form an action on a higher level aiming at a more distant end. Every action has two aspects. It is on the one hand a partial action in the framework of a further-stretching action, the performance of a fraction of the aims set by a more far-reaching action. It is on the other hand itself a whole with regard to the actions aimed at by the performance of its own parts." (Mises, 1996, 45.)¹⁸

Depending on the value system in which this or that action is planned, the subject combines coordination and subordination between different actions in different ways. In other words, depending on the value of the planned results, in each specific case, he views differently the relationships between specific actions through the prism of the correlations between goals, means, and results. For example, if actions are evaluated from an economic point of view, then political and legal actions, respectively, their results, can be considered only as means for the implementation of purely economic goals, for the creation and growth of economic values, and profit. But if the subject realizes political goals, then economic, moral and legal actions can be considered as means for obtaining political values (for increasing power), etc. But in any case, the empirical basis of all actions does not change, and obeys the same laws of nature, society and spiritual life. That is, all actions always make some changes in the existing reality, whether it be living or inanimate nature, physical reality or the spiritual sphere of ideas and emotions. But the value attitude to these changes depends only on the will of the subject, on his decision - in which system of values to plan and evaluate his actions and the changes they produce in the natural, social and spiritual spheres. Value preferences and motivations, unique for each individual or collective subject, determine which values will dominate in the process of making certain decisions and carrying out the corresponding actions.

2. Human activity is based on values. For a conscious choice of goals, means and, consequently, results, is possible only on the basis of values.¹⁹ But which values are seen as

¹⁸ "A cathedral is something other than a heap of stones joined together. But the only procedure for constructing a cathedral is to lay one stone upon another. For the architect the whole project is the main thing. For the mason it is the single wall, and for the bricklayer the single stones. What counts for praxeology is the fact that the only method to achieve greater tasks is to build from the foundations step by step, part by part." (Mises, 1996, 45-46.)

¹⁹ "A person freely creates when he introduces something fundamentally new into the world, something that has not yet existed. Of course, this can be achieved only by using as means available, actually existing things and forces. Thus, the latter acquire the character of instrumental values. And

goals, and which ones as means, sacrificed to these goals? And how does the choice of goals and means and, consequently, the choice between different values take place?

Goods cannot satisfy human needs on their own. A person satisfies all his conscious needs (whether material, social or spiritual) with his own activity, conscious actions. That is, he does it only on the basis of his volitional acts and decisions. Values are the teleological attitude of the subject to everything that gives him the possibility of free choice and free action.²⁰ There are various kinds of values - vital, social, political, economic, scientific, aesthetic, moral, religious, etc. But all these special kinds of values have one and the same essence, a single nature. This is what makes it possible for them to constitute a single system of values, without which purposeful activity in general would be impossible.

b) Value as a phenomenon of consciousness

1. A full value analysis cannot be carried out without a phenomenological approach.²¹ To understand the activity of the subject from a phenomenological point of view, the main thing is not the real object, but how it is perceived and experienced in the mind of the subject, because "a veritable abyss yawns between consciousness and reality." (Husserl, 1983, 111). Perception can be distorted or even an illusion, but from the point of view of phenomenology, this does not matter, since it is not the real object itself that opposes consciousness. For consciousness, it is fundamentally inaccessible. An attempt to go beyond consciousness and "reach" a real object is meaningless.²²

There is no causal connection between a real object and the experience of an object in consciousness in the sense in which it exists in the real world. In the real world, real facts are the causes of other real facts. But we cannot say in the same sense that real facts are the direct cause of mental facts. In his mind, the subject experiences not the facts, but the essence of the

since they can be valuable only insofar as they are suitable for the achievement of an goal, it is clear that the source of the value of means should be considered the value of the goals achievable with their help. In this ... sense, the expression is true: "the goal justifies the means." And all this means that the root of values must be sought in the target values, in the values-goals. Goals, as you know, before their realization can exist only ideally, otherwise it would be pointless to strive for their realization. (Chavchavadze, 1984, 38-39.)

²⁰ "If something is recognized, chosen as a goal, then by that it is recognized as valuable, having either the value of a goal in itself, or the value of a means to achieve some other goal, an instrumental value. This also means that the target determination of human activity is a value determination. Goals can affect human activity not in a real-causal way, but as ideal values," (Chavchavadze, 1984, 8).

²¹ "The phenomenology of E. Husserl, being a universal science of being, allows us to give apodictically reliable foundations for such a science as economic theory. On these grounds, it is only possible to build a coherent edifice of theory, which would not only give us ideas about cause-and-effect relationships, but would also be fruitful in all respects." (Usanov, 2010, 47-56).

²² E. Husserl writes: "...consciousness considered in its *"purity"* must be held to be a *self-contained complex of being*, a complex of *absolute being* into which nothing can penetrate and out of which nothing can slip, to which nothing is spatiotemporally external and which cannot be within any spatiotemporally complex, which cannot be affected by any physical thing and cannot exercise causation upon any physical thing - it being presupposed that causality has the normal sense of causality pertaining to Nature as a relationship of dependence between realities." (Husserl, 1983, 112.)

facts. Therefore, between the experience and the object of experience there is not a causal connection, not an actual connection, but an essential one. The very essence of experience implies only an indication of the object. Therefore, this connection is considered outside the context of space, time and causality. In this sense, the objects of the real world are not the causes of the experiences of consciousness. Accordingly, it is not the concept or representation and reality that should be opposed to each other, as in classical metaphysics, but the experience of consciousness, an *act of consciousness*, on the one hand, and, on the other hand, the *mental representation* of an object, the subject content of thought.

An act of consciousness can be perception, desire, evaluation, judgment, etc. Its fundamental property is that it always has its focus on one or another object, regardless of whether this object is real or not.²³ And the mental *representation* of the object (the object content of thought) has a content that connects it with the intended object.²⁴ Meaning can change in different acts of perception of the same object. Therefore, the subject may give a different meaning to the same subject, that is, perceive it from different points of view, including in coordinate systems of different values.

The meaning can change in different acts of perception of the same object. Therefore, the subject can give a different meaning to the same object, that is, perceive it from different points of view, including the point of view of different value systems.

2. Due to the perception by the principle of analogy, the subject will find another subject similar to him. Another, that is, a subject different from it, appears. As a result, for him and for the other, the subjective world becomes a common objective (intersubjective) world. This intersubjective world acquires objectivity only in relation to the consciousness of an individual subject, but for the consciousness of a collective subject it remains subjective. "All we are dealing with is our own representations (Vorstellung) or memory. Knowing or recognizing something, we correlate our experience today with what happened yesterday and the day before yesterday, that is, again with our experience, and not with things. Cognition is a comparison of some experiences (elements of practice) with others, and not experiences with the world. That is, in knowing, we are dealing with ourselves, with our own representations (German: vor + stellen - what we already have in ourselves), or representations that relate us to ourselves. Through representations we construct the world. What we receive from the sense organs is only the quantitative side of sensory experience, while the qualitative side comes from the subject himself, from ourselves. Von Glaserfeld considered J. Piaget's idea revolutionary that "the goal of 'knowledge' is not the representation of reality, but the provision of adaptation to it" (Князева, 2014, 17) And since between real phenomena and ideas about them there is not a causal, but only an essential connection, therefore, the perception of the same reality is possible in different ways,

²³ "... a perceiving is a perceiving of something, perhaps a physical thing; a judging is a judging of a predicatively formed affair-complex; valuing of a predicatively formed value~complex; a wishing of a predicatively formed wish-complex; and so forth." (Husserl, 1983, 200.)

²⁴ Edmund Husserl explains the difference between a real object and an idea about it in this way: "The *tree simpliciter*, the physical thing belonging to Nature, is nothing less than this *perceived tree as perceived* which, as perceptual sense, inseparably belongs to the¹³ perception. The tree simpliciter can burn up, be resolved into its chemical elements, etc. But the sense - the sense *cifthis* perception, something belonging necessarily to its essence - cannot burn up; it has no chemical elements, no forces, no real properties." (Husserl, 1983, 216.)

depending on what meaning is put into it.²⁵ The same object can be perceived as a product or a resource; the same subject - as a citizen, parent or owner; certain phenomena can be perceived as significant or insignificant, useful or useless, interesting or not interesting, etc. Not only do different subjects have different attitudes towards the same phenomena, but one and the same subject perceives them differently, depending on what meaning he puts into them.

All of the above applies to values as well. The value attitude is completely contained in consciousness and, like thinking, it cannot go beyond the limits of consciousness. It is the relation of the subject to his own representations, to the ideal constructs created by him. Both individual and social values are phenomena of consciousness, experiences of an individual subject or coherent experiences of a collective consciousness. External correlates of such experiences are real objects and processes. In the field of economics, for example, objects are not, in themselves, products or resources, and they have no value or utility for a person if there is no need for them.

3. It seems strange that economic values are a volitional attitude of the subject not directly to *objects*, but only to his *representations* about objects. But the point is not only that a value experience cannot go beyond the limits of consciousness, but also that a value attitude is conditioned only by those properties of objects about which the subject knows, or thinks he knows, and not by the actual properties about which the subject does not know and cannot know. That is, his representations matter, even if they are false or illusory. But the "*location*" of representations about objects, and, consequently, value relations to them, is the consciousness of the subject. They cannot be outside of consciousness.

Therefore, in order for the subject to experience a value attitude, it is not at all obligatory to have direct contact with the real object, it is not obligatory, even, its existence at all.²⁶ For example, the economic value of a house, as a phenomenon or experience in the mind of its owner, does not at all require the existence of this house in the perimeter of its direct perception. The owner may be far from the property, but as a result of this, his experience of the value of his property does not undergo any changes. Moreover, even if, for example, the house is burned down in a fire, this experience of value remains unchanged until the owner of the house receives information about the fact that has happened; that is, until his perception of the object of experience changes. The subject "carries with him" all his values in his mind.

²⁵ "After all, these "meanings", objective meanings, noematic meanings are the formations of my experience. They are sensitive to what I am experiencing at the moment and what I think at the same time, what conclusions I draw, The noematic meaning is highly dependent on me: depending on how I experience something, how I posit something, what is supposed to be modified, ... But the physical things themselves seem independent of me, of the behavior of my consciousness. (Ingarden, 1999, 178).

²⁶ "Value is always value for something and someone, therefore it is obvious that it is not a natural-real sign of things. This is especially clearly seen when comparing the value with the properties actually inherent in the object. While the existence of a property depends entirely on the existence of the thing itself, the existence of a value does not depend on the actual existence or non-existence of its bearer. The value (and its "being" as a value) of absolute justice, for example, is not in any way impaired by the fact that it is still far from being fully realized in the world." (Чавчавадзе, 1984, 36).

c) "Calculation" of values

1. Value is the relation of the subject not directly to real objects, but only to the representations of them in the mind. It can change in various acts of consciousness. In various acts of perception, a person can put different meanings into his representations. A person's value attitude to this or that phenomenon depends on what specific properties of this phenomenon are in the focus of his representations, and on the possibility of satisfying what specific needs he sees in these properties. The subject can perceive the same phenomena in different scales of values (vital, economic, political, social, moral, aesthetic, religious, etc.).

Man creates values by purposeful transformation of reality. What he creates in this process is only a form with the help of which reality acquires the properties he desires and comes in line with his needs. By creating material and spiritual values, as a result of purposeful transformations of reality, in the physical, social and spiritual spheres, more and more new opportunities for the realization of new goals appear, and a person acquires more and more freedom. As a result of the transformation, reality acquires some new properties, while others disappear or remain unchanged.

2. Although, in general, the transformation of the human environment is aimed at increasing his freedom and opportunities for the realization of new goals, but as a result of each individual act of transforming reality, the possibilities of satisfying some needs increase more, others less, and others generally decrease or do not change. Since a person perceives the attitude to these opportunities as values, as a result of each of his actions, some values are created, some are destroyed, some remain unchanged. Reality transformations are carried out in physical time. But time is irreversible. Therefore, the realization of some opportunities is associated with the destruction of alternative opportunities. Therefore, before each action, you have to make a choice. Realizing one of the opportunities, you have to give up - others. Accordingly, while creating one value, one has to refuse to create alternative values. In any field of activity, while creating some values, others are sacrificed. Man-made goods, both material and spiritual, are valuable for him and not only useful precisely because the "price is paid" for them.²⁷

3. Man, as a person, is the integrity and has a single system of values, which covers all his material and spiritual values. Therefore, individuals make all their decisions based on a single value system. "Choosing determines all human decisions. In making his choice man chooses not only between various material things and services. All human values are offered

²⁷ A value acquired by chance, received as a gift or as an inheritance, is perceived by its owner rather as a simple *utility*, but not as a *value*. Although the "payment" is not always material goods, but the *life time* and *spiritual energy* of the creator (associated with risk, abstinence and the process of creation), there are those existentially valuable, initially limited resources that must be sacrificed for the implementation of any act of value creation. Moreover, any specific form of manifestation of value is an emanation of freedom as the highest value associated with happiness. Consequently, the very *possibility of the existence* of values as such is born from the fact of the limited life time and spiritual energy of a person, but the *possibility of their creation* - with the presence of free will of a rational person striving for happiness, associated with freedom. Ultimately, this process of creating values with the help of values is a process of self-expansion of human freedom and the world of culture created by him, which is nothing but the world of embodied values.

for option. All ends and all means, both material and ideal issues, the sublime and the base, the noble and the ignoble, are ranged in a single row and subjected to a decision which picks out one thing and sets aside another. Nothing that men aim at or want to avoid remains outside of this arrangement into a unique scale of gradation and preference.” (Mises, 1996, 3.)

When setting goals and making decisions in one form or another, one has to make a choice between different values, determine priorities, make a “calculation” of goals and the sacrifices associated with them.²⁸ On the basis of the whole value system, the boundaries of the feasibility of creating a value by sacrificing other values are marked. Marking the boundaries of the expediency of creating a particular value by sacrificing other values to it occurs on the basis of the entire value system. For example, when creating economic value, political, social, moral, aesthetic, religious or other values cannot be ignored. Some of them are sacrificed, others are created in parallel, and some remain unchanged. There are limits within which the subject can act at the expense of other values. Beyond these boundaries, the sacrifices outweigh the results and the action loses its meaning. Without such a "calculation" of acquired and lost values, expedient activity cannot be *expedient*.

4. This means that there is some general criterion for comparing different values with each other, including material and spiritual ones. Without this, it is impossible to make a choice, and without a choice, expedient activity is unthinkable. Such a criterion is the *increase in freedom* that this or that particular value provides to a person. All specific values are various forms of manifestation of value in general, value as such. This universal value, to which all particular forms of value are reduced, and to which a person strives with his activity, is *happiness*.²⁹ “There is however no valid objection to a usage that defines human action as the striving for happiness..” (Mises, 1996, 14.)

Happiness is associated with the growth of human freedom, i.e. with an increase of opportunities to satisfy freely chosen goals. Happiness is a universal value, and, as such, is an abstraction into which each person arbitrarily puts his own meaning. He himself fills it with specific content, a specific composition of special values, as various forms of its

²⁸ An example from economic life: each buyer, buying a product or service, already by the very fact of the purchase makes a choice between economic and non-economic value. For in this case, money (as an economic value) is exchanged for specific goods that have non-economic value for its buyer, intended to satisfy its specific non-economic needs. Of course, the purchase of goods also implies a commensuration of economic values (associated with the problem of distribution of money, alternative value, the possibility of obtaining economic benefits from speculative operations, etc.).

²⁹ But this means that it depends only on the subject himself in what he sees happiness. It depends on his choice what specific set of individual goods, and what special values represented in them, form his understanding of happiness. In this understanding, happiness is no longer just an abstraction, but is a *concrete-universal* concept filled with specific content. Happiness in this understanding forms a system of motives and incentives for the subject's activity. It follows from this that real happiness lies in the very freedom to choose one's value priorities and actions corresponding to them. “Happiness is the goal of human goals. ... for the sake of realizing some of his inclinations, a person has to put aside others for a while and completely forget about the third ones. ... It turns out that happiness, understood as the goal of human goals, is unattainable. ... some desires are realized, but others appear. we begin to understand that although much of what we would like has not been realized, it is thanks to this that we have been able to do what we have done. ... the very possibility of choosing one's inclinations is true happiness. Real, and not imaginary, happiness lies in the freedom to choose one's inclinations, in the possibility of independently determining one's life path.” (Trufanov, 2011, 190-191)

manifestation. Therefore, happiness is manifested in the freedom of a person to determine his own goals and realize them. "But the truth of the particular satisfactions is the universal, which under the name of happiness the thinking will makes its aim. ... it is the subjective feeling and good pleasure which must have the casting vote as to where happiness is to be placed. ... Happiness is the mere abstract and merely imagined universality of things desired,—a universality which only ought to be. But the particularity of the satisfaction which just as much is as it is abolished, and the abstract singleness, the option which gives or does not give itself (as it pleases) an aim in happiness, find their truth in the intrinsic universality of the will, i.e. its very autonomy or freedom." (Hegel, 1894, 99.)

To carry out an action, a person must choose a goal (future result) and means. The criterion for this choice is value itself. That is, in the process of purposeful activity, the realization of the opportunities provided by values occurs if its result gives rise to more opportunities to satisfy needs, more freedom of choice. That is, purposeful activity implies the creation of values with the help of values, the increase in the degree of freedom with the help of the realization of freedom, and, ultimately, the pursuit of happiness. "A person freely chooses life and thereby chooses an action that is aimed at creating more and more opportunities for freedom. The "vital action" of a person, with its essential tendencies, is a free action that transforms the world in the direction of providing ever-increasing opportunities for free-unlimited action." (Kakabadze, 1985, 16-17.)

5. The above can be summarized as follows – creating value gives meaning to every action. But, as a result of action, there is a parallel creation of some values, and sacrifice of others. That is, as a result of each action, between the result's values, which is the purpose of the action and determines its meaning, and other values of the actor's value system the complementary, mutually exclusive or neutral relationships are established. Therefore, every decision when choosing goals is a compromise solution.

In each action the subject creates a certain value. Otherwise, the action has no meaning. But there are limits within which it can act at the expense of other values. And he can't overstep those boundaries. Moreover, he commensurates the increase in the created value with the damage that he can suffer on the scale of other values, and only taking into account such a "calculation" of all values, he makes a decision. Therefore, in the choice of goals and means, there is a range of acceptable decisions beyond which, according to the above general criterion, the sacrificed values exceed the value of the chosen goal. From this point of view, in purposeful activity, the general vector of which implies an increase in freedom, not only "the goal justifies the means", but also "the means justify the goal".

Moreover, the subject makes these decisions taking into account the commensuration not only of various specific values (material, spiritual, etc.), but also taking into account the differences between *individual* and *social* values. For he evaluates his actions not only on the basis of a subjective system of values, but, being a social entity, he evaluates his actions "through the eyes of society", from the point of view of social values.

Section 2.

Subsistence economy

2.1. Production and consumption.

1. All areas of activity are interconnected and depend on each other - economics, politics, law, morality, culture, science, etc. All these areas of activity require material resources. The production of intangible goods also needs the consumption of material goods, and vice versa, the production of material goods needs the use of intangible goods, such as knowledge, experience, education, law, security, health, social stability, etc. Since the material resources available to the subject are limited, in order to maximize the satisfaction of all needs, it is necessary to optimally distribute material resources between various areas of activity.

The rational distribution of material resources requires decision-making based on the commensuration of economic costs and results. But this requires a commensuration not only between economic values, but also between economic and non-economic values. It follows from this, as has already been shown, that all actions and all values of the subject, both material and non-material (social, spiritual), determine each other and are interconnected in a single system. In short, the implementation of actions in any field of activity, one way or another, requires a commensuration of costs and results, and their commensuration is impossible without a commensuration of different values.

2. Man cannot create economic goods out of nothing. It only creates a form.³⁰ It only transforms one object into another, makes them act on each other, so as to get the desired result. In this sense, the consumption and production of economic goods is the *transformation* of some goods into others; in a certain sense – *exchange* of consumed goods for goods produced. Therefore, consumption and production are not two different processes, but one and the same process seen from different points of view. For the very production of some

³⁰ “Man cannot create material things. In the mental and moral world indeed he may produce new ideas; but when he is said to produce material things, he really only produces utilities ; or in other words, his efforts and sacrifices result in changing the form or arrangement of matter to adapt it better for the satisfaction of wants. All that he can do in the physical world is either to readjust matter so as to make it more useful, as when he makes a log of wood into a table; or to put it in the way of being made more useful by nature, as when he puts seed where the forces of nature will make it burst out into life.” (Marshall, 2013, 53.)

goods is the consumption of other goods, and vice versa.³¹ “Production is thus at the same time consumption, and consumption is at the same time production. Each is directly its own counterpart. But at the same time an intermediary movement goes on between the two.” (Marx, 1998, 7-8.) “Each appears as the means of the other and as being brought about by the other, which is expressed as their mutual interdependence; a relation, by virtue of which they appear as mutually connected and indispensable, yet remaining outside of each other.” (Ibid., 9.)

3. Consumed goods are resources, and produced goods are products. And since each good is produced through the consumption of other goods, and is consumed for the production of other goods, then each good is both a product and a resource, their unity. In the course of the functioning of the economy, the processes of production and consumption, as well as the relationship between products and resources, are intertwined in a complex network of relationships. Namely, *each* good is produced and consumed in *different* processes. Produced in one process and consumed in another. On the other hand, in *each* process, *different* goods are consumed and produced. Some goods are consumed and others are produced.

At the same time, *each* good is produced by consuming *many* other goods. And *each* of these consumed goods is also produced from *many* others, and so on. On the other hand, *each* kind of produced goods participates as *one* of the kinds of consumed goods in the production of *many* other kinds of goods, and so on. Such an interweaving of all the processes of goods’ transformation takes the form of a closed system that has a network form of organization.

All goods are produced and consumed within this closed network of economic actions. As a result, a self-referential nonlinear system is formed, which is self-regulated based on feedback. For the purpose of optimization, this system can open up and import and export goods to other similar systems on equivalent terms, while maintaining equilibrium within the system. In this case, the interacting systems become subsystems of a larger closed system, within which each of them retains its autonomy.

4. Since in the process of mutual transformation every good is produced and consumed, the person who drives these processes is at the same time the producer and consumer, treating the goods consumed as resources and the goods produced as products. Moreover, a person, as an empirical object, himself is a product of his activity, with his activity reproducing not only the goods he consumes, but also himself. Man himself is both the main resource and the main product in this process. From a purely economic point of view, man himself appears as an economic good, which, like all economic goods, is consumed to produce other goods and reproduced by consuming other goods. Man, as a living organism, participates in economic processes as one of the empirical objects among other objects. This is a closed circular process of transformation of some goods into others, which acquires economic meaning and is set in motion by the subject. This subject is a Human having reason, will, interests and values; it is the source of activity and the main focus of reference for all economic processes.

³¹ If, as a result of the consumption of economically valuable goods, no other valuable goods are created, then such consumption is not consumption from an economic point of view. Therefore, from an economic point of view, consumption and production are different visions of the same process, and differ from consumption in a technological or biological sense.

2.2. Production sector and consumption sector

a) Primary resources and final products

1. A person satisfies his needs with his own activity. Before consuming goods, he must produce them. Accordingly, the economy consists of two sectors - the *production sector* and the *consumption sector*. In the production sector, a person produces goods, and in the consumption sector, he consumes them.³² But this division is conditional, because goods are produced by consuming goods, and the consumption of goods is itself the production of goods. Therefore, each of these sectors is the unity of the processes of production of products and consumption of resources. The unity of these two mutually opposite sectors is due to the fact that the products produced in each of these sectors are resources consumed in the opposite sector. Thus, none of these sectors can function without the other.

2. In the production sector, final products are produced, and for this, primary resources are consumed. In the consumption sector, on the contrary, final products are consumed and primary resources are reproduced. The division of goods into primary resources and final products is also conditional. For both are goods, and as such, they are both products and resources. Therefore, the final products of the production sector are the primary resources of the consumption sector, and the primary resources of the production sector are the final products of the consumption sector.³³

In addition to final products and primary resources, the production and consumption sectors also produce *intermediate goods*. But, unlike final products and primary resources, which are produced in one sector and consumed in another sector, they are consumed in the same sector in which they are produced, i.e. intended for domestic consumption in the sectors. In addition, intermediate goods are usually more specialized and intended for the production of relatively narrow groups of end products. Whereas primary resources have a more universal purpose and are used in the production of all final and intermediate products.

3. It is important to note that the primary resources are not the factors of production, but their services. But in order to be able to use these services, it is necessary that the subject

³² “*Consumption* may be regarded as negative production. Just as man can produce only utilities, so he can consume nothing more. He can produce services and other immaterial products, and he can consume them. But as his production of material products is really nothing more than a rearrangement of matter which gives it new utilities; so his consumption of them is nothing more than a disarrangement of matter, which diminishes or destroys its utilities.” (Marshall, 2013, 53-54.)

³³ In order not to confuse the terms, unless otherwise specified, the terms “primary resources” and “final products” will mean primary resources and final products in relation to both the production sector and the economy as a whole. But if the same terms are underlined, then they will mean primary resources and final products, in a broad sense, i.e. as *relative terms*. In this sense, the primary resources of the production sector are the final products of the consumption sector, and the final products of the production sector are the primary resources of the consumption sector.

owns the production factors. That is, the will of the subject must extend over the production factors. And the production factors are Labor force, Land, Capital and Entrepreneurship.

For example, labor force as a production factor is the ability to work, the unity of a person's physical, intellectual and spiritual abilities. But the primary resource for production is not the ability to labor, but the labor itself. If these abilities are not used, they will not be able to produce anything. And the use of these abilities, or the services of this factor, is precisely labor,³⁴ as a limited primary resource that should be distributed for the production of various products. Similarly, Land, Capital and Entrepreneurship are the production factors, and their services are the primary resources.

4. All production factors, including the Land as production factor, are reproduced by man in the sense that by themselves, natural or man-made objects, and even the very ability of subjects to physical, mental and will efforts, are neither primary resources nor resources at all. They become so only because of the production needs of the person who needs them to produce the final products. And since these needs are reproduced with the reproduction of man, the primary resources also are reproduced with him. In this sense, the Land, as a production factor (but not just as a natural object), is reproduced together with the reproduction of human needs.

5. In the consumption sector, by the consumption of final products is reproduced the economic subject, it's 1) physical and intellectual abilities; 2) decision-making ability; 3) consumption and production needs; 4) ownership rights. Therefore, it turns out that primary resources as services of production factors are reproduced along with human reproduction. At the same time, as a result of the consumption of final products, his needs and interests are not only satisfied, but also reproduced along with reproduction of himself. Thus, the entire economic process is set in motion by the energy generated by this process itself.

b) Sectors of the economy

1. Sectors of the economy consist of various branches that specialize in the production of a particular good. And for this they consume one or another set of other goods produced by other branches. Branches of the production sector produce goods consumed by the economic subject and members of his family. And the consumption sector in a subsistence economy is the family itself, which reproduces the economic subject and its members, thereby reproducing the labor force and human capital.³⁵

Each branch produces one certain kind of good by consuming various goods produced by other branches. Thus, it satisfies one of the subject's needs in the system of his needs. And the good produced in the branch is consumed in various other branches as one of the goods

³⁴ "here are three productive services. When they refer to these factors, authors most frequently employ the terms land, labor, and capital. But these names are not sufficiently rigorous to serve as a basis for rational deductions. Labor is the service of personal faculties or of persons; it is necessary, therefore, to place alongside it, not land and capital, but land services or the services of land, and capital good services or the services of capital goods." (Walras, 2014, 192.)

³⁵ This means the reproduction of knowledge, skills, motivation in the new generation and their preparation for future economic activity.

they consume. All branches are interconnected according to the network pattern and represent a closed system of transformation of some goods into others in accordance with the subject's production and consumption needs which are the same unified system of interrelated needs. The satisfaction of each need depends on the satisfaction of other needs. Therefore, there are feedbacks between the processes of production and consumption of various goods.

2. In reality, each unit of a good is produced once and, after consumption, forever disappears into non-existence. And the reproduction of a good means that another copy of the good of the *same kind* is produced, which also disappears forever after consumption. It is a one-way process directed from the past to the future. Therefore, the endless transformation of some goods into others in the process of reproduction, like moving in a circle, can only be an ideal process modeled in the human mind. In other words, we are talking about the endless reproduction of the same *kind* of good in the subject's representations. But *real* goods, as specific copy of this kind, are produced only once and disappear forever after consumption.

3. The reproduction of a particular *kind* of good implies the repetition of one and the same type of actions associated with the production of this kind of good and, accordingly, consumption of other kinds of goods. Through the thought of grouping the same kind of actions, transforming some kinds of goods into others, a picture of the *branches* of the economy is created. Since each good is produced through the consumption of other goods, all branches of the economy are interconnected and form the branch structure of a unified system of action. It is the complex, non-linear, operationally closed and causally open system of economic action that is the *economy*.

2.3. Economic value

a) Needs

1. Objects perceived by the subject as goods are not goods in themselves. They are such only *for* the subject and only because the subject has needs for those properties of objects that are able to satisfy his needs. Therefore, he perceives these properties as utilities, and objects that possess them - as goods. This means that economic goods only seem to the subject as something real and existing independently of him. But in reality, they are goods only in the mind of the subject. Outside of his consciousness, these are just natural objects and processes that have certain physical, chemical and other properties and are subject to the actions of the universal laws of Nature. Utility is erroneously perceived by the subject as a property of the objects themselves. Usually a person does not realize that he himself makes these objects useful by his needs and, accordingly, makes them goods.

2. In order to consume finite goods and satisfy needs, the subject must first produce them. Therefore, in addition to the need to consume goods, the subject has a need to produce them.³⁶ Accordingly, economic needs mean not only consumption needs, but also production

³⁶ This means that he also has a need to realize his abilities (physical, intellectual and spiritual), that is, to "consume" himself as the main resource, without which no goods can be produced.

needs, which are the same inseparable unity of opposites as production and consumption themselves.

3. Economic needs are conscious needs, the ability to satisfy of which the subject has, and the satisfaction of which depends only on the decisions he makes. Without the presence of real opportunities to meet needs, they are only potential needs. In order for potential needs to be transformed into actual ones, which give rise to real incentives for economic activity, it is necessary that the subject owns the goods necessary to satisfy them. By producing final products from primary resources, the subject satisfies production needs. Thus, it creates real opportunities to meet consumption needs and, therefore, transfers them from a potential state to an actual one. But, as was shown, by satisfying consumption needs, it reproduces production factors and, accordingly, primary resources. Thus, he creates real opportunities for satisfying production needs and, consequently, also transforms them from a potential state to an actual one.

Summarizing, we can say that some needs are reproduced as a result of the satisfaction of other needs. Since each good is both a product and a resource, then as a product it is the *result* of satisfying a need, and as a resource it is a *means* of transforming potential needs into actual ones.³⁷ Thus, the very satisfaction of needs generates new needs, and, accordingly, the incentives necessary to continue the economic process.

b) Utilities and costs

1. The needs underlying purposeful activity are conscious needs and exist in the form of representations. ideas and knowledge that 1) a certain area of reality does not correspond to his interests, and that 2) there is a real opportunity to change it in the desired direction. Since needs exist in consciousness in the form of representations, the subject can abstract from their specific content and present them in the form of *abstract needs*, needs in general. Specific needs are *qualitatively* differ from each other, and therefore *quantitatively* incommensurable, i.e. are incomparable as different *magnitudes*. But in the form of *abstract needs*, all needs are qualitatively homogeneous, and as such they differ only in magnitude and are therefore *commensurable*.

Similarly, the specific utilities of all goods are *qualitatively* differ from each other and, therefore, *quantitatively* incommensurable. But since utility is the subject's mental representation about the properties of objects that are able to satisfy his needs, he can abstract from the specific properties of objects and mentally single out only one of their properties - *the ability to satisfy the need at all*. In the form of *abstract utilities*, the utilities of various goods are qualitatively homogeneous and differ only in magnitude. In this form, they become quantitatively commensurable.

Thus, with the help of commensuration of abstract needs, it becomes possible to identify the *relative magnitudes* of various specific needs that are directly incommensurable.

³⁷ As for potential needs, they do not give rise to real incentives for action, because they contain not so much a volitional component as an intellectual one. The formation of potential needs is the awareness of one's interests and the formation of priorities for making economic decisions.

Also, with the help of commensuration of abstract utilities, it becomes possible to identify the *relative magnitudes* of various specific utilities, i.e. measures of their ability to satisfy abstract needs.

2. In the production process the utility of the consumed goods is *destroyed* along with these goods, and a new utility of the produced goods *appears*. The destroyed utilities, which are sacrificed for the sake of creating new utility, the subject perceives as *costs*. He cannot perceive them otherwise, because along with the destruction of consumed goods, the possibilities of using them to satisfy alternative needs are also destroyed. As *direct costs*, the utility of actually consumed resources is perceived, and as *indirect costs* - the utility of alternative products, the possibility of production of which is lost forever. Costs are past utilities, or "memory" of utilities associated with sacrificed goods and lost opportunities to meet alternative needs.

As a result of the consumption of goods, unsatisfied needs are transformed into satisfied ones. Accordingly, resources are converted into products, and the utility of resources into costs embodied in products. Unsatisfied needs are related to resources, while satisfied needs are related to products. If, at the beginning of production, *unsatisfied* needs are opposed by the *utility* of resources, then as a result of consumption, needs are *satisfied*, and they are opposed by *costs* embodied in products. If the consumption of resources did not lead to satisfaction of the need and obtaining the desired products, in other words, if the utility of used resources did not turn into *useful* costs, then they turned into *useless* costs, i.e. into *losses*.

3. The *cost* for production of a unit of the product depends on the utility of the resources that are sacrificed (spent) in its production. But the *utility* of this unit of product does not depend on the cost on its production and, therefore, does not depend on the utility of the resources expended in its production. The *utility* of each unit of this product depends on the ratio of the *quantity* of products produced and the *need* for them.

Since abstract utilities are qualitatively homogeneous in all goods, whether they are products or resources, and differ only in magnitude, then in the process of resource consumption and product production, abstract utilities that are *destroyed* and *created* can be equal or differ in magnitude.³⁸ From the ratio of these magnitudes and, consequently, from the ratio of costs and results, the *efficiency* of production depends.

4. Thus, *utilities*, *costs*, and *losses* are the subject's teleological relation to objects through the prism of his *needs*. These categories are closely related and do not make sense without each other. These concepts are closely interrelated and do not make sense without each other. Based on them, a system of subject's attitudes to various objects is formed, thanks to which he can purposefully influence the existing reality and control the process of its change in the desired direction.

³⁸ By the way, it is precisely with this circumstance that the risk of losses is associated, that is, the risk that useful resources may be used, but useful products may not be obtained, or obtained in a smaller quantity or not of the same quality as planned when comparing costs and results., and on the basis of which the decision was made.

c) Economic values and valuations

1. Just as all resources embody *utility*, so all products embody *costs*. But since every good is both a product and a resource, each good embodies both utility and costs. This unity of utility and cost is *economic value*. The subject as a consumer perceives the value of consumed resources from the side of their utility, and the value of the produced products - from the side of production costs. And in the process of goal-setting the adoption of economic decisions on the production of certain products by certain resources depends on the ratio of the expected value of the future products and the total value of the resources required for their production. In other words, this means that the decision depends on the relationship between the expected utility of future products and the costs required for their production.

2. However, the subject cannot perceive the magnitude of values otherwise than through the *ratio* between different values, as a *relative* magnitude. The subject perceives values only when he makes a choice between various goods and compares their values with each other. The values of various goods, like abstract utilities and abstract costs, of which they are the unity, do not differ qualitatively from each other, they are qualitatively homogeneous. They differ only in magnitude. But like any other magnitude in general, the magnitude of value cannot be perceived in isolation from other magnitudes. Accordingly, it cannot be perceived without its comparison with the values of other goods.

Various values may be larger, smaller, or equal to each other. Such a comparison may be a direct *co-measurement* of different magnitudes, or a *measurement*, if there is a unit of measurement, through which all other magnitudes are expressed.³⁹ The result of such a *co-measurement* of the values of various goods is their *valuation*. They are *indicators* of the ratio between different values. Therefore, the subject is aware of the values only during the choice between different goods, i.e. when he compares their values with each other. Evaluations emerge from such comparisons.

3. In subsistence economy there is no unit of measurement of values. The economic valuations of various goods here are as relative as their values. Some are greater, others less or equal to each other. Both values and valuations, in which values are manifested, are systemic magnitudes and acquire meaning only in the context of the entire system of value relations between goods. Thus, along with the *value system*, there is a *system of valuations*, which is derived from it. In addition, in a subsistence economy, economic values are *subjective*, so the results of their commensuration appear in the form of *subjective valuations*. Valuations are the form in which values show up in consciousness and allow the subject to co-measure costs and results and make economic decisions.

4. Since goods are produced by goods, the valuations of goods depend on each other in the same way as the values of goods. The external environment and current conditions affect the valuation of goods in each particular case. These are, a sort of, *conjunctural valuations*.

³⁹ Historically, before the unit of measurement, a man determined the magnitudes of different objects by identifying the differences between them, through direct commensuration. The accurate measurement does not appear until the unit of measurement appears. But an accurate measurement is only a more advanced form of commensuration, in which the magnitude of the measured objects and the magnitude of the object taken as the unit of measurement are directly commensurated.

They are changeable and can fluctuate within certain limits relative to more fundamental and stable valuations which directly reflect the ratio of economic values (which are also more stable over time) and serve as attractors for the conjunctural valuations. In addition, although the system of valuations is formed on the basis of the value system and reflects it, nevertheless, these systems do *not intersect* anywhere. These systems are closed in themselves and exist, as it were, parallel to each other. Both are autonomous self-referential systems existing in a subjective frame of reference.

5. As noted, goods are produced by goods and, therefore, they are both produced products and consumed resources. As a result of production, the utility of resources is transformed into costs embodied in products. But products are deliberately produced as useful resources for the production of other products. It is clear that the decision to produce a given good by consuming a certain set of other goods will be made by the subject only if the utility of the produced good is greater than the total utility of the goods sacrificed for its production (i.e., if the utility of the produced good is greater than the costs embodied in it). In other words, products are produced only if the value of the product is greater than the total value of the expended resources, that is if the *surplus value* of the product is created.

At the same time, the values of the spent resources are *not transferred* to the product, to which surplus value would be added further. No. The values of resources are destroyed along with the resources themselves when they are consumed, leaving only a "memory of oneself". Product value is newly created value. It is created together with the product and is greater than the total value of the expended resources by the amount of surplus value.

6. It was also shown above that the production of goods is associated with the risk that resources may be spent, but, for one reason or another, the product may not be produced. Therefore, making economic decisions is associated with *entrepreneurial risk*, and therefore, requires spiritual and volitional efforts, i.e. subjective costs. This means that when making a decision, the subject compares not only the total value of spent resources with the value of the product. He also compares the amount of surplus value with the amount of entrepreneurial risk and subjective costs associated with it. Entrepreneurial risk should be justified by the amount of expected surplus value. It is clear that production is not advisable at high risk and low expected surplus value. It follows from the above that the *total cost* of producing goods consists of *objective* and *subjective* costs, that is, consists of total utility of sacrificed resources and spiritual will efforts, spiritual energy associated with entrepreneurial risk. Accordingly, in an equilibrium, value is the unity of the *utility* of the good and the *full cost* of its production. At the same time, the share of surplus value in the value of various goods may be different, but in any case, from the subject's point of view it should be an acceptable compensation for the risk associated with the production of good.

In order to periodically replace depreciated capital goods with new ones, the subject must make *savings* of resources and invest them in the production of capital goods. Since there are risks of loss of resources in the production of products, the subject is forced to *insure* these risks. Also for this purpose, the subject must make savings of resources. But in order to make savings, spiritual-volitional efforts are also needed, but they are no longer associated with risk, but with *abstinence*.

7. As a result of consumption, *needs* are satisfied, *resources* are transformed into *products*, and the *utility* of resources is transformed into *costs* embodied in products.

However, the product was deliberately created as a useful resource to satisfy other, then still potential, needs. With the emergence of a product as a new useful resource, a certain set of needs that were potential before the appearance of this product (new resource) is converted into a set of actual needs. Now it depends only on the subject's will which of these alternative needs he will satisfy with the help of this new resource. Satisfying a need is perceived as eliminating dissatisfaction and obtaining the desired product, as a new useful resource. Naturally, its utility is perceived as something positive, bringing happiness and subject to *maximization*. And the costs, on the contrary, are subject to *minimization* because they are associated with the destruction of utilities.

8. Following the same logic, since in the production process some goods are sacrificed to others, the values of consumed goods and produced goods have opposite signs. For the costs of producing a good are formed from the utilities of the goods consumed in its production. The value of a product and the values of the resources from which it is produced relate to each other as *positive* and *negative*. They mutually exclude each other, although they exist only thanks to the other side. Each of them is something negative, not in itself, but only *in relation* to the other side, which is perceived positively. And since each good is at the same time a product produced from resources, and is itself a new resource from which other products will be produced, then the value of this good is a contradictory unity of polar opposites in sign a) the cost of its production and b) its utility to produce other goods. Accordingly, the value of this good as a *product* (embodiing the cost of valuable resources) has a *negative sign*, and its value as a *resource* (useful for the production of other goods) has a *positive sign*.

9. As shown above, the economy consists of a production sector and a consumption sector, which produce goods for each other with the help of the goods they receive *from* each other. From a purely operational point of view, if we abstract from causal relations, this is a closed system of economic actions and the interaction between its sectors takes on the character of a *feedback loop*. That is, each sector produces for the other side *all* the goods that it (the other side) needs to produce *all* the goods that the first side needs. These sectors do not need anything else. Therefore, the subsistence economy, being composed of two interacting sectors, economically depends only on itself. But her dependence on herself is precisely her independence from others, her self-sufficiency.

10. Since primary resources and final products are goods that are produced in one sector and consumed in another, the values of these goods are associated with costs for one sector and utility for another. Accordingly, they have a negative sign for one sector and a positive sign for another. Primary resources and final products endlessly reproduce each other, sacrificing themselves in the process. Accordingly, the values of these goods endlessly reproduce each other in the same way.

In the context of economic activity as a whole, this endless process of reproduction of values through their destruction reflects the same endless process of the birth of some needs as a result of satisfaction of others. Thanks to this, the system of economic values makes possible the coordination between all economic actions. The value is a system magnitude. They link all economic actions into a single closed self-referential dynamic system.

11. Given the nature of the interaction between sectors, it is clear that the cost of producing goods in each sector is formed from the utilities of goods produced in the opposite

sector. The utility of the goods consumed is converted into *costs*, which each sector seeks to *minimize*. And at the same time, each side seeks to *maximize utility* of the goods produced for the other side so that it (the other side) can produce more useful goods for it. The more useful goods one side produces for the other, the more useful goods the other side can produce for the former. Ultimately, it turns out that what one side maximizes, the other minimizes, and what the first minimizes, the other maximizes. The *mini-max* of one side is the *maxi-min* of the other, respectively, the economic system tends to equilibrium at the *saddle point*.

12. The value of goods is a contradictory unity of utility and costs, which have opposite signs. They are inseparable like the poles of a magnet.⁴⁰ At the same time, the subject has a positive attitude to the utility of goods, but negatively to the costs of producing goods. Therefore, the subject's value attitude to the goods is contradictory. The result of such attitude towards goods is economical consumption and thrifty attitude towards them. It gives rise to the need to both *consume* goods and not consume, i.e. *save* them. Such an attitude towards goods is a necessary condition for the optimization of economic activity, which implies the *satisfaction* of reasonable, necessary needs and the *abstention* from satisfying all unreasonable needs, excesses, and random whims. Violation of this balance between satisfaction and abstinence leads to vices - either to excessive consumerism, or to senseless asceticism and miserliness.⁴¹

2.4. Optimality

1. The subject's economic needs consist of consumption and production needs, which are two subsystems of a single system of needs. It was pointed out that meeting the needs of each of these subsystems created products that were resources for the other. It was noted that satisfying the needs of each of these sub-systems meant creating *products* that were *resources* for each other. At the same time, the needs have a certain magnitude. The magnitude of each single need is determined by its *ability to pay*, which implies the maximum amount of goods that the subject, if desired, can allocate to fully satisfy it.⁴² According to the same logic, the solvency of the entire system of economic needs over a certain period of time is due to the totality of economic goods available to the subject in the same period.

Since goods are produced by consuming goods, the scarcity of *resources* gives rise to the scarcity of *products*, which are themselves scarce *resources* for the production of other scarce *products*, and so on. In other words, the scarcity of some goods creates the scarcity of others, and together they mutually determine the degree of scarcity of each other.

⁴⁰ They mutually repel each other, but cannot separate. Just as if a magnet is broken in half, we get not a separate positive and a separate negative pole, but two small magnets, each of which has both poles.

⁴¹ Thrift should not be confused with miserliness. Unlike the miserly, the thrifty does not consume only what he does not need, but what he needs, he consumes.

⁴² Beyond its ability to pay, i.e. if the subject does not possess the necessary goods at all, or if the goods are not limited and, therefore, their consumption is not perceived as a "payment" for satisfying a need, the needs cease to be economic needs.

2. Since the subject must satisfy all his needs with all available goods, it is clear that he cannot allocate the *maximum possible* number of goods for each single need to fully satisfy it. If for some needs he allocates more goods, then for others he will have to allocate less. In other words, in the specified period of time it is impossible to *fully* satisfy *all* solvent needs, despite the fact that such an opportunity exists for one or another, separately taken need. Therefore, the problem of choice and decision-making arises - how to distribute the goods for the maximum possible satisfaction not of one or another separately taken needs, but of the totality of needs as a whole.

3. Each type of good is produced in one branch, and consumed in others; and is a product of one of the branches and a resource for other branches. As a product, a good embodies the *costs* of production (including subjective costs) carried out in the branch that produces it, and as a resource, it embodies *utility* for the branches that consume it. But since an economy is a closed system in which all goods are produced through the consumption of goods, then only such distribution of resources can be optimal, in which equal magnitude of goods' production costs⁴³ would account for equal magnitude of utility of goods produced from them, i.e., *even-utility of costs* in the system.

If the utility of a good exceeds the cost of its production, then it is *deficient*, and if the cost of production exceeds its utility, then it is an *excess*. In other words, the utility of a deficient product is *greater* than the total utility of the resources spent on its production, and the utility of excess product is *less* than the total utility of the resources spent on its production. Deficiencies and excesses are mutually conditioned and indicate a suboptimal distribution of resources. In short, the optimal is an equilibrium state, in which, *in the system as a whole*, the utility of the goods produced is equal to the utility of the goods consumed, and the utility of *each good* is equal to the full (objective and subjective) costs of its production.

4. If, as a result of the consumption of a certain good, its utility is transformed not into useful costs, but into losses, then the deficiency of the remaining stock of these goods will increase relative to the need for it. Due to the increasing deficiency of these goods, there will be revaluation and the value of the remaining stock will increase. If an excess quantity of goods is produced, then there is a revaluation and depreciation of the increased stock of these goods. Moreover, the occurrence of deficits and excesses are interrelated. They are the result of either inefficient *consumption of resources* or their inefficient *distribution*. In both cases, if there is a deficiency of some goods, there will be a excess of some other goods. Deficiencies and excesses are a consequence of the fact that part of the resources is used to produce excess products, and they are no longer enough to produce deficient products. Conversely, if there are deficient products, then not enough resources have been used to produce them. In this case, either the underused part of the resources becomes excess, or those products that were additionally produced by them. That is, in any case, the values of goods can increase or decrease as a result of the appearance of deficits and excesses caused by overproduction or underproduction of individual goods. But since the appearance of deficits and excesses are

⁴³ It means that one of the goods produced is the life of the subject and his abilities and spiritually-volitional energy reproducible with it necessary for the production of all goods. And production costs mean total costs, including subjective spiritual-will energy costs associated with risk and abstinence.

interconnected, the increase and decrease in the values of various goods balance each other and the total value of all goods remains unchanged.

5. The utility of a particular good depends on its quantity in the existing stock. And its quantity in stock at any given moment depends on the ratio of the rate of production and the rate of consumption of this good. That is, their scarcity is changeable, constantly fluctuating depending on the intensity of their production and consumption. The optimization of economic activity occurs through the production of more deficient goods from less deficient (or relatively excess) goods. This is expressed in the fact that in the process of permanent satisfaction and the birth of needs, priority is given to the satisfaction of more intense needs, after which they give way to other needs that were less intense. And for this, of all the available ones, such technologies (in the production sector) and consumer bundles (in the consumption sector) are used that use relatively abundant and less deficient goods. The general course of this process is aimed at equalizing the deficit of goods in all areas, therefore, it leads to the *even-utility of costs*. This supports the desire for a dynamic equilibrium between production and consumption in accordance with the structure of needs.

2.5. Total value

1. The subjective world of economic values is a self-referential system in which there is an infinite self-production of its unity. It is a closed world that is infinite within itself.⁴⁴ The aggregate economic value of all goods is the totality, which is procedural in nature and which generates the economic values of the individual goods from which it is composed. For only in the context of intra-system interactions of this totality, the economic values of individual goods endlessly give rise to each other, sacrificing themselves in the process. This whole world of economic values has no determinate being and is directly inaccessible to observation from the outside. It exists only in the mind of the subject himself, as a mental process that connects the values of present, past and future goods in an inseparable stream of time, and organizes the economic actions of the subject in accordance with his needs. At that, over a certain period of time, depending on the productivity of economic processes, increase and decrease can only the quantity of goods produced and consumed, but not their total value.

2. The totality of *all* produced and consumed goods (including intermediate products and resources) is ultimately formed from the goods belonging to two opposite totalities of goods, and related to each other as *primary resources* and *final products* that endlessly reproduce each other. Each of these two totalities consists of goods that serve as *resources* for the reproduction of the goods of the opposite totality. This process is accompanied by the same endless mutual reproduction of the *total value of primary resources* and the *total value of final products*. Accordingly, the totality of unsatisfied needs is transformed into a totality of satisfied needs, which again gives rise to a new totality of unsatisfied needs, etc.

The total value of all economic goods is a single whole, consisting of variable and different values of individual goods, as its parts. But despite the variability of its constituent

⁴⁴ See Attachment.

parts, the total value of goods itself, nevertheless, remains invariably in magnitude a self-producing integrity, consisting of parts that are permanently transformed, disappearing and re-emerging. For, since goods are produced by the consumption of goods, the creation of the values of some goods is associated with the destruction of others, just as the satisfaction of some needs is associated with the birth of new ones.

3. The value being of the totality of economic goods has a procedural character. The total value of primary resources and the total value of final products form each other. In the process of formation, they are sacrificed to each other. Therefore, these two totalities of economic values are equal to each other and, at the same time, *opposite in sign*. Since goods are created by goods, and their values are created by values, the total value of all economic goods exists in the form of a process of self-generation and self-destruction. This is a process of self-reference, in which the total value of all economic goods is related only to itself and, as such, is a closed process of reproduction of some economic values by destroying others. It follows that although the values of individual goods have their own magnitudes, but these are relative magnitudes - some more, others less. And since the sum of relative magnitudes is equal to 1 or 100%, then the concept of the magnitudes of the total value of all economic goods loses its meaning. It has no absolute magnitude, but it always is an whole that can be represented as 1 or 100%.

What is true of the total value of economic goods is also true of total utility and total cost. All these totalities can be thought of not as certain magnitudes, but only in categories of the *whole and its parts*. Thus, the quantitative determinateness of the value, utility, and costs of production of each particular good, is always presented only as a certain proportion of the corresponding totality associated with 1 or 100%. Therefore, the magnitude of the total value, total utility or total costs, which are wholenesses, do not depend on the activity of the subject. Only the rational distribution of goods (for their consumption and reproduction) depends on his will, based on the distribution of the total value of goods, which, in turn, is carried out by calculating the values of goods produced and consumed.

4. Similar reasoning is also valid for economic needs, the reflection of which are economic values. Needs actualize each other as a result of their satisfaction. Each new actual economic need can arise only as a result of satisfaction of some other economic needs. Therefore, the totality of economic needs can be thought of not as a specific magnitude, but as a whole, consisting of various needs, greater or lesser relative to each other. Economic needs, as abstract needs for certain specific goods, are qualitatively homogeneous and differ only as *relative magnitudes*, measured by the magnitude of the values sacrificed to satisfy them. But as a whole, the totality of economic needs can neither increase nor decrease and is always associated with 1 or 100% in the same way as the totality of values, utilities and costs.

5. The *utility* of a unit of a product depends on the *quantity* of the product produced. But the *costs* of its production depend on the *quantity* of resources consumed in its production and the *utility* of each of them. But each of these resources is itself a product produced earlier from other resources. And the aforementioned product itself is a resource for the production of other products in the future, etc. However, all goods are simultaneously products and resources. As you can see, the *utility* of goods, and the *cost* of producing each of them, directly depend on the *quantity* of goods produced and consumed. But these quantities depend on the will of the subject, i.e. from the distribution of goods according to his needs.

In conditions of such a circular dependence of utilities, costs, and quantities of produced goods, the desire of the subject to obtain maximum utility with a minimum of costs gives rise to a tendency to achieve even-utility of costs of producing all goods. This is precisely the tendency towards the formation of a dynamic equilibrium of the system, in which the created value of each produced good is equal to the total value of the goods consumed in its production. This tendency towards intra-system equilibrium is due to feedback and the circular organization of the economic system.

However, in what specific goods and in which their specific quantities are embodied economic values - this depends not only on how the goods are distributed for consumption, production, and satisfaction of needs. It also depends on the external environment of the economic system - on available technologies, knowledge, natural resources, natural and social disasters, social norms, the structure of needs, non-economic preferences, etc. This circumstance is due to the fact that the economic system, although it is an *operationally closed*, is at the same time a *causally open* system and is in a causal relationship with other natural, social and cultural systems, which are the external environment of the economic system.

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Subsistence economy is characterized by a number of features that determine the principles of managing the economy, allocating resources, optimizing production and consumption, and so on. These features determine the methods of economic decision-making. In the subsistence economy: 1) a limited set of products was produced, necessary for a minimum standard of living; 2) there was a connection, perceived by the subject, between the production and consumption of all goods; 3) a more or less stable set of products was produced and there was a stability of sectoral proportions that were reproduced from generation to generation and hardly changed over long periods of time.

In such circumstances, the subject had little choice of alternative solutions. He knew all his needs, as well as the opportunities for their satisfaction, that is, he knew directly - *What? How?* and for *Whom?* produce. Therefore, the adoption of economic decisions was based mainly on *natural indicators*. And economic values and valuations contributed to decision-making and the subject, if possible, adhered to a simple rule - to produce more scarce goods by consuming less scarce goods. However, economic values will play a dominant role in a market economy when making decisions and optimizing the economic activity of society as a collective subject.

The subject strives for the optimal distribution of resources, but never achieves them due to many objective and subjective factors - natural conditions, unforeseen circumstances, lack of knowledge, etc. Therefore, as a rule, deficits and excesses arise in the subsistence economy of each individual. This gives rise to incentives for the interaction of economic subjects, in which the parties exchange excesses of their products, which are deficient resources, for the other side. This contributes to the optimization of the economic activity of each of them.

Section 3.

Market economy

3.1. System of economic actions

1. Economy is a system of economic actions.⁴⁵ But in a subsistence economy, these are *individual actions*, and in a market economy, *social actions*. In the case of a subsistence economy, everything that the subject produces, he himself consumes. Products produced as a result of some actions of the subject serve as resources for consumption in other actions of the *same* subject. But in a market economy, everyone produces goods for each other and exchanges them. Products produced by the actions of *some* subjects serve as resources for the actions of *other* subjects. All of them are bound together by their actions. As a result, a closed network of social actions of society as a collective subject emerges.

Only a part of the *individual actions* of subjects of the subsistence economy is transformed into *social actions*. As a result of the division of labor, they are built into a unified network of social actions. It is these social actions that form the market economy as a complex self-regulating system of actions. It builds on the individual actions of private subjects, thereby transforming the former subsistence economies into its subsystems and subordinating them to its own laws of functioning. Accordingly, the economy of each individual subject appears as a single system consisting of two subsystems of economic actions - individual and social, coordinated by his mind and will.

Economic processes that were previously modeled in the mind of an individual subject are now being implemented in the social space in the form of economic interactions between subjects. But these processes are already being modeled in the collective consciousness of society. Along with the similarity of these mental constructs in the individual and social consciousness, there are also specific differences. This specificity should be explored in more detail.

2. Subjects bring to market only those products that can be exchanged for other products. And since the same types of goods for exchange are produced by many actors that together form a separate branch, it is clear that in a closed market system only such a branch

⁴⁵ In this concept, the economy is presented as a system, the primary element of which is economic action. According to this understanding, economic agents are a combination of economic actions that perform various functions. Therefore, farthere, when speaking about producers, consumers, entrepreneurs, savers, investors, etc., or about certain branches of the economy consisting of economic agents, we will mean sets of actions that perform homogeneous functions or consume and produce homogeneous goods.

can arise, the products of which are needed by other branches. Each branch produces products that other branches consume as resources. This is how a system of interconnected branches is formed, which are parts of a single whole.

In the absence of any regulatory center, the market exchange of goods itself must contain a mechanism for regulating sectoral proportions. For none of the market agents knows either the magnitude of the solvent needs for his product on the part of other industries, or the volume of production of similar products by other producers in his industry. Accordingly, no one knows what the ratio of market demand and supply will be; does not know whether the market price for his product will be sufficient to profitably exchange it for the resources he needs.

3. All owners of production factors (Labor, Land, Capital and Entrepreneurship) are consumers of final products. They form the consumption sector. But also, they all contribute to the production of final products in the production sector in the form of services of their production factors. In the market of primary resources, entrepreneurs buy from the owners the right to temporarily use the services of production factors – Labor, Land and Capital. With the help of the services of these production factors, entrepreneurs produce final products, which they, together with the entrepreneurial services embodied in products, sell to the owners⁴⁶ of the factors in the market of final products.⁴⁷ Thus, all owners of production factors are buyers of products. All economic actors are involved in the production of products that they themselves consume.

4. To perform the entrepreneurial function, the producer does not need ownership of production factors themselves. He needs only the *services* of these factors. But it is possible to buy these services from the owners of production factors only in the form of buying the *right* to temporarily *use* the services of these factors.⁴⁸ For the owners themselves do not sell the production factors as long as they wish to keep them as a source of permanent income.

It turns out that the reproduction of primary resources is reduced to the reproduction of ownership of the production factors. It is the *ownership right* that provides owners with the opportunity to sell the *rights to use* the services of these factors. But only living people - owners - can have rights in any form. Therefore, the reproduction of rights is reduced to the reproduction of the owners' life and, consequently, to their consumption of final products. Thus, the circle is closed. Final products are produced from primary resources, and primary resources are reproduced by consuming final products.⁴⁹

⁴⁶ The entrepreneurs themselves buy final products from each other in the same way that all other owners buy these products from them.

⁴⁷ The purchase and sale of final products differs from the purchase and sale of primary resources only in that in the first case, the *right to property* of the products is sold and bought, and in the second case, the *right to use* services. For, in the final analysis, the purchase and sale is nothing but an exchange of *rights* between the seller and the buyer.

⁴⁸ Production here means not a *technological process* (as a set of technological operations), but an *economic process* of transforming one economic good into another. Factor services are primary resources in a technological sense, but from a purely *economic point of view*, the primary resources for entrepreneurs are not factor services, but the *rights to use* them.

⁴⁹ In the economic literature, not the *services* of the Land (as production factor) are often indicated as primary economic resources, but non-renewable natural resources that are reproduced by nature, and not by man (oil, gas, ore, standing wood, etc.). However, oil or ore while they are in the ground, or trees in the forest, cannot directly serve as resources for the production process. In order to

3.2. Branch structure

1. In a market economy (like a subsistence economy) there is a *production sector* and a *consumption sector*. In the production sector, subjects (entrepreneurs) are producers of final products and consumers of primary resources.⁵⁰ And in the consumption sector, on the contrary, the subjects (owners) are consumers of final products and reproducers of primary resources.⁵¹ These sectors are interconnected through the two aforementioned markets - the market for final products and the market for primary resources. They exchange their products, which are resources for the other side. If the markets for final products and primary resources are presented as a single market, then, in the final analysis, it turns out that primary resources and final products are exchanged with each other.⁵² But in a money economy, the exchange of goods is mediated by the exchange of goods for money. And instead of a single barter market, we have two separate markets interconnected by money flows.

In modern conditions, the production sector is represented by firms that produce products, and the consumption sector is represented by households that reproduce primary resources. Firms producing homogeneous products form branches of the production sector. The final products produced in this sector are consumer products and physical capital. And households, that reproduce property rights to homogeneous production factors and sell their services, form branches of the consumption sector. Primary resources and human capital are reproduced in this sector.

2. If each branch specializes in the production of one good, and produces them for other branches, and for its own production consumes goods produced by other branches, then the

be able to use them as resources, they must first be removed from the bowels of the earth, cut down in the forest, etc. But in this case, they already become products, i.e. *intermediate* resources rather than *primary* resources. As mentioned earlier, the difference between them lies in the fact that primary resources are reproduced in the consumption sector and consumed in the production sector, while intermediate resources (products) are produced and consumed in the production sector itself. Thus, before withdrawal, non-renewable natural resources are not economic resources suitable for production at all, and after withdrawal they become intermediate resources (products). But in order to remove ore from the earth or cut down trees in the forest, it is necessary to have the right to do so. Although Nature itself provides an agent with the opportunity to use its benefits and thereby provides him with services, but in the conditions of the legal environment in which the institution of private property exists, it is also necessary to have the right to use these services. In other words, in order to be able to use the opportunities provided by Nature, the entrepreneur also needs the opportunities provided by society, which is the right to use the services of production factors. It is these *right to use* that the entrepreneur buys from the owners of the production factors, including from the owners of the Land.

⁵⁰ As already noted, all economic entities simultaneously consume and produce goods. Therefore, they are both producers and consumers at the same time. However, in order not to get confused in terms, we will call the subjects of the production sector (entrepreneurs) *Producers*, and the subjects of the consumption sector - *Consumers*. (Moreover, entrepreneurs who are Producers in the production sector are also Consumers in the consumption sector.).

⁵¹ In this sense, the products of the production sector are resources for the consumption sector, and the products of the consumption sector are the resources of the production sector.

⁵² In this whole process, we do not separately consider intermediate products and intermediate production, because. Ultimately, the cost of all final products can be reduced to the cost of primary resources. For the total value of final products is equal to the total value of primary resources.

branches become organically connected with each other through market exchange. Together they form the market economy as an operationally closed system of economic actions.

An emergent property of a market economy is such a relationship between its branches, in which *each branch produces goods in accordance with the needs of all other branches*. This systemic property plays the role of the organizing principle of economic processes, aimed at maintaining the integrity of the economic system and necessary for the formation of the optimal branch structure of the economy. The emergent property of a competitive economy naturally arises from the division of labor and specialization. Due to this property, the economy tends to a state of dynamic equilibrium in which the functioning takes place in an optimal mode.

3. It becomes possible to discover the emergent property of a market economy only after the economy begins to be understood as a unified system of economic actions. This makes it possible to detect an *essential relation* in the economic system, and to present it as a *whole, consisting of parts*.⁵³ The essential relation serves as the basis for understanding how the feedback system, optimal market prices and the mechanism of self-regulation are formed in a market economy.⁵⁴

Thus, the connection between production and consumption “is realized in the form of that reflection through which the whole mediates its parts. Moreover, the mediation here has a complete character - a single production-consumption process has all the parts it assumes, is closed and, therefore, optimal in a broad sense. Within the framework of this abstract moment, the law of symmetry is fulfilled - that and only that is produced that is consumed, and only that which is produced is consumed.” (Яцкевич, 1990, 83).⁵⁵ Theoretically, the emergent property of an economy based on the division of labor ensures the achievement of dynamic equilibrium and the mode of optimal functioning. But in practice, under conditions

⁵³ According to this understanding, “... the multitude is recognized as contained in the unity, i.e., it is recognized as its parts, and the unity is considered as a whole. The essential relation is thus in the form of the relation of the whole and the parts. This relationship is essential: neither side can be conceivable without the other, there is no whole without parts and no parts without the whole. Each side presupposes the other, the whole presupposes the parts, and vice versa.” (Fischer, 1902, 523-524.)

⁵⁴ “In this sense, the whole (wholeness) is the unity of the necessary parts on the basis of the realization of their essential relationship. each of them is defined through the other. The leading factors here are mutual conditioning, essential connection with each other, As a result, this reflection ensures the certainty and stability of both the whole and all its parts. Here reflection is embodied in a concrete essential relation. ... Obviously, the essential relation of the whole is system-forming. We emphasize that not every system is a whole, since its elements, parts are not always necessary, that is, not always optimal. Removing some part may not violate anything.” (Yatskevich, 1990, 66 – 67). “The classic example is a pile of sand; the relation $x \in A$ here is purely formal; it makes no sense to talk about any kind of optimality. The grains of sand are only indifferent to each other and are not connected by essential relationships.” (Ibid., 67) “....All these provisions are in good agreement with the fact widely known in cybernetics - if there is no closure, then the dynamic process loses stability. The considered case is extreme, but it convincingly shows that the weakening of reflection reduces the efficiency of the entire production. If there is no closure, then there is no certainty, and therefore there is no optimality.”

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of decentralization, the emergent property is realized only in the form of a tendency towards equilibrium. In fact, equilibrium is not achieved due to the spontaneous nature of market processes and the destabilizing effects of the external (natural and social) environment.⁵⁶

4. In general, the economy appears as a system in which the “production of commodities by means of commodities” (P. Sraffa) takes place. It consists of many branches, each of which consumes goods produced by other branches. “... in a state of equilibrium, an increase of production in any one branch is impossible without a reduction of production in some other branch. Any change leads to an imbalance of the system. In conditions when all branches produce goods for each other, the interaction between branches takes the form of commodity exchange. But the branch can sell only what it produces itself, and - buy only what other branches produce. In conditions of equilibrium, each branch produces goods exactly in the volume that fully satisfies the solvent needs of all other branches. And since the solvency of the needs of each branch is determined by the very volume of its production, it is clear that in conditions of equilibrium, with the given system of social needs, there is a single system of exchange ratios that provides a complete clearing of all markets. From this it follows naturally that in the presence of competition there is a unique equilibrium of system. Further it will be shown that this equilibrium is stable, because its violation gives rise to economic forces that restore equilibrium. In the final analysis, it all comes down to the fact that each branch pays for consumed goods by produced goods. But supply and demand only contribute to matching the rhythms of production and consumption.” (Leiashvily, 2021, 7-8.)⁵⁷ For these rhythms do not coincide in time. For example, wheat is harvested once or twice a year, but bread is consumed daily in society. On the other hand, there are goods whose consumption is seasonal, or capital goods that are consumed over many years but are produced throughout the year, and so on. By means of supply and demand, the market regulates the portions of the goods offered for sale in accordance with the demand for them. But if we take a sufficiently long period of time, the supply and demand for that period is more or less the same as production and supply for the same period. And the discrepancy

⁵⁶ “Closedness and certainty (of a biological species, a production process, a specific language of communication) are one and the same thing. The inconsistency of development lies in the fact that each of these systems each time redefines itself and its parts, but in this movement it removes certainty, since it reveals something that belongs to it only in perspective, but not yet related to the whole. Therefore, optimality is necessary... and the determining factor. Any open system strives for it, but in this striving bypasses it, ensuring the unlimitedness of the evolutionary process.” (Yatskevich, 1990, 85-86)

⁵⁷ “When goods are carried to market what is wanted is somebody to buy. But to buy, one must have wherewithal to pay. It is obviously therefore the collective means of payment which exist in the whole nation that constitute the entire market of the nation. But wherein consist the collective means of payment of the whole nation? Do they not consist in its annual produce, in the annual revenue of the general mass of its inhabitants? But if a nation’s power of purchasing is exactly measured by its annual produce, as it undoubtedly is; the more you increase the annual produce, the more by that very act you extend the national market, the power of purchasing and the actual purchases of the nation. ... Thus it appears that the demand of a nation is always equal to the produce of a nation. This indeed must be so; for what is the demand of a nation? The demand of a nation is exactly its power of purchasing. But what is its power of purchasing? The extent undoubtedly of its annual produce. The extent of its demand therefore and the extent of its supply are always exactly commensurate.” (Mill, 2006. 8-9.)

between them is precisely the cause of economic crises, which restore the broken correspondence. (See: Leiashvily, 2011, 2012, 2015.).

5. All subjects are functionally interconnected. But who exactly will perform an adjacent function does not matter. It is for this reason that chaos arises at the micro-level. For the action of each subject is built into this system of economic interactions through the opportunity that a huge number of potential contractors can perform an adjacent function. It depends on chance who exactly will become a counterparty in the conditions of competition and the constant search for more favorable terms of the transaction. In a decentralized economy, this creates the illusion of chaos. However, this chaos is not chaos in the usual sense of the word. In terms of Chaos Theory, it is "deterministic chaos". In particular, in the economy, competition narrows the range of variation in the parameters of transactions made in the market. The parties to the transaction, having mutually opposing interests, seek and find more profitable partners for themselves. The result of this is the narrowing of the spread and the formation of average parameters, relative to which the deviations of individual parameters of similar transactions are concentrated.

6. All subjects are outwardly independent and freely decide what goods to produce and consume, from whom to buy, and to whom to sell. But nevertheless, to produce and consume any goods, to sell to anyone, and to buy from someone - they must. Those. they are connected to each other by "*weak ties*". These connections are chaotic and random. They can appear here and there, and break as easily as they arise. Here the necessity is manifested through chance. There is a necessity to *sell* in order to be able to *buy*, and vice versa, to *buy* in order to *sell*; in order to be able to *consume* and *produce* - to sell again, etc. Those. it is impossible to avoid moving in this "charmed circle" of operational closure. For if one breaks out of this circular causality, in which one's needs can be satisfied only by satisfying the needs of others, then the satisfaction of needs becomes impossible. It is a necessity or a law of the market economy, which is conditioned by the very basic relations of the mode of production which prevail in such an economy.

7. As noted, in a competitive market, the subject is not bound by rigid ties to one or another counterparty. But the function that it performs is rigidly tied to another function that can potentially be performed by various subjects. That is, it is functionally tied to all those who perform a complementary opposite function. Each function must be executed and, therefore, the action that implements this function must be carried out. But who exactly, which particular subject will perform this action, does not matter as long as there is competition and until the performance of this function is not monopolized by one or another subject.

Thus, when someone sells his product, someone else must buy it. Also, when he buys, produces, consumes, invests or consumes in debt, borrows or lends. In all these cases, there must be someone else in society who will fulfill the opposite complementary function. But who exactly does it is not important. In the face of one or another specific counterparty, each actor interacts with the whole society. All his economic actions take on the character of interaction between the individual and society as a whole. Society needs the function performed by the individual just as much as the individual himself. The market economy, as a social system, is born from the social actions of individuals, and the need and incentives for

the implementation of these actions are born by the very form of organization of such an economic system.

8. Everyone began to depend on each other. But outwardly in the market it seems that all agents are independent, free. It seems to each agent that his actions depend only on him. But the fact that "each branch must produce in accordance with the solvent needs of all other branches" is hidden in the deep structures of the market system. For an individual market agent does not know how many goods are produced in his branch, he does not know how many goods are required to satisfy the solvent needs of other branches, that is, he does not know the size of the market demand for his product. He produces blindly, "backdating".

9. Each branch exchanges its products with many other industries whose products are resources for it. Accordingly, each individual producer of one branch or another can exchange his goods with representatives of any other branch or group of branches and exchange his product for the products of these branches. But since the exchange of goods is mediated by money, all this is hidden behind a "money veil". Therefore, the subjects, although they know with whom personally they exchange goods for money, or money for goods. But no one knows specifically between which goods the exchange actually takes place.

Behind specific buyers who pay money, you can't see what industry they represent. Also, behind specific sellers who receive money, it is not visible what goods they buy with the money. And even if it were visible, individual transactions are just scattered facts, from which it is impossible to find out the ratio of the masses of goods exchanged between branches. But if sectoral proportions are violated, then deficits and excesses will arise, and, accordingly, deviations from equilibrium prices will also arise. Some make profits above the norm, others below the norm, and still others make direct losses. There will be incentives for redistribution. But these incentives arise only from the disruption of equilibrium proportions of goods exchanged between branches, about which no one has information. And these proportions are formed spontaneously. For no one asks anyone which industry to enter, or which one to leave, and how much to produce goods and how much to consume, respectively, what and how much to sell, buy, invest, consume on credit, etc. But the structure of industries, their proportions, the ratio of commodity and cash flows depends on what individuals produce, consume, sell and buy. But what and how much is produced, consumed, sold and bought by separate individuals determines the structure of branches, their proportions, the ratio of commodity and money flows. That is, the structure of the economy, which is vital for its normal functioning, is formed spontaneously.

In the event of large disproportions between branches and commodity-money flows, an economic crisis arises and a structural rearrangement of the economy begins. A new structure of branches and commodity-money flows is being formed, more in line with the new conditions of the external environment (natural and social). This is due to the fact that individuals at the nano- and micro-levels have to drastically change their actions and adapt to new conditions of the natural and social environment; to restore ties broken during the crisis, or to establish new ones; commensurate new needs with new conditions and possibilities for their opportunities, etc.

10. But when a deviation from equilibrium disturbs the integrity of the decentralized economy and its harmonious functioning, due to the emergent feature, the hidden interdependence of economic agents becomes apparent.

“No one can sell unless someone else purchases. But no one directly needs to purchase because he has just sold. Circulation bursts through all the temporal, spatial and personal barriers imposed by the direct exchange of products, and it does this by splitting up the direct identity present in this case between the exchange of one's own product and the acquisition of someone else's into the two antithetical segments of sale and purchase. To say that these mutually independent and antithetical processes form an internal unity is to say also that their internal unity moves forward through external antitheses. These two processes lack internal independence because they complement each other. Hence, if the assertion of their external independence [*iiusserliche Verselbstiindigung*] proceeds to a certain critical point, their unity violently makes itself felt by producing – a crisis.” (Marx, 1976, 209.)

This law operates behind the backs of market agents as a blind necessity, as a spontaneous market law. “The owners of commodities therefore find out that the same division of labour which turns them into independent private producers also makes the social process of production and the relations of the individual producers to each other within that process independent of the producers themselves; they also find out that the independence of the individuals from each other has as its counterpart and supplement a system of all-round material dependence.” (Marx, 1976, 202-203.) This “material dependence”, about which Marx writes, is embedded in the branch structure and is a manifestation of the emergent feature of an economic system based on the division of labor.

3.3. Relative price system

1. The invisible «*inner structure or order of economic life*», (Heilbroner) appears on the market in the acts of commodity exchange. Accordingly, it is only possible to «dig up» mentally to this «*inner structure of economic life*» only by analysing the commodity exchange. Therefore let's consider commodity exchange in a pure form, not covered by «money veil».

In a market economy, every commodity has the potential to be exchanged for all other goods. In the exchange act, the goods exchanged are in a mirror opposite relations. Each of these goods represents a payment for the purchased goods. A commodity that is purchased for one counterparty is sold for another. That is, each product is both sold and bought at the same time. Each commodity has its own purchasing power, or *exchangeability*, which is due to the solvent needs of the buyers of this commodity, and their willingness to sacrifice their goods for the sake of its acquisition. The *need* for a particular product or its *utility* is

measured by the costs sacrificed by the buyer for the sake of acquire it. Therefore, the exchangeability or purchasing power of a commodity in the market is determined by its utility for buyers and is estimated by the quantity and utility of commodities exchanged for it, i.e. sold commodities.

Moreover, in each exchange act, the purchasing power of each commodity can be expressed through the corresponding quantity of another commodity. This quantity, as an indicator of the goods' exchange rate, is the public estimate of the goods' purchasing power or the goods' *relative price* expressed in the opposite goods. In Marx's terminology, if one of the exchanged goods is in a *relative form* of value, the other will be in an *equivalent form* of value. In the exchange act $xA = yB$ (where: x and y are the quantities of the corresponding goods), the purchasing power of commodity A can be expressed in terms of the quantity of commodity B, and vice versa, the purchasing power of B can be expressed in terms of the quantity of commodity A. These market prices will be in inverse relation to each other: $A = y/x B$; $B = x / y A$.

2. Under conditions of division of labor, all branches of the economy produce products for each other. The products of each of them are resources for branches that consume these products. The volumes of their production and consumption come into line with each other through the exchange of products in the markets. In the process of this exchange, the same reflective relations arise as in the sphere of production and consumption. Each party in the exchange offers its own product instead of the purchased one. Demand is always effective demand. If it is insolvent, then it is not valid. But the solvency of demand is provided by supply. Each party in the exchange is both a buyer and a seller at the same time. If we take the totality of all branches of the economy, then a complete correspondence between their production and consumption is possible only with such proportions of the exchange of products in which the supply of products of each branch corresponds to the total demand for its product from all other branches. It is this reflection between production and consumption, product and resource, supply and demand, buying and selling, that determines that all industries turn into necessary parts of a single whole. As noted, the essential relationship is the relationship between branches in which each branch produces goods in accordance with the needs of all branches. It is this essential relationship that is the organizing principle of economic processes, which determines the integrity of the economy, the formation of an optimal branch structure and a system of optimal relative prices.⁵⁸

3. If all branches produce commodities for each other and exchange them for the commodities they consume, then the relations between branches will take the form: $xA =$

⁵⁸ "The problem that determines the heuristic possibilities of the integrity principle is the problem of substantiating integrity in each specific case. This principle significantly complements the systematic approach, since it is aimed at finding an essential relationship, essence, absolute. It is noted that the same object can have a different set of models, but the most adequate of them will be the one that reflects the basis of the wholeness of the phenomenon under consideration as a leading moment. The concept of "whole" is directly related to the problem of optimal choice. Let the set A be a concrete whole, then the set of parts that make it up, and the structure of their relations, are also concrete. ... In this sense, choosing the optimal means providing, creating, constructing the wholeness, fulfilling the creative function." (Yatskevich, 1990, 67)

yB .⁵⁹ Since all branches, and hence all commodities, exchange among themselves in certain proportions, the price of each can be expressed in units of another commodity. So in the case of $xA = yB$, as shown, the relative price $A = y/xB$, and the relative price $B = x/yA$. That is, under conditions of competition, the system of equilibrium relative prices is formed at the interbranch level, and each product has relative prices expressed in terms of all other commodities. Moreover, if each branch produces goods in strict accordance with the solvent needs of all other branches, then supply and demand for each individual commodity are always equal, as well as aggregate demand and aggregate supply. Such a branch structure corresponds to a single system of relative prices. This is a state of general equilibrium. For these prices are the direct result of the exchange ratios between branches when the markets are completely cleared. "Any violation of equilibrium proportions will cause a deviation from equilibrium prices; The integrity of the economy will be violated, for the reflection between the whole and its parts will disappear. Iterations between relative prices and interbranch structure occur until a new equilibrium is established between production and consumption." (Leiashvily. 2021, 6)

4. The exchange ratios of a given commodity with a multitude of other commodities generate a number of different indicators, i.e. a series of relative prices. This series is a qualitative characteristic of this commodity. The exchange ratios of any other commodity with the same set of commodities gives rise to another series of indicators. For example, two commodities that are indifferent to each other and are compared with each other have different series of indicators of the exchange ratios that they form with the same set of other commodities that oppose them. These series are series in which the relative prices of the two mentioned commodities are expressed in terms of the same set of commodities exchanged for them. Since these series consist of different indicators, it seems that the two commodities themselves being compared, which express their qualitative certainty with the help of these series, have nothing in common. In order to compare these two commodities, some common being-for-itself unit is required. Although it seems that such a common unit does not exist, but in reality such a common "unit" or constant for their comparison, is in these series themselves. For, although both series differ from each other in the *composition* of their indicators, the *ratios* between the indicators themselves within each of these series are the same. For the same set of commodities served to express the relative prices of the two commodities being compared. It is these ratios of indicators within the series that are the common constant for comparison. Now it becomes possible to compare these two commodities by comparing the series of relative prices expressing them.

5. What is true for two commodities is also true for many commodities. Instead of the two commodities from the previous example, as commodities indifferent to each other and

⁵⁹ Of course, typical barter problems can arise when branch A needs the products of branch B, but branch B does not need products A, but needs the products of a third branch C, which, in turn, does not need the products of branch B, but needs products of branch A, etc. But this problem is easily resolvable and comes down to the fact that branch A pays for the goods received from branch B with its goods supplied to branch C. For the goods received from branch C, branch B pays for its goods supplied to branch A. Similarly, branch C. In such an asymmetric barter pattern, many branches can be involved. It doesn't change the essence of the matter. Therefore, the relationship between them in all cases can be reduced to the form $xA = yB$.

compared with each other, we can take all primary resources (a, b, c). But as the set of commodities opposing them, through the exchange ratios to which their series of indicators (a' , b' , c' ...) are formed, one can take the set of final products (α , β , γ ). Following the previous logic, although these series (a' , b' , c' ...) differ from each other by the *composition* of their indicators, the *ratios* between the indicators themselves within these series are the same. For the same set of final products (α , β , γ ) served to express the relative prices of various primary resources (a, b, c). It is these ratios between indicators within the series that are the common basis, the constant for comparing primary resources with each other.

6. But further, all products from that set of final products (α , β , γ ), through which the compared primary resources (a, b, c) expressed their qualitative certainty, are themselves independent goods. And they are also opposed by primary resources (a, b, c), through which they themselves can express their qualitative certainty and be compared with each other. That is, a series of primary resources and a series of final products are in mirror-symmetric relations to each other.

So, *two series* of goods are opposed - a series of primary resources and a series of final products. Each of the primary resources express their purchasing power through a *series of indicators* of exchange ratios with a series of final products. And since within these *series of indicators* the ratios between indicators are constant, then the primary resources become comparable with each other and, therefore, are themselves in certain exchange ratios. The same can be said about final products. Each of the final products expresses its purchasing power through a *series of indicators* of exchange ratios with a number of primary resources. And by the same logic, final products are in certain exchange ratios with each other.⁶⁰

Thus, between primary resources (within a series of primary resources), and between final products (within a series of final products), and, therefore, between all primary resources and all final products, there are certain exchange ratios that express their ability to exchange for each other, that is, their purchasing power. These exchange ratios among all commodities, or their *relative prices*, are expressed by *indicators*, simple *numbers*, or *coefficients* of exchange.

7. At the same time, it is not necessary to confine ourselves by consideration of exchange ratios only between primary resources and final products. The same regularities hold true for all commodities, including intermediates. And since they all are commodities, it ultimately turns out that each commodity has its own series of indicators of exchange ratios with all other commodities. All these series differ from each other only in the *composition* of their indicators, but not in the *ratios between* these indicators.

However, these constant *ratios between* indicators are themselves nothing but a *series of indicators* that shows the *ratios between the purchasing powers* of all commodities, but shows them in a unified form. In other words, this series of indicators shows the exchangeability of each commodity for all other commodities. This unified form of ratios between the purchasing powers of different commodities is hidden behind a multiplicity of

⁶⁰ "In this way, both sides are a series in which, *first*, each number is simply a unit with respect to the opposite series in which it has its specifically determined being as a series of exponents; *second*, each number is itself one of the exponents for each member of the opposite series; and, *third*, it is a comparative number for the rest of the numbers of its series and, as such an amount which belongs to it also as an exponent, it has its unit, determined for itself, in the opposite series." (Hegel, 2010, 307.)

exchange ratios between commodities, i.e. hidden behind the multiplicity of their relative prices. However, in the future, as a result of the development of market relations, the emergence of money reveals this hidden series of relationships and unambiguously expresses it in monetary form, in the form of a series of money prices. This series of absolute prices, or the unified monetary form of expressing the relative prices of all commodities, thus brings to light the relative purchasing power of these commodities from the veil and seeming chaos of barter prices.

Questions naturally arise: Why are commodities exchanged precisely in such proportions and not in others? In other words, on what does the purchasing power of commodities, their relative prices, depend? The very fact that all commodities are exchanged among themselves according to well-defined proportions suggests that there is a certain *homogeneous substance* that is contained in all commodities, but in *different quantities*. It can be assumed that the exchange proportions of commodities are formed by equating this homogeneous substance contained in them. The thought arises that this substance may be the market value of goods, which is hidden behind their relative prices, just as the subjective values of goods was hidden behind their subjective evaluations in the subsistence economy. But the subjective values of various market agents are not comparable with each other. Therefore, the relative prices of commodities exchanged on the market between different agents cannot be based on their subjective values. But what then is this "mystical" substance? Why is it found in different commodities in different quantities?

3.4. Money

1. Of the whole variety of goods, one of them (usually gold or silver) is withdrawn from the sphere of consumption and begins to circulate as an intermediary in exchange relations, performing the function of money as a medium of exchange. The fact that it was gold or silver that began to perform the function of a monetary unit is due to their physical properties and random circumstances.⁶¹ Theoretically, any of the goods can perform the function of a monetary commodity. Its purchasing power will be conditionally taken as the unit of measure for the purchasing power of all other commodities. Depending on the chosen monetary commodity, the prices of all commodities will be expressed by different indicators, but the ratios between them will remain unchanged. 2. All goods begin to be exchanged for gold, a certain amount of which is conventionally accepted as a unit of purchasing power.

⁶¹ In general, the choice of a unit of measurement for something, whether it be length, weight, volume, or something else, is due to random circumstances that are insignificant for the unit of measurement itself. "A measure, in the usual sense of a standard, is a quantum which is arbitrarily assumed as the unit *determinate in itself* as against an external amount. Of course, such a unit can in fact also be determinate in itself, like a foot or some such other original measure; to the extent, however, that it is used as the measuring standard for other things, it is with respect to them only an external measure, not their original measure. – Thus the diameter of the earth or the length of a pendulum may be taken as a specific quantum on their own account. But the choice of a fraction of the earth's diameter or of the pendulum's length, and this last under which degree of latitude, for use as a standard of measure is arbitrary. And for other things such a standard is something even more external." (Hegel, 2010, 289.)

Thus, all commodities express their *relative prices* in terms of a certain number of monetary units. But expressed in money, they already become *absolute (nominal)* prices. In this form, all commodities, despite the fact that they all qualitatively differ from each other, become quantitatively commensurable through their absolute prices, which are simple numbers, indicators of the exchange ratios between commodities and money. And since all relative prices are interconnected with each other, the absolute prices of all commodities depend on each other and represent a single system.

Prices are system magnitudes. Each price is a function of all other prices. In mathematical terms, prices are a mathematical group. A change in the price of any one good affects the prices of other goods. Evaluation of goods in such a unified form greatly facilitates the adoption of economic decisions and speeds up economic processes. Instead of a huge series of relative prices, each commodity receives a single monetary price. Accordingly, instead of a multiplicity of series of relative prices, the price system is represented by a single series of money prices.

3. If earlier all goods were exchanged for each other, now they are exchanged only for money. And the economic process externally manifests itself not as a system of counter commodity flows, but as a system of counter flows of goods and money.⁶² It is no longer clear what goods are exchanged for what, in what proportion and in what volume (between branches). Behind absolute prices, neither relative prices nor the emergent property of the system, on which the logic of market optimization is based, are visible.⁶³ Outwardly, one can observe only the exchange of goods for money. This does not change the essence of the self-regulation mechanism, however, there is a gap in time between the sale of some goods and the purchase of others, which gives rise to the possibility of crises.

4. As noted, the economy is in equilibrium when each branch produces in accordance with the solvent needs of other branches. In a barter economy, the equality of aggregate demand and aggregate supply means that the above equilibrium condition is met. But with the advent of money, the equality of aggregate demand and aggregate supply is a necessary but not sufficient condition for equilibrium. But with the appearance of money, the equality of aggregate demand and aggregate supply is a necessary but not sufficient condition for equilibrium. It does not guarantee that each branch will produce goods in accordance with the solvent needs of other branches. For, in a money economy, the solvent needs of branches are no longer expressed in the goods they produce, but in money. With the advent of money, the

⁶² "That this one-sided form of motion of the money arises out of the two-sided form of motion of the commodity is a circumstance which is hidden from view. The very nature of the circulation of commodities produces a semblance of the opposite. ... Hence although the movement of money is merely the expression of the Circulation of commodities, the situation appears to be the reverse of this, namely the circulation of commodities seems to be the result of the movement of money." (Marx, 1976, 211-212.)

⁶³ The emergent property of a market economy (according to which each branch produces in accordance with the solvent needs of all other branches) provides a tendency towards an equilibrium state of the system and underlies the mechanism of its self-regulation. Looking ahead, we note that this property of the market system and its tendency to equilibrium is born by the operation of the *law of value*, in which agents of a competitive market are forced to exchange goods on an equivalent basis. The law of value is the regulator of the economy, the "invisible hand" about which A. Smith wrote.

financial sector of the economy appears, where money can flow from the real sector, or flow from it into the real sector. In such an economy, veiled by monetary processes, the entire market process is presented in a mystified form. Perhaps this explains A. Smith's appeal to the metaphor of the "*invisible hand*". For behind the monetary veil it is difficult to *see* the emergent property of the economy, which forms it as a whole. That is, we do not see that essential relationship between the whole and its parts, thanks to which the economy appears as a harmonious interaction of its constituent branches.

5. Depending on which good is accepted as a unit of market value, absolute prices will vary, but relative prices remain unchanged until the branch structure changes. For the normal functioning of the system, from a theoretical point of view, it does not matter which commodity performs the functions of a money commodity, *what amount* of money commodity is in circulation, nor even whether the commodity, paper banknotes, or digits in computer memory are money at all. In order for money to perform its function normally, it is only important to ensure the *stability* of the amount of money in circulation.

6. Under barter conditions, commodities were bought by commodities, and each commodity embodied purchasing power, as the ability to buy other commodities. Now this ability to buy other commodities is delegated to only one monetary commodity, which falls out of consumption and circulates. The process carried out in the form – $T_0 - T_1 - T_2 - T_3 - T_4 - \dots$ was transformed into a process – $T_0 - D_0 - T_1 - D_1 - T_2 - D_2 - \dots$. Now the purchasing power of money is the ability to buy *any* commodities, and the purchasing power of commodities is the ability to buy *only* money.

Since commodities are no longer exchanged for each other, but are exchanged only for money, money has become a *universal* commodity. Money can buy any goods. Because of this, they have an abstract utility that can be transformed into the utility of any particular commodity. Since money is the ability to buy *any* commodities, and consequently, is a *universal* purchasing power, it acquires a special power in the world of commodities and becomes a *universal need*.

7. Everything that can perform monetary functions is money. Therefore, in essence, money is not so much a material carrier of monetary functions, but the totality of these functions itself. The fact that at one time gold emerged from the world of commodities as money became possible because, like other commodities, it itself had a value. And gold had purchasing power because it had value. But as money, gold, on the contrary, has value because it has purchasing power. And the source of this power is the *universal need* for those functions that money performs (medium of exchange, means of payment and measure of value). Gold, as money, gains value because, by virtue of its functions, it has power over all commodities and, through this, provides economic freedom to its owners. The very power vested in the money has a value, be it gold, silver or symbolic money. But the power of money depends on its purchasing power, or on its *exchangeability*, which in turn depends on the *relative scarcity* of money in the world of commodities. Otherwise, it depends on the quantitative ratio of money and commodities. As a result, the value of gold *as a commodity* begins to diverge from the value of gold *as money*. Over time, it becomes possible to replace commodity money with paper money, and later with credit money, simple entries in ledgers or in computer memory. Over time, it becomes possible to replace commodity money with paper money, and later with credit money, simple entries in ledgers or in computer memory.

8. The world of commodities, split into two opposites, in which gold played the role of commodity money, subsequently unites again. Gold returns to the world of ordinary commodities (as a privileged commodity), but instead of itself leaves its symbol - paper money.⁶⁴ Banknotes or other monetary symbols are of negligible value compared to the value of the power and freedom that they provide to their owner.

Depending on the distribution of money, some subjects have more economic power, others less. The power of money extends over all subjects, since everyone needs them.⁶⁵ Since money becomes a universal need, then, unlike the need for specific commodities, the need for money has no limits. Everyone needs money, always and everywhere, without restrictions, while the need for commodities is limited. Everyone needs them only until the saturation of one or another specific solvent need.

9. Under barter conditions, all subjects exchanged produced commodities for consumed ones ($T_1 - T_2$). But with the advent of money, a single act of exchanging of commodities is torn into two parts - selling ($T_1 - D$), and buying ($D - T_2$), and the whole process takes the form: $D_0 - T_1 - D_1 - T_2 - D_2 - T_3 - D_3 - \dots$ etc.. "From here, as Aristotle concluded and Marx put at the centre of his definition of capital, two kinds of exchanges emerged: buying for selling (hopefully at a profit) or buying for consuming, having sold to acquire the needed money to buy that which is needed to try to satisfy a felt need."⁶⁶ In the latter, money is just a means for exchange, placed between two different use-values, while in the former it becomes an end in itself, being used for its secondary purpose and aimed at an increase in exchange-values. By introducing money as an intermediate link between two different commodities ($C_1 - M - C_2$) facilitating an exchange between two different use-values, you also open the doors for putting a commodity as an intermediate link between two exchange-values, the aim being to increase your capital ($M_1 - C - M_2$ aiming to get $M_2 > M_1$)."
(Stahel, 2020, 4.)

10. With the advent of profit opportunities in the money economy, entrepreneurial individuals appeared, whose main goal was money and enrichment.⁶⁷

⁶⁴ "Hence in this process which continually makes money pass from hand to hand, it only needs to lead a symbolic existence. Its functional existence so to speak absorbs its material existence. Since it is a transiently objectified reflection of the prices of commodities, it serves only as a symbol of itself, and can therefore be replaced by another symbol." (Marx, 1976, 226.)

⁶⁵ Under such conditions, those who have a lot of money gain power over those who have little or no money. The greater the economic inequality, the greater the power of some people over others. As a result: "Things which in and for themselves are not commodities, things such as conscience, honour, etc., can be offered for sale by their holders, and thus acquire the form of commodities through their price." (Marx, 1976, 197.)

⁶⁶ "Formally Marx portrayed the first one as $M_1 - C - M_2$ aiming to get $M_2 > M_1$ (money here being used to buy a commodity which is later to be resold at a profit), while in the latter we have $C_1 - M - C_2$ (here a commodity is sold in order to earn the money needed to acquire another, different commodity with it). In the first case, the aim is quantitative, the intervening quality of the commodity not being of the essence, being just a mean-to-an-end, while in the second case it is the qualitative difference between the commodity possessed at the beginning of the circuit with respect to the one acquired at the end which is of the essence. Exchanging something you need less in order to acquire something you desire more. In both cases, the intermediating link is just a means-to-an-end."
(Stahel, 2020, 4)

⁶⁷ Production, trade, finance, business in general, is set in motion by the efforts of entrepreneurs, for whom the main motive for economic activity is profit and enrichment. "The increase in wealth is to a large extent an end in itself as well as a means to the increase of income. ...

Everyone needs money, but some need it mainly as a goal, while others need it as a means of buying commodities.

Since money provides the opportunity to make a profit by producing commodities with commodities, or by buying and selling commodities, the right to use the services of money itself becomes the most demanded commodity. Money becomes capital, yielding interest. The owner of money sells the right of temporary use of the services of money in the same way as the owners of the labor force, land, or physical capital sell the right of temporary use of the services of these production factors. The rate of interest is the price for the right to temporarily use the services of money, just as Wages, Rent, or Rental payment (for physical capital) is the price for the right to use the services of these production factors.

11. In such conditions, it is possible to make a profit not only through the *production* of commodities or the *purchase* and *sale* of commodities. But the services of money can also become an object of buying and selling. Since money provides an opportunity to make a profit in the sphere of production or trade, the services of money become a demanded commodity. First, usurers appear - owners of money capital, who sell the *right* to temporarily *use* the services of money and receive interest as a payment for it. A little later bankers as financial intermediaries appear. They buy these *rights* at a low price from those, who have temporarily free money, and sell them at a high price to those, who temporarily need them. In other words, they borrow money at low interest and lend at high interest. The difference between the interest received and paid is their profit.

12. Since gold with its value returns to the commodity world, and leaves in its place simulacra, endowed with an equivalent value, the total value of the commodity world has doubled. It appears as two counter, equal in magnitude and opposite in sign, value flows of goods and money. Since money is a universal good and has universal *exchangeability* (liquidity), all commodities go where money goes, and money goes where there are commodities demanded by the owners of money. One way or another, money becomes the driving force of economic processes.

13. The purchase and sale of goods becomes the sale and purchase of money, which serves as a kind of a way of fixing the debt that society has to the owner of the money. For the fact that the subject has money testifies that its owner has transferred a socially useful commodity to society, but has not yet received another commodity of equivalent value from it in return. He received only money, indicating his contribution to the production of useful commodities for society. By buying commodities with this money, society repays its debt in the form of commodities of equal value.⁶⁸

in business generally, produce wealth to be used in producing more wealth with no view to any use beyond the increase of wealth itself. ... We can hardly over-emphasize the fact that the dynamic urge back of modern economic life is the desire to increase wealth, rather than a desire to consume goods,...” (Knight, 1921, 319 -320.).

⁶⁸ Scientific disputes as to whether they have a commodity or credit origin have no basis. In different economies, both are possible. These are just different ways of emergence of commodity-money relations. Commodity money in itself is a form of manifestation of credit relations. “Shortly, the Credit Theory is this: that a sale and purchase is the exchange of a commodity for a credit. From this main theory springs the sub-theory that the value of credit or money does not depend on the value of any metal or metals, but on the right which the creditor acquires to ‘payment,’ that is to say, to satisfaction for the credit, and on the obligation of the debtor to ‘pay’ his debt, and conversely on the

3.5. Birth of macro-order from micro-chaos

1. Separate acts of commodity-money exchange, *chaotically* arising at the micro-economic level, at the macro-economic level takes the form of an ordered system of counter flows of commodity and money. How does order arise from the chaos of uncontrolled actions in a decentralized economy? After all, various subjects proceed from their own interests and are guided by subjective values and, accordingly, by subjective valuations?

Although the subjective assessments of different individuals are incommensurable with each other, but if the exchanging parties made a decision and the exchange act took place, then this could happen only according to one or another exchange ratio. During a certain period of time, a huge number of exchange acts take place on the market between similar two commodities. These transactions involve many subjects with different subjective values. Accordingly, in each of these transactions, different exchange ratios, or, what is the same, different *individual prices*, are formed.⁶⁹ But the *market prices* of these commodities are weighted averages of the entire set of individual prices at which transactions were made during the specified period of time.⁷⁰ Market prices serve as a guideline for each agent to make decisions about whether to continue looking for better deals. In addition to market

right of the debtor to release himself from his debt by the tender of an equivalent debt owed by the creditor, and the obligation of the creditor to accept this tender in satisfaction of his credit. Such is the fundamental theory, but in practice it is not necessary for a debtor to acquire credits on the same persons to whom he is debtor. We are all both buyers and sellers, so that we are all at the same time both debtors and creditors of each other, and by the wonderfully efficient machinery of the banks to which we sell our credits, and which thus become the clearing houses of commerce, the debts and credits of the whole community are centralised and set off against each other. In practice, therefore, any good credit will pay any debt. Again in theory we create a debt every time we buy and acquire a credit every time we sell, but in practice this theory is also modified, at least in advanced commercial communities. When we are successful in business, we accumulate credits on a banker and we can then buy without creating new debts, by merely transferring to our sellers a part of our accumulated credits. Or again, if we have no accumulated credits at the moment when we wish to make a purchase, we can, instead of becoming the debtors of the person from whom we buy, arrange with our banker to 'borrow' a credit on his books, and can transfer this borrowed credit to our seller, on undertaking to hand over to the banker the same amount of credit (and something over) which we acquire when we, in our turn, become sellers. Then again, the government, the greatest buyer of commodities and services in the land, issues in payment of its purchases³ vast quantities of small tokens which are called coins or notes, and which are redeemable by the mechanism of taxation, and these credits on the government we can use in the payment of small purchases in preference to giving credits on ourselves or transferring those on our bankers. (Innes, 2004, 51-52.)

⁶⁹ "The possibility, therefore, of a quantitative incongruity between price and magnitude . of value, i.e. the possibility that the price may diverge from the magnitude of value, is inherent in the price-form itself. This is not a defect, but, on the contrary, it makes this form the adequate one for a mode of production whose laws can only assert themselves as blindly operating averages between constant irregularities." (Marx, 1976, 196.)

⁷⁰ We are talking about actual current market prices, and not about equilibrium prices. Equilibrium prices are ideal market prices in the case of an optimal branch structure, in which everything that is produced is consumed and everything that is consumed is produced. But the actual prices and the actual branch structure are always striving towards the optimal, but never reach them due to the incessant changes in technology, needs, natural and social conditions and other destabilizing influences of the external environment.

prices, in each transaction, the parties take into account macro-economic conditions common to all (inflation, unemployment, optimism or pessimism, etc.), to which each agent reacts differently. It also takes into account conditions unique to each subject (its production capabilities, consumer preferences, rational expectations, comparative advantages, etc.). The result of this is that in each individual transaction the individual prices of commodities deviate to some extent from market prices. “Accordingly, the set of individual prices, which will be formed as a result of individual deviations from existing market prices, will in general fully reflect all changes in the needs and production capacities of society. There is an inverse relationship between individual and market prices. ... Therefore, the set of individual prices, which is formed by deviating from current market prices, serves as the basis for the formation of new market prices, which, in turn, will become new reference points for the formation of a new set of individual prices, etc. without end. Individual and market prices are formed in an endless process of circular causality. They infinitely change each other. ... In this case, individual deviations from market prices occur consciously, but the formation of market prices, as average magnitudes, occurs spontaneously. For, although the deviation of individual prices from market prices in each transaction occurs consciously, but the very *set* of individual prices (the *number* of transactions and the *bigness* of individual prices in each of them), on the basis of which average market prices are formed, is formed spontaneously.” (Leiashvily, 2021,11-12.).

2. Just as individual and market prices are formed on the basis of feedback between them, micro- and macroeconomic parameters are formed in the same way. When market prices change, subjects change the individual parameters of their production and consumption, supply and demand, the number and volume of exchange transactions, individual prices, etc. But the aggregated results of these changes are new macroeconomic parameters of production and consumption, aggregate demand and aggregate supply, sectoral structure, dynamics of economic processes, public moods of optimism and pessimism, and so on. In other words, those macro-economic conditions are changing, on the basis of which individual decisions were made at the micro-level and individual parameters of economic activity of subjects were formed. Self-regulation of the market economy occurs due to this feedback between micro- and macro-economic processes.

“One of the earliest insights of economics—it certainly goes back to Smith—is that these aggregate patterns form from individual behavior, and individual behavior in turn responds to these aggregate patterns: there is a recursive loop. It is this recursive loop that connects with complexity. Complexity is not a theory but a movement in the sciences that studies how the interacting elements in a system create overall patterns, and how these overall patterns in turn cause the interacting elements to change or adapt. ... Complexity is about formation—the formation of structures—and how this formation affects the objects causing it. To look at the economy,... from a complexity viewpoint then would mean asking how it evolves, and this means examining in detail how individual agents’ behaviors together form some outcome and how this might in turn alter their behavior as a result. Complexity, in other words, asks

how individual behaviors might react to the pattern they together create, and how that pattern would alter itself as a result.” (Brian, 2015, 3.)⁷¹

As in the case of individual prices, all individual parameters of economic activity of subjects are formed on the basis of their conscious decisions. But since there is no single center coordinating the subjects’ actions, the formation of market prices and macroeconomic parameters, which are based on these individual parameters occurs *spontaneously*. “For, in the absence of external regulation, from the chaos of uncoordinated actions of a multiplicity of independent agents, the very *set* of different individual parameters are spontaneously formed, from which, in turn, the system’s uniform parameters are formed. This is an essential factor determining the elements of spontaneity and uncertainty in a self-regulating decentralized economy, in which the macroeconomic order is born out of microeconomic chaos.” (Leiashvily. 2021, 12.)

3. Pricing doesn't happen at the micro level. It occurs in the entire system as a whole, simultaneously at the micro and macro levels. Without a clear understanding of how this happens, it is impossible to bridge the existing gap between micro- and macro-economics.

3.6. Market value

1. Market value has been studied by economic science from the very beginning of its birth. But in economic theory, the problem of value turned out to be so difficult that the neoclassicists stopped studying it altogether and practically replaced it with the problem of price. As a result, both problems remained unclear - both the problem of value and the problem of price. “ *The general problematic of value, ..., is the effort to tie the surface phenomena of economic life to some inner structure or order. ... Empirical investigation into the provisioning process is an essential, indeed a constitutive, part of economic inquiry, but it is not the only such part. Equally necessary for the existence of what we call economic thought is a level of abstract inquiry—an inquiry directed not at the “facts” of economic life but at some structure or principle “behind” the facts. ... Economics now becomes an inquiry into the systemic properties, the structural attributes, the tendencies and sometimes even the telos of the provisioning process. Thus behind empirical investigations into allocation*

⁷¹ “What until now seemed mysterious, inexplicable or even paradoxical, suddenly becomes completely clear. We find that the collective behavior of many separate individuals (be they atoms, molecules, cells, animals or people) and, ultimately, their own destiny is determined by themselves in the course of their interaction with each other: through competition, on the one hand, and cooperation on the other. . . . In this sense, synergetics can be viewed as the science of collective behavior, organized and self-organized, and this behavior is subject to general laws. When a science declares the universality of its laws, this immediately produces very important consequences. Synergetics draws on very different disciplines, including not only physics, chemistry and biology, but also sociology and economics...” (Haken, 2003, 24-25) “When we henceforth speak of collective behavior, we will mean by this behavior in which people act as if they had colluded among themselves.” (Ibid., 165) “Here again we encounter a peculiar relationship between separate individuals and an ordered structure. Structure subjugates individuals; however, the reverse is also true: it is individuals who maintain the existence of the structure. (Ibid., 189)

problems we have theoretical premises as to the “workings” of the price mechanism; behind the functional equations of econometric models there are assumptions as to the “laws” of behavior of individuals, or perhaps even the “laws of motion” of the capitalist system; behind input output matrices are “production functions,” equally abstract representations of the idealized behavior of the industries in question.” (Heilbroner, 1988, 106 - 107) (Heilbroner, 1988, 106 - 107)⁷²

In order to understand the problem of market value, it is necessary to understand how it is formed by aggregating subjective economic valuations, and with them the subjective economic values that they express.

2. In each exchange act, when comparing the values of exchanged goods, both parties are guided by their subjective valuations and opposing interests. In the case of a barter exchange, the parties evaluate the subjective value of sold commodities in terms of the individual costs of their production and sale, and the subjective value of the purchased commodities is evaluated in terms of the subjective utility acquired through these costs. Each party in the exchange compares the value of the sold commodity with the value of the purchased commodity only on its own subjective scale of values. The decision to exchange is made only if for each party the utility of the purchased commodity is greater than the costs of production of the sold one; in other words, if the subjective value of the purchased commodity is greater than the subjective value of the sold one. If there is no increase in value, the transaction loses economic sense for them.

The opportunity that both parties receive surplus value is due to the fact that, firstly, the parties have different value systems, and, secondly, they have a mirror-opposite attitude towards the exchanged commodities. A commodity, which for one side is the embodiment of costs, for the other side is the embodiment of utility. However, the range of exchange proportions acceptable to both sides has its limits. Outside this range, the transaction cannot be mutually beneficial, since in this case the gain of one side becomes possible only at the expense of the losses of the other side.

But even within the specified range, each party seeks to maximize its benefits - to obtain maximum utility with minimal costs. This finds its manifestation in the desire of each party to exchange a smaller quantity of its goods for the largest possible quantity of purchasable goods. Therefore, although the deal remains mutually beneficial, it may be *more* beneficial for one side, and *less* - for the other. The actual exchange proportions, within a

⁷² «Every economist knows that Smith, despite his beaver and deer parable, felt impelled to explain prices on a basis different from pure labor inputs. This was because he recognized that, in all social stages beyond that of “rude” society, capital and land were undeniably involved in the pricing process, and that a theory of value that ignored them could not serve as a foundation for explaining the basis of exchange. Thus Smith took his well-known recourse to the description of exchange value as composed of the “natural” prices of the three constituent cost-elements in commodities – the wages of labor, the rent of land, and the profits of capital. Every economist also knows that on two counts this is an unsatisfactory basis for resolving the value issue. First, it ignores the fact that wages, rents, and profits are themselves prices whose relation to some ordering principle must be explained rather than passed over. Second, it is mute in the face of query, “What is the *substance* or, if you will, the *nature* of the ‘value’ that enters into all three elements?” With respect to labor, as we have seen, the classical economists overlooked the problem of defining a common unit of effort. But even assuming that one could constitute such a unit from labor’s “toil and trouble”, no counterpart in terms of basic unit of input was ever adduced for land and capital. (Heilbroner, 1988, 116-117.)

mutually acceptable range, depend on the bargaining power of the parties. But if the exchange took place, then it took place according to a certain proportion and, consequently, each commodity received its individual price, expressed in the quantity of the opposite commodity exchanged for it.

3. Agents cannot directly perceive the market value of goods, i.e. their social economic value. For this, market prices are needed, i.e. their public valuations. As was shown, public valuations are formed on the basis of individual prices in individual exchange acts, and individual prices are formed on the basis of individual valuations, i.e. subjective valuations. That is, ultimately, public valuations are the result of aggregation of individual valuations. But since the individual valuations themselves are formed on the basis of individual values,⁷³ the very logic of the formation of social valuations suggests that along with their formation on the basis of individual valuations, in the same process, the formation of social values on the basis of individual values takes place. And this means that public valuations reflect public values in the same way that individual valuations reflect individual values. In other terms, the market value of commodities appears externally in market prices.⁷⁴ Thus, the market value of goods is also formed on the basis of subjective values, as well as market prices - on the basis of subjective valuations.

But this is only one side of the formation process of market values and market prices. The other side of this process is the inverse effect of market values and market prices on subjective values and subjective valuations, which occurs with the help of the feedbacks between micro- and macro-economic processes described above.

4. The exchange of commodities between two economic agents is an elementary exchange act $xA = yB$, from which a market economy is born. Behind the outward simplicity of this act lies a problem that Aristotle had already discovered. "Money, then, acting as a measure, makes goods commensurate and equates them; for neither would there have been association if there were not exchange, nor exchange if there were not equality, nor equality if there were not commensurability. Now in truth it is impossible that things differing so much should become commensurate, but with reference to need (hence, also utility - P.L.) they may become so sufficiently." (Aristotle, 2009, 90.) Pointing to the need as a *sufficient basis* for comparison, Aristotle gives the right reference point for further analysis, although he himself does not delve into this problem.⁷⁵

⁷³ Individual (subjective) evaluations are formed as a result of the *commensuration* of various subjective values. The subject always has to do this when he makes a decision and makes a choice between the values of various goods. As a result of manifold repetitions, certain goods are assigned certain values in his mind (until a reevaluation of values occurs). Thus, a system of a person's subjective evaluations is formed.

⁷⁴ "The general problematic of value, ..., is the effort to tie surface phenomena of economic life to some inner structure or order." (Heilbroner, 1988, 105)

⁷⁵ But if the distinction between concrete and abstract needs (and their corresponding utilities) is not pointed out, an objection arises. For specific needs (utilities) are 'so different' and 'cannot become commensurable', as are the 'things' about which Aristotle writes. Commenting on the quoted thought of Aristotle, Marx writes: "'There can be no exchange,' he says, 'without equality, and no. equality without commensurability' ...; Here, however, he falters, and abandons the further analysis of the form of value." (Marx, 1976, 151.)

Only quantities of the same quality can be measured. As empirical objects, exchanged commodities differ qualitatively from one another; their properties are incommensurable. Some commodities may have some common properties, but such a common quality that absolutely all commodities without exception have, and on the basis of which they can be commensurate, according to the above, can only be their ability to satisfy a need in general, i.e. abstract need. Since the reverse side of an abstract need is abstract utility, it means that the general quality of goods is abstract utility. And assuming that commodities are produced by the consumption of commodities, in the process of which their utility is converted into costs, it is not difficult to logically conclude that the common quality of all goods, in addition to abstract utility, is also abstract costs and, consequently, economic value, as a unity of abstract utility and abstract costs.

5. However, another problem arises. It turns out that the exchanged commodities must be both equal and unequal at the same time. They should be equal as social values (market values) and not equal as individual values (subjective values). Each subject makes a decision to exchange only if the subjective value of the purchased goods is greater than the subjective value of the sold one.⁷⁶ This is possible only due to the fact that the subjective values of counterparties differ from each other. Otherwise, the transaction cannot be profitable for both subjects at the same time. But as social values, the exchanged commodities are equal.

The fact is that each party in the exchange is an equal member of society, and each of them represents a part of the public demand for the purchased commodity and a part of the public supply of the commodity sold. If this single transaction has been completed, then in their person society has recognized the social utility of each of the exchanged goods, and, accordingly, has recognized the utility of the social costs for the production of each of them. Therefore, considering the exchange of goods ($xA = yB$) between two subjects, in their person, society compares the social utility of the purchased goods with the social costs of producing the goods sold. If the exchange act took place, then this confirms the mutual recognition by the subjects, as representatives of society, of the social values of both goods.

Thus, this single transaction confirms that, in the given exchange proportion, the exchanged commodities represent equal social values, but different subjective values.⁷⁷ The

⁷⁶ The 18th-century French economist Candillac wrote: "It is not true that in an exchange "of commodities we give value for value. On the contrary, each of the two contracting parties in every case gives a less for a greater value ... If we really exchanged equal values, neither party could make a profit. And yet they both gain, or ought to gain. Why? The value of a thing consists solely in its relation to our needs. What is more to the one is less to the other, and *vice versa* ... It is not to be assumed that we offer for sale articles essential for our own consumption ... We wish to part with a useless thing, in order to get one that we need; we want to give less for more ... It was natural to think that, in an exchange, one value was given for another equal to it whenever each of the articles exchanged was of equal value with the same quantity of gold But there is another point to be considered in our calculation. The question is, whether we both exchange something superfluous for something necessary." (Quoted from: Marx, 1976, 261.) (Obviously, by "values" here are meant subjective values.)

⁷⁷ At the same time, it should be taken into account that the individual parameters of production, consumption, and exchange differ significantly for different individuals. But all of them can be expressed both in subjective evaluations that are incommensurable for different individuals and in common for all social evaluations, i.e. at market prices. On the basis of individual parameters, average social parameters are formed by aggregation and averaging. It should also be noted that the individual

costs and utilities of the exchanged commodities, which are incommensurable in the subjective valuations of the parties, become commensurable in a single system of market prices, in which the social costs and social utilities of all commodities are expressed.

6. Speaking of *subjective* values, usually refers to individual values, which are as unique as the individuals themselves. But social value usually means *objective* value. However, social value, which is formed on the basis of the interaction of individual values, is objective only in relation to individuals. For the social values of goods, although they are formed on the basis of the very subjective values of interacting individuals, they do not depend on the values of any of them separately. However, by their nature, social economic values are also subjective values in the sense that they represent the values of society as a collective subject. They exist only in the intersubjective space of social consciousness. Social economic values are society's attitude to certain economic goods as *socially useful* goods that can satisfy its needs. And after satisfaction of his needs, the *social utility* of these goods is perceived as a *social cost*.

7. By analogy with individual values, social values represent the unity of utility and costs. But the utility and costs of society as a collective subject are implied. In other words, market value is the unity of *use value* and *production value*. In this case, use value is understood as the value seen from the side of *social utility*,⁷⁸ in contrast to the production value, which reflects the value from the side of *social costs*. At that, the production value consists of two components - 1) the sum of utilities of the sacrificed social resources and 2) the spiritual efforts of the society associated with the adoption of economic decisions.⁷⁹

8. Utility is only an *assumption* about the ability of a good to satisfy a need. The truth or falsity of this assumption will become clear only when the utility turns into costs or losses, i.e. when there is no more usefulness. And costs are only a *memory* of the utility of a good that has already satisfied a need. That is, the memory of what was, and not the knowledge of what is. In other words, neither utility nor cost is something immediately existing. They are either an assumption or a memory of the specifically human, teleological attitude of the subject to this or that good. This means that value, as a unity of utility and costs, is something that does not exist as immediately existing, but exists only in individual and collective consciousness in the form of mental acts of assumption and recollection. That is, these are purely mental processes. However, it is on their basis that a choice is made between

prices of an exchange transaction are formed on the basis of subjective evaluations of the parties. Individual prices are only exchange proportions in a single market transaction, formed as a result of an agreement between the parties. The subjective values and evaluations of different individuals are unique, they are not commensurate and therefore cannot be directly aggregated. However, the formation of market prices based on individual prices automatically means that on the basis of subjective values the formation of social values occurs.

⁷⁸ Use value is understood here as an abstract utility, and not as a concrete utility, as it is presented in Marx's *Capital*.

⁷⁹ As will become clear from further analysis, the source of surplus value is the spiritual and volitional efforts of society as a collective subject, associated with entrepreneurship. "According to Hegel, definitions of value cannot be obtained in the way Marx obtained them. A Hegelian adept would say about the first sections of *Capital* that definitions of one particular form of value are there taken to be universal definitions of value, while they are not universal definitions at all. He would recommend to deduce universal definitions of value from definitions of reasonable will (the way they are deduced by Hegel in *The Philosophy of Right*)."(Ilyenkov, 1960, 57.)

alternatives, economic decisions are made, individual and market prices arise, which coordinate the actions of independent agents, regulate economic processes and form a macroeconomic order out of microeconomic chaos.

3.7. Law of Value

1. As we see, despite the apparent independence of economic agents, in reality they all depend on each other. But their connections, which are based on the exchange of equal values, are hidden in deep economic structures. "The value problematic concerns the nature of this "deep structure" within economic life and the manner in which it influences the surface phenomena of production and distribution. It must therefore be apparent why the search for such a structure, the explanation of its connection with the world of appearances is a perennial question of elemental importance. Prices link the world of action and that of order. Value "theory" is therefore indispensable for understanding how the capitalist system, largely guided by price stimuli, tends toward some kind of determinate outcome." (Heilbroner, 1988. 106 – 107.) «... the mechanisms only serve as the means by which the empirical world is guided toward a certain configuration. The search for value is an inquiry into the rationale and characteristics of that configuration. As Adolph Lowe puts it: "Suppose that a universal amnesia were to wipe out the knowledge of all present prices, would there be a rule for reestablishing them?"." (Ibid., 107 – 108.).

As has been shown, such a "a rule for reestablishing of all present prices" will be exchange ratios between branches that produce goods for each other and exchange them in accordance with the solvent needs of their agents. And exchange ratios between certain branches are formed spontaneously, on the basis of averaging the set of exchange ratios in individual exchange acts between counterparties exchanging goods of these branches. Accordingly, market prices are formed as weighted averages of the entire set of individual prices in individual exchange acts. Under such conditions, when the solvency of each branch is determined by its production, each branch, in equilibrium, produces in accordance with the solvent needs of all other branches. However, the processes of formation of *individual prices* themselves (in separate exchange acts), and of *market prices* (as exchange relations between industries), which are conditioned by individual and social values, are hidden in «deep structures of economic life». But how does it happen?

2. In order to understand what determines the exchange ratios between commodities in the market, it is necessary to look beyond the market processes. After all, behind the market processes are production and consumption. In the market there is only an exchange of products of production on an equivalent basis. (This process is mediated by their exchange for money, but in this context it does not matter.) As a result of market exchange, these products are transferred from producers to consumers, who consume them as resources for the production of their products. But these consumers are also producers, with the difference that after the exchange acts, instead of the former products, they already own the resources. For the products that they have acquired from each other through exchange have become resources for them, which they will consume in order to reproduce again the same products.

These newly produced products will again be brought to the market and exchanged for all those resources that are necessary for the further production of the same products, etc. (The circle is closed) All these processes in dynamics take on the character of a closed system of intricately intertwined counter commodity flows that have a network pattern. But they are hidden. Behind the counter flows of commodities and money are the counter flows of the commodities themselves. Commodities are brought to the markets for exchange as products of production, and after the exchange they become resources for the reproduction of the same products.

2. The production of products by consuming resources is nothing more than the destruction of some goods for the sake of creating others, and, in a certain sense, there is an "exchange" of resources for products. And in the conditions of commodity production, this is the exchange of *consumed* commodities for commodities *produced*. And since all subjects buy the commodities they consume, and sell the commodities they produce, it ultimately turns out that in the process of consumption and production, all subjects change the *consumed* commodities into *produced* commodities, and on the market, on the contrary, they change the *produced* commodities into *consumed* ones. And this, in turn, means that if the market exchange takes place on an equivalent basis, then the exchange of resources for products in the process of production and consumption must also take place on an equivalent basis.

3. Each commodity is a product produced from other commodities, which are resources in relation to the produced product. Quantitative ratios between consumed resources and produced products are expressed by the *production function*. The product itself is also one of the resources in the production functions of other products, and so on. Thus, in a closed system of interrelated production functions, a *network pattern* of economic relationships between produced and consumed commodities is manifested.

4. The production function of any commodity is a kind of function of "exchange ratios" between produced and consumed commodities. The production function of a commodity shows how many different other commodities must be sacrificed for a unit of the commodity produced. With the help of *expenditure coefficients*, the production function shows how many different commodities are "exchanged" for a unit of produced commodities.⁸⁰

5. Ultimately, the production of products from resources is the same exchange of commodities as market exchange, with the only difference that in the first case, the subject receives the desired product by *destruction* the consumed commodities, and in the second case, by *alienation* the sold commodities. In other words, *market prices* are the coefficients of exchange of commodities belonging to different subjects, and *expenditure coefficients* are the coefficients of exchange between different commodities belonging to the same subject. He kind of "exchanges" his resources for his own products. At the same time, if market prices

⁸⁰ We recall that according to this concept, households play the same role in the consumption sector as firms in the production sector. They are not only consumers, but also producers. As owners of production factors, they reproduce primary resources in the form of temporary *rights to use* of services of production factors. Therefore, in this study, the production function involves not only the production of (final and intermediate) products in the production sector, but also the reproduction of primary resources in the consumption sector. Accordingly, instead of *production coefficients*, *norms of consumption* of final products, or consumer norms, are assumed here. It is therefore more convenient, for brevity, to use the term "expenditure coefficients" as a general term that includes both production and consumption coefficients.

are coefficients that regulate and balance processes within the economic system and ensure its operational closure, then expenditure coefficients regulate the interaction between the economic system and its environment, thereby maintaining the causal openness of the system. Market prices and expenditure coefficients are interconnected subsystems of a single system of *exchange coefficients*.⁸¹ This is due to the fact that the choice of technologies and consumer schemes depends on the price system in the same way as the prices themselves depend on the applied technologies and consumer schemes. Both subsystems of coefficients together provide self-regulation of the market economy, its desire for dynamic equilibrium within the system through coordinated reactions to destabilizing effects of the environment. That is, the whole logic of the self-organization of a market economy is based on a single system of commodity exchange coefficients.

6. In the process of production, the exchange of resources for products takes place in accordance with the *expenditure coefficients*. And in the market, if you ignore the "money veil", the product produced is exchanged for the resources necessary for its production, in accordance with *relative prices*. Ultimately, we are talking about mutually opposite processes of exchanging resources for products and products for resources. After all, it is clear that if certain amounts of different resources are consumed to produce a certain amount of a given product, then, in order to continue the production process, it is necessary to exchange this produced product on the market for the same resources that are necessary for its reproduction. Therefore, between the coefficients of exchange of resources for products and products for resources, there is a certain relationship.⁸² Due to the interdependence between expenditure coefficients and relative prices, the homeostasis of the economic system is ensured, which ensures that the economy constantly strives for dynamic equilibrium despite changes in the external environment.

7. Market supply depends on production, and demand on consumption, but consumption itself is production, on which supply depends. And this circular causality between production, supply, demand and consumption exists not only at the macroeconomic level, but for each individual subject and each branch. And all these processes are intertwined in a complex network of relationships in such a way that as a result, the economy tends to balance as its optimal state. In this state, the economy produces only what is consumed, and consumes only what is produced. Accordingly, market demand is equal to market supply, production is equal to consumption, and solvent needs are equal to production possibilities, because the solvency of needs is due to production possibilities.

8. From the very logic of the functioning of a market economy, it follows that as a result of the clash of interests of many sellers and buyers in the market, a competitive

⁸¹ This is due to the fact that the choice of technologies and consumer schemes depends on the price system as well as the prices themselves depend on the applied technologies and consumer schemes.

⁸² So if we trace the relationship between the expenditure coefficients of the production sector and the consumption sector, we will see that there is an inverse relationship between them - a decrease in some is associated with an increase in others; the same inverse relationship exists between the prices of primary inputs and final products. For example, if, as a result of technological progress, technological norms in the production sector are reduced, then, firstly, the prices of final products decrease relative to the prices of primary resources, and, secondly, consumer norms in the consumption sector increase..

equilibrium is established between supply and demand, which, in turn, is transformed into a equilibrium between production and consumption. And vice versa, in the optimal mode, the equilibrium between production and consumption is the condition for the equilibrium between supply and demand. And the whole economy appears as a single system of collective actions, as a result of which there is a constant transformation of some goods into others in accordance with the needs of society.

9. So, since market exchange at relative prices is an equivalent exchange, then the exchange of consumed commodities for those produced on the basis of expenditure coefficients must also take place on an equivalent basis. Thus, under conditions of equilibrium, the value of commodities consumed and produced, as well as the value of commodities sold and bought, must be equal. This is the *law of value*.

3.8. Profit and Savings

a) Difference between income and expenditure

1. Entrepreneurs are the owners of the Entrepreneurial production factor. The services of this factor are embodied in the products sold, and the payment for them is the profit that enters into their price. But since the prices of products are changeable and depend on market conditions, the profit is the residual value, after deducting the costs of production from the income received. Market prices provide only the opportunity to receive both profit and loss. The implementation of this possibility is associated with the risk of losing the spent resources. This risk is especially great in a market economy, in which the receipt of income depends on the decisions not only of the producer himself, but also of other subjects. Producers are therefore required to make a volitional effort to provide entrepreneurial services and consumers are required to pay for these services.

Abstinence is a service that the owners of the factors of production render to society. Thus, they accumulate the necessary resources for insurance and investment. The result of abstinence is *savings*, which are part of the income. But, in a market economy, the incomes of consumers (as sellers of primary resources) also depend not only on their decisions, but also on the decisions of other subjects. They have no guarantee that in the future they will receive income sufficient to meet their future needs. Therefore, they must make savings as an insurance against future expenses. This also requires strong-willed efforts from consumers, the result of which is also excess income over expenses i.e. savings. The efforts of the consumers must also be paid for by the producers (for whom these savings are a source of investment) in the purchase of primary resources, just as the efforts of the producers are paid for by the consumers in the purchase of their products. Therefore, it turns out that not only consumers pay for the *profits* of producers, but also producers pay for the *savings* of consumers.

2. *Profit* and *savings* represent the difference between income and expenditure of subjects. Profit is the difference between income and expenditure of producers, and savings is the

difference between income and expenditure of consumers.⁸³ “Alternation of incomes and expenses takes place both in production sector and in consumption sector. Incomes and expenses are the same reflective concepts as production and consumption, products and resources, utility and costs. Incomes of producers are expenses of consumers, and expenses of producers are incomes of consumers. Accordingly the difference between incomes and expenses accepts mirror opposite forms for them - profit and saving. Just for this reason profit and saving are inherently interconnected. So far as incomes of one are expenses of others and vice versa, then profit and saving cannot be independent amounts.” (Leiashvily, 2012, 68)

3. As a *producer*, the subject must carry out expenditure in such a way that, as a result, he receives income in excess of their income, i.e. receive some surplus of income over expenditures. It requires *entrepreneurial effort*. But as a *consumer*, the subject must spend out of his income in such a way that as a result there remains a certain surplus of income. This requires *abstineney* and *thriftiness*. But subjects are both producers and consumers at the same time. In a certain sense, this means that profits and savings, as well as income and expenses have all economic subjects.

4. In the usual sense, producers make profits and consumers make savings, and it seems that there is nothing in common between them. But in a deeper sense, there is both identity and difference between profit and savings, as well as between other dialectically interconnected categories - production and consumption, producer and consumer, income and expenses, products and resources, utility and costs, etc. Profit and savings are *identical* in the sense that both of them are an excess of income over expenses, but *differ* depending on whether income is generated by expenses, or expenses are generated by income. But income and expenses always alternate over time. It depends on the subject how he relates to his activity - as production, or as consumption. It depends on this whether he correlates income with the expenses that preceded them and *generated them*, or, conversely, with the expenses that followed them and were *caused by them*. Accordingly, the profit and savings of the same subject (as the difference between his income and expenses) can be equal or differ in value. Profit can be more or less than savings. It depends on the decisions made by the subject and the results of his actions. Thus, it depends on the subject himself whether he treats the excess of income over expenses as profit or as savings.⁸⁴

⁸³ At the same time, entrepreneurs, being the subjects of the production sector, are also the owners of their Entrepreneurial abilities as a production factor.

⁸⁴ “Therefore, all economic subjects adopt each decision concerning expenses in view of both received and expected income. Consequently, decisions are made from positions of both saver and entrepreneur. For in general, excess of expected income over the current expenditure is his profit, but excess of already received income over the current expenditure is saving. And in alternation of incomes and expenses from position of subject it depends whether the difference between incomes and expenses is considered as profit, or - as saving.” (Leiashvily, 2012, 69)

b) Statement of the problem

1. In a market economy, commodities are produced by consuming commodities, and therefore some values are created by destroying others. These are recursive processes. Moreover, the whole process takes place in time. Therefore, in conditions of equilibrium, during a given period of time, what is produced is consumed, and what is consumed is produced. Accordingly, the same value of goods is created, which is destroyed. And since all subjects produce goods for each other, and then buy them from each other, then, firstly, the incomes of some subjects must be equal to the expenses of others, and, secondly, the incomes of the subjects themselves must be equal to their expenses. But with such an understanding of economic processes, there is no room for profit and savings, which imply that during the considered period of time, the income of all economic agents should be greater than their expenses.

2. Also at the macro level, since final products are produced from primary resources, and primary resources from final products, we get a closed system. And as has been shown, the total value created in the production sector and in the consumption sector are equal. However, the existence of profit implies that in the sector of production, the value of goods produced is greater than the value of goods consumed,⁸⁵ and saving implies that, in the sector of consumption, the value of goods consumed is less than the value of goods produced. It turns out that in both sectors, in conditions of equilibrium, surpluses of value arise in a strange way - more is produced than is consumed (or less is consumed than is produced). And since the goods produced are sold and the goods consumed are bought, it turns out that in both sectors the value of goods sold is greater than the value of goods bought. Is it possible?

3. Ultimately, it turns out that, according to the equilibrium conditions, in the same period of time, production is equal to consumption, demand is equal to supply, sales are equal to purchases, and yet everyone receives more income than they spend, and receive a surplus. This is clearly a logical contradiction. At the same time, this surplus of income over expenses is obtained by the ordinary sale of goods in the market. This implies that each entity must sell some surplus of goods, in excess of the amount whose income covers the cost of producing the entire volume of goods sold. All this leads to arguments by analogy with the logic of Marx's *theory of surplus value and surplus product*.⁸⁶

⁸⁵ In order to avoid double counting, we do not take into account separately the production and consumption of intermediate products, because the cost of final products already takes into account the cost of intermediate products, which is decomposed into the cost of the same primary resources.

⁸⁶ Marx, according to his theory of surplus value, used the terms: necessary and surplus value, necessary and surplus product, necessary and surplus labor, necessary and surplus labor time. "... Sraffa's work ... provided a basis for a definitive demonstration that the theoretical analysis of wages, profits, and prices, within a surplus approach, was entirely independent of any 'labour theory of value' and, indeed, that any labour theory is necessarily a barrier to the development of a surplus-based theory" (Steadman, 1981, 12-13). "... a surplus approach to profits and prices has absolutely no need of any 'labour theory of value'" (Ibid, 16.)

c) Surplus products and saved resources

1. First of all, let's try to look beyond the "monetary veil" and consider the processes in terms of the barter economy. The fact is that these surpluses of value are embodied in the products produced by different sectors. The products of each sector are resources for the other. And since final products are produced by the consumption of primary resources, and primary resources by the consumption of final products, then the excess value embodied in surplus products and saved resources is destroyed and created along with the consumption and production of these products and resources. Therefore, the appearance of these surpluses of value simultaneously in both sectors of the economy is not only impossible, but, on the contrary, is a necessary condition for maintaining its integrity.

"The exchange ratios (prices) in the market are set so that only part of final product is exchanged for primary resources needed to produce that product. That is, the value of resources, spent in branches of production sector, is equal to the value of only one part of produced product. That part of produced product, which is exchanged for resources necessary for reproduction of whole product, is a *necessary product*. The value of the rest part of created product is *surplus product*, sales of which makes a profit and is the reward for entrepreneurial risk.¹⁰ Similarly, only a part of primary resources is exchanged for final products required for reproduction of these resources (that is, to satisfy the owners' current living needs). This is the *necessary resource*. Accordingly, only one part of resources is necessary for payment of owners' current consumption. The rest part of resources is the *surplus or saved resource*, the sale of which generates owners' saving and which is the reward for his abstention and frugality. The more the owners' abstention is the more resources are saved from their current consumption. That's why the total amount of reproduced resources depends only on the amount of production factors, which are in owners' possession, but not on the volume of their consumption." (Leiashvily, 2015, 15-16.)⁸⁷

2. However, in a money economy, the exchange between primary resources and final products does not take place in the form of barter, but through acts of sale and purchase in two different markets - the market for primary resources and the market for final products. These markets are interconnected by money flows. Therefore, in a money economy, the exchange between primary resources and final products takes the following form. Income from the sale of the *necessary product* pays for the primary resources necessary for the production of all products. Payment for these resources is the income of the owners of production factors - Salary, Rent, Interest. But the income from the sale of the surplus product is Profit, which is the payment for entrepreneurial services. Thus, out of the profit created by entrepreneurs (as producers) in the production sector, their income (as consumers) in the consumption sector is formed.

⁸⁷ At the same time, surplus products are *surplus* only from the point of view of the entrepreneurs themselves, who, with their own efforts, produce more products than is necessary to pay for the resources consumed. But from the point of view of the whole economy, surplus products are just as *necessary* as necessary products. Similarly, saved resources are *saved* only from the point of view of consumers who, through abstinence, have saved them from current consumption. But from the point of view of the entire economy, they are as *necessary* as necessary resources.

3. Factor incomes of the owners of Labor, Land and Capital consist of income from the sale of *necessary* and *saved* primary resources. Incomes from the sale of the *necessary* primary resources are paid for the final products for the current consumption of the owners of production factors and, therefore, necessary for the reproduction of primary resources. Income from the sale of *saved* primary resources form monetary savings. Thus, profit and savings, as the excess of income over expenses, are the monetary expression of the value of the surplus product and saved resources.

4. Both profit and savings are residual values that appear at the end of the period under consideration. Profit is the part of the income from the sale of the produced product, which remains after the deduction of the costs of their production. And saving, accordingly, is the part of the income from the sale of primary resources that remains after deducting the consumption expenditures of the owners of production factors. Since profits and savings are formed at the end of the period under review, then, naturally, as monetary resources, they cannot be used in the same period in which they were received as residual values. Their use is possible only in subsequent periods. Similarly, the surplus products and the saved resources, the income from the sale of which are profits and savings, are produced in one period, and consumed in another. However, in the markets it is impossible to distinguish necessary products from surplus products, or necessary resources from those saved. The surplus products are sold at the same prices as the necessary products, just as the saved resources are sold at the same prices as the necessary resources.

5. After all of the above, the above definitions of profit, savings, surplus product and saved resource must be supplemented with the following statements:

1) It is necessary to distinguish the received profit from the withdrawn profit. The *received profit* is equal to the difference between the income from production and the expenses due to which they are received. This profit is the net income of the entrepreneur as a producer and represents the payment for the services he renders to society. And the *withdrawn profit* is that part of the profit received, which he withdraws from the sector of production and uses for personal consumption in the consumption sector. The difference between the received and withdrawn profits is used in the production sector to pay income taxes, depreciation⁸⁸ and other purposes necessary to continue the production process.

The profit withdrawn is the personal income of the entrepreneur *as a consumer*. Like other incomes, it consists of consumption and savings. At that, the entrepreneur's personal consumption, as will be shown below, is his investment in his human capital. As for his personal savings, the source of their formation, as usual, is the entrepreneur's abstention from personal consumption. Part of the entrepreneur's personal savings is withdrawn from the consumption sector. Part of the personal savings of entrepreneurs withdrawn from the consumption sector (together with the savings of the owners of other production factors), after being transformed into credit resources, is invested in the production of physical capital in the production sector.

2) The surplus product from the necessary product, as well as the saved resource from the necessary resource, differ in that they are bought not with current income, but with

⁸⁸ Further clarifications regarding depreciation allowances will be made below.

previously received ones. Simplifying somewhat,⁸⁹ we can say that the surplus product is invested mainly in *human capital*, and the surplus resource is mainly invested in *physical capital*. With the above in mind, below are commodity and cash flow diagrams that will make the above easier to understand.

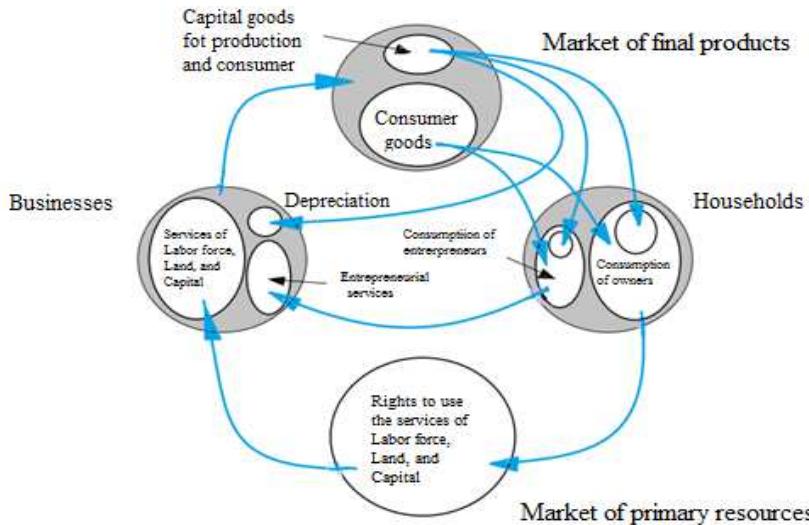


Fig. 1. Commodity flows

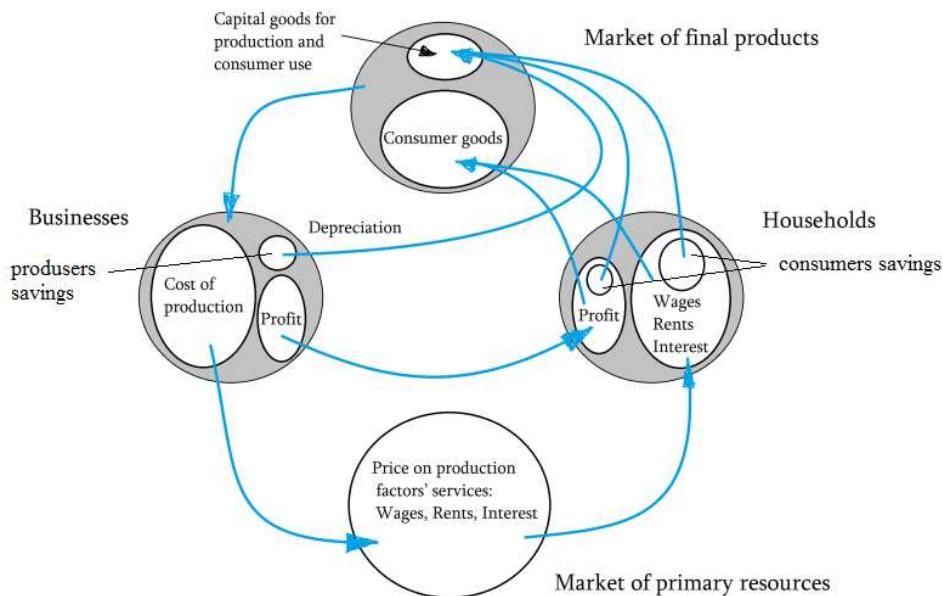


Fig. 2. Money flows

⁸⁹ At this stage, simplification is done for the convenience of reading the text. Further, it will be shown that part of the surplus product (profit) is also invested in physical capital, and part of the saved resource (savings) is invested in human capital.

3.9. Capital and current goods

a) Conditionality of classification

1. Different goods require different times for production and consumption. In order to avoid deficits and surpluses in the economy, the rates of production and consumption of various goods must be synchronized. Depending on the time required for their production and consumption, all goods can be conditionally divided into capital and circulating goods.

Goods that are produced and consumed within one year can conditionally be classified as current goods, and those that require more time for this - to capital or investment goods. Moreover, both capital and current goods can have both production and consumer purposes. In this sense, capital goods and current goods are relative concepts. The division of the commodity world into those and others depends on the time interval conventionally taken as a unit of reference. With an increase in this time interval, many goods that were previously considered investment goods will be in the category of current goods, but if this time interval is shortened, on the contrary, a number of current goods will be in the category of investment goods.

2. The production of capital goods takes a long time. To be able to produce capital goods, it is necessary to save resources from current consumption and invest them in the production of capital goods.⁹⁰ According to the *logic of barter relations*, during the entire period while capital goods are being produced, the resources invested in their production are consumed in debt. That is, there are credit-debt relations. Therefore, until the completion of production and the sale of capital goods, their producers do not have to pay for these resources. Payment for these resources will occur after the realization of the produced capital goods.

But according to the *logic of commodity-money relations*, both the resources for the production of capital goods, and the capital goods themselves, are bought on the market for money, just like all other goods. At the same time, credit and debt relations are transferred from the sphere of purely commodity relations to the sphere of purely monetary relations. *Commodity credit* is replaced by *money credit*. Accordingly, resources for the production of capital goods are already bought with money credit, which are repaid from future income from the sale of capital goods.

⁹⁰ "Thus, investments are carried out due to saved resources and surplus products. The first are invested into the physical capital, the second - into the human capital." (Leishvily, 2012, 60) As a result of investments, the creation of investment goods, the restoration and growth of physical and human capital is carried out. And over time, natural capital will also have to be restored, in which more and more investments have to be made in order to preserve it. "Investment into the physical and human capital is a process beyond circulation of necessary product and necessary resource. Investment assumes other form of relationships between consumer and producer, rather than current production and consumption⁷³. Instead of exchange (buying and selling), credit relations ... are here implied. ... If someone one invests, it means that someone another consumes on debt. One is impossible without another. They represent two aspects of the same redistributions in time of production and consumption possibilities." (Ibid.)

3. If during the period under consideration the good is not consumed completely and does not disappear along with consumption, then we can only talk about its *wearout*, and about its *services*. As they wearout, capital goods need to be restored. The consumption of capital goods themselves and the consumption of its services are not the same thing. The *services* of capital disappear completely in the very process of consumption. But *capital* itself in the consumption process wears out gradually over a long period covering a number of conditionally accepted units of time. After the complete depreciation of capital, it must be restored. To restore it, it is necessary to use a certain part of the produced capital goods to replace depreciated capital, and the other part - for a net increase in capital. It follows, too, that the investment of resources in the *recovery* of capital must be distinguished from their investment in *pure growth* of capital. Accordingly, gross investment consists of *depreciation* and *net investment*.

b) Final and intermediate capital goods

1. As noted, in contrast to final products and primary resources, intermediate products are consumed in the same sector in which they are produced.⁹¹ Like final products, intermediate products can be both capital and current goods. Both capital and current intermediate goods are produced and consumed in the same sector. But the difference between them is that current intermediate goods are consumed in the *same* period in which they are produced, while capital intermediate goods are produced and consumed in *different* periods of time. At the same time, both capital and current intermediate goods can be both for production and for consumer purposes. According to this understanding, capital produced in a sector of production with the aim of replacing depreciated capital in the same sector is an intermediate product, and its depreciation is intermediate consumption.

2. When purchasing capital for production purposes, the owners invest their money savings in order to receive factor income from the sale of services of this capital. Entrepreneurs buy and consume these services as a primary resource. But the consumption of these services is impossible without the consumption of capital itself, which wears out in this process. However, entrepreneurs do not pay anything to the owners of capital for this wearout. It turns out that the capital itself, they *consume in debt*. But ultimately, the entrepreneur must at his own expense compensate the owner for this wearout and replace the

⁹¹ In addition to circulating goods, final products also include capital goods produced for a net increase in capital (but not to replace worn-out capital). Moreover, capital goods can be both for production and consumption purposes. Therefore, it turns out that, as part of the final products, capital goods for production purposes are produced in the production sector, but are bought and used by the owners of Capital in the consumption sector. It is understood that the owners who bought these capital goods use them as an income-generating factor of production. They sell their services to entrepreneurs as a primary resource. In other words, it is about using capital in the economic sense to generate factor income. It is understood that the owners who bought these capital goods use them as an income-generating factor of production. They sell their services to entrepreneurs as a primary resource. In other words, it is about using capital in the economic sense to generate factor income.

wornout capital with a new one.⁹² To this end, in parallel with the wearing out of capital, entrepreneurs make money savings (depreciation deductions) from the income received in order to replace capital after its wearing out. Thus, it turns out that, in contrast to pure investments, which are carried out by the *savings* of capital owners, depreciation is carried out from the *profits* of the entrepreneurs themselves.

3. It should be emphasized that depreciation is part of the profit and not part of the production cost, which for a long time by portions are included in the cost of products. Depreciation deductions are a purely financial procedure. It has very little to do with the actual loss of value of capital as it wears out. The choice of norms and methods for depreciation deductions does not depend on the real wearing of capital. It depends on the economic policy of the state.⁹³ The depreciation fund is the saved part of the production income of entrepreneurs, which is spent by them not for current production expenditures, but for the future replacement of wornout physical capital. Therefore, depreciation deductions should not be understood as an extended write-off of previously incurred expenses. In other words, they are not production costs. According to this interpretation, depreciation deduction is the saved part of the profit received, which is not taxed and is not withdrawn to the consumption sector for the personal expenses of entrepreneurs.

Something similar happens when the owners of production factors, as consumers, save part of their income in order to replace worn physical consumer capital, or invest in human capital, which also wears out and also needs to be restored.⁹⁴

4. The capital goods needed to replace depreciated capital are intermediate products. Therefore, depreciation should not be included in GDP. In general, such a division of the produced product into Gross and Net Product is the result of a misunderstanding of depreciation. The indicator that the System of National Accounts refers to Net Product is, in essence, Gross Product. And the Gross Product indicator, in the form in which it is taken into account in the SNA, is a false indicator obtained as a result of an incorrect interpretation of economic processes.

In the process of production of depreciation goods, factor incomes are created, to which, ultimately, their price is reduced. But these factor incomes are already taken into account in those factor incomes from which is derived the prices of final products in the production of which these depreciation goods took part. Therefore, the introduction of

⁹² This refers to the relationship between the *functions* of the entrepreneur and the owner. However, in reality, the entrepreneur himself may also be the owner of capital. In this case, the logic of the relationship of the functions performed by him remains in force. If the entrepreneur himself is the owner, then he must compensate for this depreciation to himself. Otherwise, his property will decrease.

⁹³ There has always been controversy in understanding depreciation. There are two meaningful characteristics of depreciation - (1) the depreciation of property and (2) the formation of a fund for its restoration. The uniform distribution of depreciation over periods does not correspond to real depreciation processes, because the older the capital, the faster it wears out. But it is impossible to determine the correspondence of real depreciation to depreciation rates. In addition, any depreciation rate assumes the possibility of operating the object after its full normative wear. By setting the depreciation rate or useful life, the procedure for calculating and using depreciation charges, the state regulates the pace and nature of the reproduction process in branches.

⁹⁴ This refers to the upbringing, health, training of a new generation, which should replace disabled ("worn out") human capital, leaving the labor force due to age or illness.

depreciation into the Gross Product is tantamount to the introduction of intermediate products along with final products. This creates a double count and inflates the real volume of the product produced.

5. "According to Smith the value of each individual product is equal to the sum of incomes consisting of wage, profit and rent. He has not acknowledged the capital expenditures as the fourth component of price because they match the value of previously created products of labor, which in turn is divided into the same three elements as the final product is. Smith's position is quite reasonable: the inclusion of capital expenditures into the price of all goods would lead to the fact that one and the same product would enter the yearly product of society repeatedly. By this approach, Smith avoids double counting in a measurement of annual product. But Smith argues that if the value of each individual commodity falls into incomes, this should apply to the whole mass of commodities, composing the annual product of each country. Therefore, the value of national product should also be equal to the sum of incomes consisting of wage, profit and rent. But the core of the problem is that the part of annual product produced in the country is the capital goods required to replace depreciated capital. For the society their value is the costs required for production of annual product. It turns out that the cost of each product individually consists only of incomes, but the value of entire national product, which consists of these products, in addition to incomes, includes also the value of depreciated capital. But after all within the prices of individual products the value of depreciated capital has already been decomposed into incomes. Why does it occur again in the national product? This enigma remains enigma and generates a number of problems. The value of final product turns out to be greater than the amount of incomes. It turns out that the aggregate supply is greater than the aggregate demand; that the entire product cannot be sold inside the country. But economic reproduction is possible only under the condition that all goods will be sold, all the means of production and consumption goods - recovered. Consequently, the crises are inevitable, etc. A. Smith cuts down this "Gordian knot" and just gets rid of the problem by introduction of concepts of "gross" and "net" products. But from a purely theoretical standpoint - this is incorrect. Here clearly exists ambiguity, which remains so up to this day." (Leiashvily, 2015, 89-90.)

6. This problem has not only purely theoretical but also practical significance. Here is what is stated in the System of National Accounts (SNA 2008):

2.141. In principle, the concept of value added should exclude the allowance for consumption of fixed capital. The latter, in effect, is not newly created value, but a reduction in the value of previously created fixed assets when they are used up in the production process. Thus, theoretically, value added is a net concept. This conclusion applies to domestic product as well; theoretically, domestic product should be a net concept. Net domestic product (NDP) is obtained by deducting the consumption of fixed capital from GDP.

2.142. However, gross measures of product and income are commonly used for various reasons. The depreciation of fixed assets as calculated in business accounting does not generally meet the requirements of the SNA. ... So GDP is broadly used even if it is, on a conceptual basis, economically inferior to NDP.

2.144. By deducting the consumption of fixed capital from GNI, net national income (NNI) is obtained. The remarks above about the conceptual relevance

of the net concept in case of product apply even more strongly to national income. (SNA 2008, 2009, 34.)

Since the depreciation of capital is paid by depreciation deductions from profit, then the income of producers of depreciation capital is already taken into account in gross profit (hence, in the NNI indicator). Therefore, the GNI indicator is a false indicator that overestimate the national income indicator due to double counting of income. "So, division of national product and national income into "gross" and "net" cannot be considered as a solution. On the contrary, such division essentially hides the real problem, creates illusion of its solution and thus conserves the problem. Smith deviates from solving of the problem and leaves this enigma unsolved. Since the days of Smith a large number of economic works is devoted to this problem, but it still remains unsolved . . . And it cannot be solved as long as economic theory reaches a clear understanding of how the economic reproduction is performed. And it cannot be solved as long as economic theory reaches a clear understanding of how the economic reproduction is performed." (Leiashvily, 2015, 90.)

c) Investment in human capital

1. Production of a product requires not only physical, but also human capital. These are knowledge, experience, qualifications, health, social connections, etc., which are necessary for a person to be able to carry out economic activity. Entrepreneurial ability is also related to human capital. For human capital, the usual depreciation approach applies. The formation of this capital requires investment in improving the level and quality of human life. For the functioning of human capital, the consumption of final products is necessary. For knowledge and ability exist only in a living person. But over time, this capital "wears out", knowledge and experience become obsolete, a person loses his ability to work due to illness, leaves the labor force upon reaching retirement age. "Accordingly, it is necessary to renew the knowledge and experience, to restore health, raise and educate the younger generation for the inflow of new workforce, raise the heirs of property, successors of business, etc. All this requires the economic costs and implies consumption of final products by above the necessary costs for current consumption of owners of human capital.¹⁷ It is necessary to accumulate funds for education, sickness, to create the insurance and pension funds, etc. This means - to make saving from incomes and, therefore, to limit the current consumption." (Leiashvily, 2015, 21.)

2. Personal consumption of entrepreneurs is "consumption in debt to himself." In this regard, the remark of K. Marx in a letter to F. Engels (dated June 23, 1868) is interesting. Marx quotes A. Smith: "*His profit, besides, is his revenue* the proper fund of his subsistence. As, while he is preparing and bringing the goods to market, he advances to his workmen their wages, or their subsistence, *so he advances to himself*, in the same manner, his own subsistence, which is generally suitable to the *profit* which he may reasonably expect from the sale of his goods. Unless they yield him this profit, therefore, they do not repay him what they may very properly be said to have cost him'." Further, Marx writes: "This second manner of pressing the profit into the **prime cost** — because already consumed — is really fine." (Marx, 1988, 46)

The profit of the current period is the residual value. Its receipt is associated with risk and is possible only at the end of this period. Therefore, in the current period, the entrepreneur, as a consumer, can pay for personal consumption expenses only from previously received profits (withdrawn from the production sector), as his personal income. In other words, he invests his financial resources in the reproduction of his life and capacity as an entrepreneur, i.e. invests in the reproduction of his human capital. Without such investments in his consumption, he will not be able to fulfill the entrepreneurial function.

3. “The produced surplus product is invested also in education, science, culture, healthcare, security, law and order, etc. These investments into the human capital create conditions for normal functioning of not only economy, but also a society as a whole.” (Leiashvily, 2012, 60) Investments in human capital are financed both by individual subjects from their incomes and by the state from the budget formed by taxation as a kind of “mandatory savings”⁹⁵.

4. In conclusion, we note the following. As can be seen from the above, investment in physical capital comes from both profits and savings. Profits finance depreciation, while savings form credit resources for net investment. Investment in human capital is also financed from profits and savings. At the same time, the reproduction of the entrepreneurial factor is financed by the withdrawn profits of entrepreneurs, and the net increase in human capital is financed by the savings of owners in the consumption sector.

3.10. Optimality and its criteria

1. During a given period of time, society has a certain set of urgent needs and a certain amount of primary resources needed to satisfy them. The amount of these resources is sufficient to fully satisfy each of these needs separately, but they are not enough to fully satisfy all the needs together. Society must somehow allocate resources to meet its needs. Since resources are limited in relation to existing needs, if some needs are met more, then others will have to be met less. Satisfaction of various needs depends on each other.

2. Decision-making regarding the allocation of resources, of course, assumes that the amount of available resources is afore *predetermined*. Considering that the production costs are determined by the utility of the resources expended and technological norms, the production costs *per unit* of product do not depend on the allocation of resources. But the *production cost* of the whole branch output, of course, increases or decreases proportionally with the amount of output, i.e. there is a *linear* relationship between them.

On the other hand, depending on the quantity of output, the utility of both the total output and each *unit* of the product changes. The greater the quantity, the smaller utility, the smaller the quantity, the greater utility. However, if there is a *linear* relationship between

⁹⁵ The fact that taxes are paid out of income, which consists only of consumption and saving, means that taxes, by definition, are already paid out of saving as the non-consumable part of income. As it was shown, both profit and savings are the difference between income and expenses, therefore, there is a non-consumable part of the income, respectively, of producers and consumers. It follows that only the savings of consumers and the profits of producers can be the source of tax payments.

costs and quantity of a product, then there is a *non-linear* relationship between *utility* and quantity. Accordingly, if the branch output *increases*, then the costs of entire output increase extensively, while the utility decreases intensively, but if the output *decreases*, the costs decrease extensively, and the utility increases intensively.

Thus, depending on the quantity of output, the *cost* of each unit of the product does not change, but its *utility* does. This means that depending on the resource allocation, in various industries the utility of a unit of product will either increase or decrease in relation to costs. The utility of a unit of product may be greater or less than these costs. In one case we get a *deficit*, in the other - an *excess*. This means that part of the resources is spent on the production of less useful goods (*excesses*), as a result of which they are no longer enough to produce more useful goods (*deficits*). Thus, underproduction of goods in some branches is due to overproduction in others. Deficits and excesses are measured by the degree of deviation of the existent quantity of goods from the optimal. And the optimal quantity is the quantity of goods at which the *even-utility of costs* is achieved simultaneously in all industries. *Even-utility of costs* is a condition of optimality and an indicator of general economic equilibrium in the economy.

Since utility is the other side of needs, deficits and excesses testify that some needs are satisfied to a greater extent, others to a lesser extent; there is a glut of some needs and a dissatisfaction of others. And the even-utility of costs indicates the even-satisfaction of all needs, which means that the structure of goods produced corresponds to the structure of needs.

3. But the even-utility of costs is only a *global criterion* of optimality, which contributes to the optimal *allocation* of available resources between branches. However, for the optimal use of resources, their optimal allocation is not enough. After all, the even-utility of costs does not exclude the possibility of equally low efficiency of costs in all branches. Therefore, it is also necessary that efficient technologies be used and that resources be *used* economically. For obtaining the maximum of the total utility of the products with the available resources implies that this utility is obtained at the minimum cost. One is impossible without the other. Therefore, when making concrete economic decisions, the subjects are guided by a *local* optimality criterion, which implies not the equal utility of costs, but, on the contrary, *maximum utility* with a *minimum of costs*. In accordance with the local optimality criterion, the subject not only seeks to obtain the *maximum utility per unit of cost* and, thus, produce the most deficit products with the available resources. He also strives to realize the *minimum cost per unit of utility* and, consequently, to use efficient technologies in the production of these products, save resources and eliminate losses.

According to *intra-branch* competition, guided by the *local* optimality criterion, all subjects strive to maximize incomes and minimize expenditures. To this end, they strive to produce the most useful products for society with the minimum consumption of socially useful resources. But, thanks to *inter-branch* competition, they tend to redistribute their resources, withdraw them from less profitable branches and invest in more profitable ones. Thus, the tendency of the economy to achieve even-utility of costs is realized in accordance with the *global* criterion of optimality.

4. At the *microeconomic level*, according to the local optimality criterion, subjects strive to maximize utility and minimize costs. But this is manifested not only in monetary form, not only in the fact that producers strive to maximize profits, and consumers - to maximize savings. But also in the fact that the former seek to obtain maximum profit with minimal effort and risk, while the latter seek to obtain maximum savings with minimal abstinence (that is, with the maximum possible satisfaction of needs).⁹⁶ At the *macroeconomic level*, according to the global optimality criterion, there is an inter-branch redistribution of resources in search of more profitable branches. This gives rise to a tendency to equalize the rate of profit between branches, to equalize production and consumption, supply and demand.

Accordingly, in the first case, optimization is reduced to finding an *extremum*, the maximum or minimum value of the extremizable function.⁹⁷ And in the second case, optimization comes down to finding a *essential relationship* between the necessary parts of the whole and the formation of the *integrity* of the economy as a negative unity of branches.⁹⁸

5. As already noted, the incomes of producers (entrepreneurs in the production sector) are the expenditures of consumers (owners in the consumption sector), and vice versa, the expenditures of the former are the incomes of the latter, and the difference between incomes

⁹⁶ According to the *local criterion* of optimality, entrepreneurs seek to invest resources in those branches in which production is associated with low risk and high profitability, and goods are in high demand. And this causes 1) an intersectoral redistribution of resources and a reduction in the production of excess goods and an expansion in the production of scarce goods; 2) equalization of profit rates between industries, 3) achievement of even-utility of costs, and even-scarcity of goods produced in the economy as a whole. All this leads to the optimization of the production of products in the economy in accordance with the *global criterion* of optimality.

And consumers, as owners of production factors, according to the *local criterion*, strive to maximize savings with minimal abstention. But this means that they refrain from satisfying the least significant needs, and satisfy all the necessary needs. As a result, maximum savings are achieved by minimum abstinence with maximum satisfaction of needs. But in order to increase income, the owners will seek to possess the most scarce production factors and sell their services to those producers who need them most and buy at the highest prices. All this leads to the optimization of resource consumption in the economy in accordance with the *global criterion* of optimality.

⁹⁷ "... the very concept of "optimal" is divided into two: "optimal in the narrow sense" and "optimal in the broad sense". (Yatskevich, 1990, 27) "Optimal in the narrow sense implies an extremum and movement towards it. ... Optimality in a broad sense means the necessary belonging (inalienability) of some element to the system. Without it, the latter cannot be a wholeness. Each of its elements assumes all the others, and each element is assumed by all others. Therefore, optimization in a broad sense is the search for not just some element-solution, but the search for wholeness Such optimization is essentially based on the totality of system-forming relations. The presence of any extremum here is of secondary importance and does not determine anything by itself." (Ibid., 30)

⁹⁸ "The problem that determines the heuristic possibilities of the principle of integrity is the problem of substantiating wholeness in each particular case. This principle significantly complements the systematic approach, since it is aimed at finding an essential relationship, essence, absolute. It is noted that one and the same object can have a different set of models, but the most adequate of them will be the one that reflects the basis of the wholeness of the phenomenon under consideration as the leading moment. The concept of "whole" is directly related to the problem of optimal choice. Let the set A be a concrete whole, then the set of parts that make it up, and the structure of their relations, are also concrete. ... In this sense, choosing the optimal means providing, creating, constructing the wholeness, fulfilling the creative function." (Yatskevich, 1990, 67) "The whole has all the features of the absolute - it is absolutely whole, since it contains all that and only that which is necessary, and by this exhaustively determines itself." (Ibid., 66-67).

and expenditures, in one case takes the form of profit, and in the other, savings. In the exchange of their goods, economic agents pay each other either profit or savings, depending on whether they buy final products or primary resources. For profit and savings are price components, respectively, of the final product and the primary resource. Therefore, although, in the process of production and consumption of goods, subjects create profits (in the production sector) and savings (in the consumption sector), but in the process of exchanging goods they pay each other for their profits and savings. Ultimately, in equilibrium, the profits of some pay for the savings of others, and vice versa. Therefore, as a result of the exchange, gross profit and gross saving mutually balance each other.

6. If the economy is monopolized and intersectoral redistribution of resources is suppressed, this means that the *global* criterion of optimality is ignored. In such a case, the dominance of the local criterion inevitably tends to increase *inequality*. Large corporations thrive by suppressing small and medium-sized businesses. The rich get richer and the poor get poorer.⁹⁹ If the *local* criterion of optimality is ignored, then the economy will gradually *decline* due to the low efficiency of resource use in the entire system.

7. Local and global optimality criteria only in unity form a general optimality criterion, which is the Pareto criterion, which provides the maximum total utility with a minimum of total costs already at the level of the entire system. Moreover, such a state of the economy is achieved only under conditions of equality of total utility and total costs, which, as has been shown, logically follows from the interaction of the production sector and the consumption sector. And only in this case all branches begin to produce goods in accordance with the solvent needs of all other branches. As a result, such an optimal system of exchange ratios or equilibrium relative prices is formed, in which neither deficits nor excesses arise in the market.

3.11. Total cost

1. In the closed market system we are considering, the values of commodities are *related only to each other*. Accordingly, the total value of all commodities is *related only to itself*. This process of *self-reference* of total value is a closed process of mutual transformations of the values of all produced and consumed commodities. The total value as a whole does not correlate with any other values outside this system, for it is a closed system. In this sense, the total value remains a self-producing integrity, consisting of parts that are permanently transformed, appearing and disappearing in the process of production and consumption of goods. Its being is procedural; *process* is the mode of existence of total value.

2. Since the total value of primary resources and the total value of final products endlessly reproduce each other, sacrificing themselves in this process, the concept of the

⁹⁹ We proceed from the fact that, in contrast to the concept of *welfare*, the concepts of *wealth* and *poverty* are *relative concepts*. Welfare is measured by the level of consumption and satisfaction of needs. Whereas, regardless of the level of well-being, the rich are rich only in *relation* to the poor, and the poor are poor only in *relation* to the rich.

definite magnitude of the total value of all goods loses its meaning.¹⁰⁰ The total value of all commodities is not a definite magnitude. To be *defined*, any magnitude as such must be *limited* by other magnitudes and, therefore, *correlate* with them. But the total value of all commodities does not correlate with the values of any other commodities, and therefore is not limited by them, and, in this sense, is *unlimited*.¹⁰¹

3. Since final products are created from primary resources, and primary resources are created from final products, while sacrificing themselves, their total costs are *equal in magnitude* and *opposite in sign*. Since each of them is formed on the basis of the other side, then none of them can be neither more nor less than the other side. At the same time, both of them are homogeneous substances, differentiated within themselves in accordance with the magnitudes of their constituent components. Each of them consists of many different and variable in magnitude, but qualitatively homogeneous parts - the values of individual goods (respectively, primary resources and final products). However, as a result of incessant changes in the relative magnitudes of the values of various commodities, only the *state* of the total value changes as a qualitatively homogeneous substance and as integrity. But this variability in the relative magnitudes of its constituent values does not affect it as a whole. The whole always remains whole, no matter how its parts change. For the whole is not the *sum* of its parts, but their *unity*, and as such, from the point of view of quantitative determinateness, the whole is always associated with 1 (unit) or 100% and its parts with *fractions of a unit* or *percentages*. The total value, consisting of relative magnitudes, is the negative unity of the values of individual commodities. This means that when the value of some commodities increases relative to the values of other commodities, then the value of the latter decreases relative to the former.¹⁰²

4. But the foregoing concerns only the total value of commodities. But as a result of a change in productivity, the total amount of commodities produced and consumed, in which the total value is embodied, changes. The *structure* of commodities produced in the economy and the *proportions* of values produced in various sectors, which express the *ratios* between different parts of the total value, also change. But, at the same time, the total value of all commodities does not change, which, as has been pointed out, is a qualitatively homogeneous whole, always associated with a *unit* or *100%*.

5. The magnitude of the value of any given commodity or set of commodities is always only a certain *fraction* of the total value of all commodities, otherwise it is a certain *part* of the whole. Therefore, the values of commodities can be commensurate among themselves

¹⁰⁰ We have in mind the costs of primary resources and final products only, and do not take into account separately the costs of intermediate products, because, in the final analysis, the costs of final products include the costs of intermediate products, which can also be reduced to the costs of primary resources.

¹⁰¹ See Appendix for more details.

¹⁰² Since the subjective values of individual goods are relative values, they can be compared with each other. The value of some goods is greater or less than others. Therefore, the subjective conception of economic value can be attributed to the *ordinal theory* of value. But since money appears in a market economy as a unit of measurement of value, the values of individual goods can not only be *commensurate* among themselves, but also *measured* by this unit of measurement (money). Therefore, in contrast to the concept of subjective value, the concept of social economic value is a *cardinal theory* of value.

only as relative magnitudes, as a greater or lesser share of the total value. And when one commodity stands out from the world of commodities, which performs the function of money as a unit of value measurement, then the values of various commodities begin to be commensurate with money and are expressed in a common form for all - in the number of monetary units, i.e. as the market prices. Thanks to this, *commensuration* becomes a *measurement*. With the help of market prices, values can be compared not only as relative, but also as absolute magnitudes, expressed in certain amounts of monetary units. But the system of absolute prices is always derived from the system of relative prices, in which the price of one of the commodities is conventionally taken as a unit. Absolute prices can change indefinitely depending on the relative magnitude of the value of the monetary unit and, consequently, on the number of monetary units in circulation and on the speed of their circulation, but they (absolute prices) will always express a system of *relative prices*, which, in turn, express only a system of *ratios between the values* of the goods themselves.

6. Therefore, the total value of goods remains unchanged in both boom and crisis, and is always equal to 1 or 100%. For the whole, as such, cannot increase or decrease. It is a relative concept, correlated with the concept of the parts of which it is composed. The whole always remains whole, as the unity of its parts, just as the 100% associated with the whole always remains 100%, as the sum of the percentages share that comprise it. Only the object itself, which represents this wholeness, can increase and decrease. Therefore, although the total value of commodities does not change, the very quantity of commodities produced and consumed can significantly increase and decrease in different phases of the economic cycle. In boom and crisis conditions, the branch proportions of value creation can also change significantly.

7. In the outside world, values manifest themselves only indirectly, through their ratios with each other, through the exchange ratios of the commodities in which they are embodied, i.e. through market prices, which are only indicators, coefficients. At the same time, the market prices themselves are also interconnected into a single integrity, and represent a closed system of coefficients for the market exchange of commodities. Since in the process of production and consumption of commodities, values are created by destroying values in a single process of self-reference of total value, the prices of produced commodities are formed on the basis of the prices of consumed commodities and also form a self-referential system of market prices.

At the same time, although the system of market prices reflects the ratios between the values of commodities, it is only parallel to the system of values and nowhere directly intersects with it. That is, the price system and the value system are in a *structural coupling* which implies that they are a source of mutual perturbations for each other, but at the same time they maintain the consistency of structural changes.¹⁰³ This does not prevent the fact that each price is a function of all other prices and that all exchange ratios of commodities are functionally interconnected within a single closed system of prices.

¹⁰³ The price system depends on the value system; the specific composition of produced (consumed) goods depends on the price system; the value system depends on the composition of goods. Thus, the value system, the price system and the composition of goods depend on each other. In the process of recursive interactions, they adapt to each other, change "towards each other", while remaining operationally closed.

8. Conclusion. The total value of all commodities produced, consumed and exchanged in a closed economic system is a qualitatively homogeneous integrity, differentiated within itself by the size of its constituent parts. It consists of many different and variable in size, but qualitatively homogeneous parts - the cost of individual commodities. However, as a result of a change in the magnitude of these parts and the quantitative ratios between them, only the *state* of this integrity changes, but not the total value of the goods itself. The total value of commodities, as a whole, always remains whole, no matter how the values of individual commodities change, for it is their unity.

3.12. Self-regulation of value flows

1. As noted, together with the transformation of the totality of primary resources and the totality of final products into each other, their total values are also transformed into each other, which are *equal in magnitude* and *opposite in sign*. But since this exchange of two totalities is mediated by commodity-money exchange, it takes place in two different markets - in the market of final products and the market of primary resources. These two markets are interconnected by a single monetary circulation. In the resource market, money flow is exchanged for a totality of resources from which a totality of products is produced. And in the product market, the same money flow is exchanged for a totality of products, as a result of the consumption of which a totality of resources is reproduced.

2. In this circular movement of money flow, what matters is not the total *amount* or *velocity* of money in the real sector of the economy, which can change in the process of fluctuations in economic activity,¹⁰⁴ but the *distribution* of money between different branches within each of both sectors of the economy. For the prices formed in these markets arise as a result of the distribution of a single money flow for the purchase of final products of various branches in the product market, and for the purchase of primary resources - in the resource market. These prices, formed in two different markets, are interconnected by feedback and constitute a single system. Moreover, in equilibrium,¹⁰⁵ the sum of prices of all final products is equal to the sum of prices of all primary resources. For, both in the market of final products and in the market of primary resources, prices are formed by the same amount of money circulating in the real sector. Money is only distributed differently depending on the supply and demand for certain products and resources in these markets. This equality of the sum of the prices of all products and all resources determines the equality of the national product and national income.

3. These prices tell entrepreneurs what products to produce and what resources to consume for their production. And the owners of production factors are told what products to consume and what resources to reproduce for this. Ultimately, it is the *distribution* of a unified money flow in the product market and in the resource market (and the price system formed in this process) that *determines* how the totality of primary resources for the production of products will be allocated and, accordingly, what will be the structure of the

¹⁰⁴ For money is introduced, then withdrawn from circulation.

¹⁰⁵ This means the equality of inflow and outflow of money in the real sector of the economy.

final product. And it depends on the distribution of the same maney flow how the totality of final products will be distributed among the owners of production factors and, accordingly, what will be the structure of reproduced primary resources.¹⁰⁶

From the economic decisions of subjects regarding the distribution of a) primary resources for the production of various final products and c) final products for the reproduction of various primary resources, the appearance of deficits and excesses of various products and resources depends. So, eventually, it is distribution that determines the utility, costs and value of all produced and consumed products and resources.

4. The mechanism of self-regulation of a market economy is based on the tendency for equality of two counter value flows - commodity and money. In the ideal case, they should be equal. Therefore, supply and demand must be equal both in the product market and in the resource market. An imbalance in one of them will lead to an imbalance in the other. By buying primary resources for the production of final products, and selling the produced products profitably, producers create the income of the owners (consumers) with which they will buy these products. Similarly, consumers, by buying final products, create those incomes for producers who will buy these resources.

5. Some difficulty in understanding the above equality of counter commodity and cash flows stems from the fact that investments of one period or another are financed by the savings of the previous period. But from the point of view of continuous dynamics, the process comes down to the fact that the counter value flows of goods and money are equal to each other. Under equilibrium conditions, the total price of final products produced by entrepreneurs in a certain time interval is equal to the sum of the owners' income (Salary, Rent, Interest, Profit) received over the same time interval.

And the money expenditure of the owners for the consumption of final products create those money incomes of entrepreneurs, with which these resources are bought. In other words, in the very process of producing commodities, that purchasing power is created with the help of which these commodities can be sold.

6. However, the correspondence between the purchasing power and the monetary value of the goods produced is only the possibility of equality of supply and demand. The actual equality of supply and demand and the clearing of markets depend on how much the structure of goods produced corresponds to the structure of solvent needs for them.

In the general case, the solvent social need for a particular commodity, respectively, its social utility is reflected in the demand price, and the social costs of production - in the supply price. If in all markets the supply and demand prices are equal, then this indicates that for all goods, social costs are equal to social utility. This means that in the economic system

¹⁰⁶ Since credit represent the same purchasing power as money, it should be clarified that when setting prices, the distribution of not only money, but also the credits issued is important. Of course, if the ratio between production and consumer credits, as well as the ratio of issued and repaid credits as a whole, fluctuates sharply in the course of the functioning of the economy, then the feedback between the prices of primary resources and final products will be broken. But if the balance between them is not disturbed, then the distribution of the aggregate purchasing power of money and credits will adequately reflect the structure of society's needs in the price system. This problem is of particular importance in modern conditions, when more than 95% of the money in circulation is bank money, i.e. purchasing power created by commercial banks when issuing credits.

there is an even-utility of costs, all needs are satisfied evenly, the system is in equilibrium and operates in an optimal mode.

7. The discrepancy between supply prices and demand prices in the markets shows the discrepancy between production and demand; produced not what society needs. If the market supply prices of certain commodities are greater than the demand price, then there is an overproduction of these commodities in comparison with the solvent needs for them. If, on the contrary, demand prices are higher than supply prices, then there is a shortage of production. Accordingly, the rate of profit will be below the average in the case of overproduction of goods, and higher in the case of underproduction. In such cases, resources flow from unprofitable industries to profitable ones. Due to the redistribution of resources between branches, there is a tendency to bring the social costs of production of goods into accordance with the social utility of goods. This means the existence of a tendency towards the equal use of costs and the establishment of a correspondence between the society's structure of production and the structure of its solvent needs.

Something similar happens in the case of a discrepancy between the demand price and the supply price in the primary resource market. However, the redistribution of ownership of production factors is associated with difficulties, because it is associated not only with purely economic, but also with a number of other factors (political, legal, social, etc.). Nevertheless, the economic forces directed at their redistribution and the struggle for possession of the most deficient factors of production are generated by the same feedbacks between the market prices of final products and primary resources.

8. The whole essence of market self-regulation comes down to the fact that the changes that occur in the *distribution* of a single money flow between different final products (in the market of final products) and between different primary resources (in the market of primary resources) are mutually conditioned due to feedbacks arising as a result of circular organization of economic processes.

Approaching or moving away from the state of even-utility of costs and economic equilibrium depends on the above distribution. However, the economic equilibrium is formed on the basis of the value indicators of production and consumption, supply and demand, formed by feedback within the system, and the operational closure of this system. But in what particular commodities, and in what quantities of each of them, these values are embodied, this also depends on the external environment of the economic system; from the environment with which the system is connected by causal links. Expenditure coefficients just reflect the impact of the external environment on the economic system. This environment is technological knowledge, science, education, non-economic (social, cultural, etc.) needs, natural and social processes, and much more.

At the same time, thanks to technological progress, the flow of goods on the market of final products is constantly growing in physical terms, both the quantity and quality of final products and services are increasing. But since their total value does not change, there is correspondingly a general tendency to decrease the value of individual commodities in this market and, accordingly, to decrease the relative market prices in which these values are expressed. As for the value and relative prices of primary resources, they depend on changes in the degree of their scarcity.

3.13. General equilibrium model

a) "Symmetric model"

1. The "symmetric model" is represented as a square matrix of order ($m+n$). It reflects a system of relationships not between economic subjects, but between those economic actions, functions, commodity and money flows that ensure the integrity of the economic system. This is a model of a closed decentralized economic system in which final products (m types) are produced by consuming primary resources (n types) and primary resources are reproduced by consuming final products.¹⁰⁷ For the sake of simplicity, the model does not take into account the production and consumption of intermediate products. Since both products and resources are commodities, the market economy is presented as a system in which the “production of commodities by means of commodities” (P. Sraffa) takes place. The division of goods into products and resources is conditional. Therefore, all goods are products for their producers and resources for their consumers. The first sector produces products that are resources for the fourth sector. As a result of the consumption of these resources, the fourth sector produces products that are resources for the first sector. The exchange of goods takes place in the markets (sectors 2 and 3). All commodities are produced by some, consumed by others, sold by some, bought by others. Therefore, all agents are simultaneously producers and consumers, sellers and buyers. Each of them receives income and incurs expenses, and uses the difference between income and expenses to invest in physical and human capital.¹⁰⁸

The formation of income and expenses is carried out on the basis of prices, since the expenses of buyers are incomes of sellers. On the one hand, prices reflect the *costs* of production and, accordingly, are formed on the basis of the prices of consumed goods. On the other hand, prices reflect the *utility* of the goods. Since utility is the ability to satisfy solvent needs, prices determine the amount of those expenses that consumers sacrifice from their income to acquire this utility. That is, the price of the purchased goods for the consumer represents a monetary expenditure. Therefore, in this model, incomes and prices paid from these incomes have opposite signs. This reflects the fact that, as a result of the acquisition of goods, prices also "neutralize" income, just as utility "neutralizes" (satisfies) the need as a result of its consumption. Therefore, the cells of the diagonal of the matrix simultaneously show both the *production value* of goods and their *use value*. Since the elements of the diagonal of the matrix are at the same time elements of both rows and columns, they simultaneously reflect both costs and utility. The rows show the elements of the goods' production costs, and the columns show the distribution and consumption of the same goods in the production processes of various other goods.

¹⁰⁷ This model can be refined to an arbitrarily large degree by increasing the number of rows and columns. You can count the labor force by profession, physical capital by type of equipment, land by fertility zones, final products by detailed product groups, and so on. This allows using this approach to create applied models, with the number of rows and columns adapted to the computing power.

¹⁰⁸ For the sake of simplicity, it is assumed that gross profits generated are fully withdrawn as personal income for entrepreneurs, and savings generated are fully withdrawn for investment in physical capital.

Clockwise in the matrix, resources are converted into products, which, in turn, are consumed as resources for the production of other products, and so on. Counterclockwise, there is a transformation of money income into money expenses, which in turn are themselves income and then again transformed into expenses, etc. Each element of the diagonal matches the rows and columns of the matrix. In value terms, the sum of the elements of each row of the first sector is equal to the sum of the elements of the corresponding columns of the fourth sector, and the sum of the elements of each row of the fourth sector is equal to the sum of the elements of the corresponding columns of the first sector. That is, in a closed economic system, only what is consumed is produced and only what is produced is consumed. In equilibrium, such a correspondence between production and consumption means that for each commodity (product and resource), supply and demand are fully correspond to each other.

Matrix of the “Symmetric Model” of General Economic Equilibrium

Сектор 1				Сектор 2			
$- a_{11}x_1v_1$	$- a_{12}x_1v_2$	....	$- \alpha_1 A_1$				x_1p_1
$- a_{21}x_2v_1$	$- a_{22}x_2v_2$	....	$- \alpha_2 A_2$			x_2p_2	
....		
$- a_{m1}x_mv_1$	$- a_{m2}x_mv_2$	....	$- \alpha_m A_m$ $- P'$	$x_m p_m$ $I = S$			
			$P = Q$ $y_n v_n$	$- S'$ $- \beta_n B_n$	....	$- b_{n2}p_2y_n$	$- b_{n1}p_1y_n$
	
	y_2v_2			$- \beta_2 B_2$	....	$- b_{22}y_2p_2$	$- b_{21}y_2p_1$
y_1v_1				$- \beta_1 B_1$	....	$- b_{12}y_1p_2$	$- b_{11}y_1p_1$
Сектор 3				Сектор 4			

Tab. 1. Matrix of a closed system of economic actions

x_i - goods produced in sector 1 (consumed in sector 4), $i = 1, 2, \dots, m$;
 p_i - value of goods x_i (equilibrium price), $i = 1, 2, \dots, m$;
 y_j - goods produced in sector 4 (consumed in the sector 1), $j = 1, 2, \dots, n$;
 v_j - value of the goods y_j (equilibrium price), $j = 1, 2, \dots, n$;
 a_{ij} - consumption of recourse j for production of unit of product i (technological coefficients);
 b_{ji} - consumption of product i for reproduction of unit of recourse j ;
 α_i - the rate of surplus product (save resources) in the production of good i ;
 β_i - the rate of surplus product (save resources) in the production of good j ;
 P - gross surplus product (save resources) in the sector 1;
 S - gross surplus product (save resources) in the sector 4;
 Q - gross consumption in debt;
 I - gross investment;
 S' - saving from consumption in debt;
 P' - surplus product (save resources) in the production of investment goods.

In both the first and fourth quadrants, the monetary value of the goods produced is greater than the sum of the monetary value of the goods consumed in their production. In the first sector, this difference takes the form of *profit* (P). The withdrawn profit is invested in human capital (reproduction of the entrepreneurial resource). With these funds, a *surplus product* (Q) is bought. In the fourth sector, this difference between the value of produced and consumed goods takes the form of *savings* (S), which, after being converted into credit resources, is invested in the production of physical capital (I), i.e. the *saved resources* are bought.¹⁰⁹ Agents are interested in increasing the surplus product and the saved resource. Surplus production requires entrepreneurial risk, and abstinence is necessary for resource savings.

Since each agent is both a producer who produces a *surplus product* and a consumer who saves *resources*, they simultaneously perform both the function of an entrepreneur and the function of a saver.¹¹⁰ Thus, in order for economic agents to gain value in the process of production and consumption of goods, both risk and abstinence are necessary. The monetary reward for risk and abstinence is precisely profit and savings.

2. Description of the model: Constants: a_{ij} , b_{ji} . Variables: x_i , y_j , p_i , v_j , α_i , β_j .

1) If all agents are represented as producers, then:

$$A_i = \sum a_{ij} x_i v_j ; i = 1, 2, \dots, m; j = 1, 2, \dots, (n - 1); \quad (1)$$

$$B_j = \sum b_{ji} y_j p_i ; i = 1, 2, \dots, (m - 1); j = 1, 2, \dots, n; \quad (2)$$

$$(1 + \alpha_i) \sum a_{ij} v_j = p_i; i = 1, 2, \dots, m; j = 1, 2, \dots, (n - 1); \quad (3)$$

$$(1 + \beta_j) \sum b_{ji} p_i = v_j; i = 1, 2, \dots, (m - 1); j = 1, 2, \dots, n; \quad (4)$$

$$\sum a_{ij} x_i = y_j; j = 1, 2, \dots, (n - 1); i = 1, 2, \dots, m; \quad (5)$$

$$\sum b_{ji} y_j = x_i; i = 1, 2, \dots, (m - 1); j = 1, 2, \dots, m; \quad (6)$$

$$\alpha_0 = \frac{\sum_i \alpha_i A_i}{\sum_i A_i} = 1, 2, \dots, m; \quad (7)$$

$$\beta_0 = \frac{\sum_j \beta_j B_j}{\sum_j B_j} = 1, 2, \dots, n; \quad (8)$$

¹⁰⁹ It should be added that the primary resources saved in the fourth sector are saved from their use for the needs of current consumption, and not from consumption in general. They are used for investment and hence are consumed in the production of capital goods and inventories. For primary resources (from a technological point of view) are the services of production factors. But services cannot be saved except in the form of goods produced with their help (i.e., in a materialized form) or in the form of money from the sale of these goods.

¹¹⁰ Since the saving of primary resources is possible only in the form of investments, saving is associated with investment risk.

$$x_i \geq X_{\min}; \quad i = 1, 2, \dots, m; y_j \leq y_{\max}; \quad j = 1, 2, \dots, n. \quad (9)$$

2) If all agents are represented as consumers, then:

$$A_i = x_i p_i; \quad i = 1, 2, \dots, m; \quad (10)$$

$$B_j = y_j v_j; \quad j = 1, 2, \dots, n; \quad (11)$$

$$\sum a_{ij} v_j / (1 - \alpha_i) = p_i; \quad i = 1, 2, \dots, m; j = 1, 2, \dots, (n - 1); \quad (12)$$

$$\sum b_{ji} p_i / (1 - \beta_j) = v_j; \quad i = 1, 2, \dots, (m - 1); j = 1, 2, \dots, n; \quad (13)$$

$$\sum a_{ij} x_i = y_j; \quad j = 1, 2, \dots, (n - 1); i = 1, 2, \dots, m; \quad (14)$$

$$\sum b_{ji} y_j = x_i; \quad i = 1, 2, \dots, (m - 1); \quad j = 1, 2, \dots, m; \quad (15)$$

$$\alpha_0 = \frac{\sum_i \alpha_i x_i p_i}{\sum_i x_i p_i}; \quad i = 1, 2, \dots, m; \quad (16)$$

$$\beta_0 = \frac{\sum_j \beta_j y_j v_j}{\sum_j y_j v_j}; \quad j = 1, 2, \dots, n; \quad (17)$$

$$x_i \geq X_{\min}; \quad i = 1, 2, \dots, m; y_j \leq y_{\max}; \quad j = 1, 2, \dots, n; \quad (18)$$

As we can see, according to these formulas in both cases, both equilibrium prices and equilibrium quantities of goods are formed on the basis of recursive processes, and the equilibrium condition is the equality: $P = Q = I = S$ and, therefore, the equality of the average rate of profit α_0 and the average rate savings β_0 . Under conditions of competition, α_0 and β_0 strive for equality and, thereby, cause a tendency towards equality $P = Q = I = S$ and, accordingly, towards the equilibrium of the entire system.

Technological coefficients are coefficients for transformation of primary resources into final products, and consumer coefficients - final products into primary resources. Prices are the coefficients of the exchange of money for goods and, accordingly, the coefficients for transformation of income into expenses and expenses into income.

3. In equilibrium, gross profit is equal to gross investment in human capital (in the Entrepreneurial factor) and, therefore, is equal to consumption in debt of final products ($P = Q$). And gross saving is equal to gross investment in physical capital, i.e. is equal to the consumption in debt of saved primary resources ($S = I$). Under equilibrium conditions, the leakage of funds from the income of producers in the form of withdrawn profit P , must be compensated by the inflow of funds in the form of credits for productive investment I . And the leakage of funds from consumer income in the form of savings S , must be compensated by the inflow of funds to finance consumption in debt Q . That is, in the resource market, the condition for maintaining demand at the required level is the equality $P = I$, and in the

product market, such a condition is the equality $S = Q$. Otherwise, the equilibrium between supply and demand (at existing prices) will be disturbed both in the resource market and in the product market. But what flows out of the fourth sector in the form of savings S must, under equilibrium conditions, be equal to what, through the money market, flows into the first sector in the form of productive investment I . And what in the form of withdrawn profits P flows out of the first sector must be equal to what flows into the fourth sector in the form of consumption in debt Q (ie investment in the entrepreneurial factor). This is reflected in the model, according to which productive investment (investment in physical capital) I and gross saving S correspond to the same element of the diagonal in the second sector. Therefore, in equilibrium $I = S$. Similarly, consumption in debt Q (ie investment in entrepreneurial factor, investment in human capital) and gross profit P correspond to the same element of the diagonal in the third sector. Therefore, $P = Q$.

The equilibrium condition is the equality $P = S = I = Q$. Therefore, the equality $\alpha_0 = \beta_0 = r_0$ must hold, where α_0 , β_0 and r_0 , respectively, represent the average rates of profit, savings and interest rate. At the same time, it must be taken into account that, unlike all other commodity-money flows, the transformation of P into Q , and the transformation of S into I takes place not on the basis of an equivalent exchange of goods, but on the basis of credit relations, in which the interest rate r_0 performs a balancing function.

Violation of the equilibrium conditions in the system violates the equality between the sum of the elements of the rows and the sum of the elements of the columns corresponding to them. This leads to a bifurcation of the elements of the diagonal. There arises a discrepancy between production and consumption, supply and demand, costs and utility, production values and consumer values. There arise the scarce and surplus goods. Unsold goods or unused money will appear in the markets of various goods. Some get additional profit at the expense of other people's losses or lost profits. This generates incentives aimed at restoring equilibrium in the markets. At the same time, an imbalance between any one pair of rows and columns inevitably gives rise to an imbalance between other pairs of rows and columns. General economic equilibrium will not be reached until the equality $P = S = I = Q$ is reached, which means that $\alpha_0 = \beta_0 = r_0$. Equilibrium states will be formed depending on the magnitude of interest rates, and various gross indicators corresponding to them - profits, savings, investments and consumption in debt.¹¹¹

¹¹¹ This model holds true also for a centralized economy in which all factors of production other than labor force are public property. In this case, the final products market will be represented only by the market of consumer products, and the resource market will be represented only by the market of labor force (up to full automation and robotization of production). On the basis of supply and demand, market prices will be formed only in these markets, and the prices of all other products and resources will be presented in the form of dual prices in econometrico-mathematical models, on the basis of which the allocation of resources and the regulation of the economy will take place. These market prices for services of the labor force and consumer products will serve as the input for "fine-tuning" these models.

b) Fluctuations in economic activity

1. Based on the "Symmetric Model", fluctuations in economic activity, somewhat simplified, can be interpreted as follows. (See Fig.3). Under equilibrium conditions, the money flows flowing through the reservoirs (the resource market and the product market) and the pressures in them are equal, since the outflows of money P and S balance each other in the same way as the inflows of money I and D. Under such conditions, resources and products have optimal prices. At such prices, entrepreneurs earn a normal profit, which they consider to be an adequate reward for the burden of entrepreneurial risk. (See Fig.4). Under such conditions, resources and products have optimal prices. At such prices, entrepreneurs earn a normal profit, which they consider to be an adequate reward for the burden of entrepreneurial risk. The owners of the factors of production make normal savings that satisfy them as the price of abstinence.

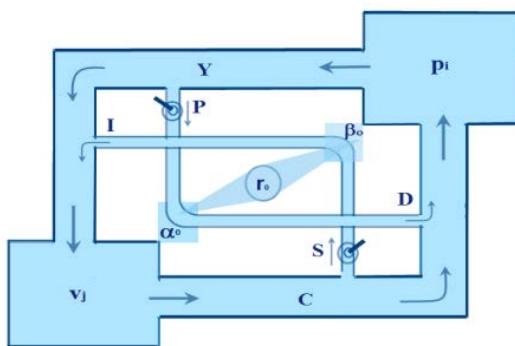


Fig. 3. Circulation of financial flows according to the "Symmetric model".

2. In the phase of economic expansion in the economy, income and expenditure flows increase. At the same time, as a result of the psychological law of Keynes, the marginal propensity of consumers to save increases, respectively, the marginal propensity to consume decreases. As a consequence of this, against the general background of an increase in all money (and commodity) flows, in the sphere of consumption, the share of S is growing, and the share of C is decreasing. On the other hand, as a result of the formation of optimistic moods, the marginal propensity of producers to take risks increases. As a result, opposite processes take place in the sphere of production. The marginal propensity to expand production (to reinvestment and entrepreneurial risk) increases and the marginal propensity to withdraw profits decreases. Accordingly, in the total money flow, the share of P decreases, while the share of Y grows.

3. As a result of this redistribution of flows, "money pressure" decreases in the upper reservoir (product market) and increases in the lower one (resources market). Accordingly, the relative prices of products begin to decline, while the relative prices of resources begin to increase. But such changes in the price system provoke a change in the phase of the economic cycle. The recession is starting. The rate of profit received decreases, which leads to a decrease in the propensity to take risks. As a result, production is reduced, consumers' incomes and their propensity to save, etc. decrease. That is, there are opposite trends - the

shares of S and Y are decreasing, while the shares of P and C are growing. This leads to a redistribution of flows, the ratio of "monetary pressure" in the markets of products and resources is reversed. The relative prices of products again begin to increase, and resources - to decline. The revival begins.

4. As a result of fluctuations in economic activity, the money supply required to service transactions also fluctuates. In the expansion phase, monetary resources are introduced into the circulation, and in the recession phase they are withdrawn. At the same time, it should be borne in mind that although the rates of profit received and withdrawn by producers are different, just as the rates of savings made and withdrawn by consumers are different, but changes in the ratios of these rates in the process of expansion and recession cause only a redistribution of economic flows, but not a change in the total quantity of money. The input and output of monetary resources occurs at the expense of monetary assets of economic agents. And all these processes of input and output of money in the real sector of the economy, or the redistribution of money flows, directly depend on the level of the interest rate r_0 , that is, on the price for the right to use monetary resources. For the level r_0 affects economic decisions, and thus - on P, S, I, D, α_0 and β_0 . Demand and supply in the money market form the interest rate, with the help of which the economy seeks to restore the "golden ratio" $\alpha_0 = \beta_0 = r_0$ ¹¹² and, accordingly, the equilibrium and optimal ratios of prices for resources and products.

5. In a money economy, business cycle fluctuations are the only mechanism that brings P, S, I, and D into line (respectively, α_0 , β_0 , and r_0). This is a built-in mechanism for correcting imbalances in the system. However, it does not ensure the equality of these flows, which is necessary for the general equilibrium. It only keeps their differences within certain limits. A decentralized economy is a "feedback" system, i.e. cause-and-effect relationships are closed in a circle and transformed into a functional relationship, due to which any deviation excites forces for its self-elimination, proportional to the strength of this deviation. The spontaneous laws of the market are "blindly" acting laws. And "blindness" is manifested

¹¹² Interest is the price for the right to temporarily use the services of money, just as Wage is the price for the right to temporarily use the services of Labor force, Rent is the price of the services of the Land, Rent is the price of the services of physical Capital. And like all other prices, it depends on all other prices, just as they all depend on it. But just as money has a special role in the commodity world, so the interest rate plays a central role in the functioning of a money economy. The owner of money can invest money in the production of goods and make a *profit*, or issue a loan and receive *interest*. Therefore, under perfect competition, interest and the rate of profit tend to be equal. And since in equilibrium conditions the profit rate (α_0) and the savings rate (β_0) are equal, then all three parameters are equal ($\alpha_0 = \beta_0 = r_0$). The functioning of the economy depends on the interest rate in the same way that the interest rate depends on the functioning of the economy as a whole. Interest is a backbone indicator, which is formed depending on the supply and demand of monetary resources in the money market. But, both the demand and the supply of monetary resources themselves depend on the results of the functioning of the entire economy. In this regard, the remark of V. Pareto is interesting, that "There are infinitely many extremely varied circumstances which cause gross interest rates to vary." (Pareto, 2014, 223). And no less interesting are the comments of J. Schumpeter regarding this judgment of Pareto: "Another opinion of Pareto's deserves comment. He thought that to search for the 'cause' of interest was in itself a mistake. The interest rate, being one of the many elements of the general system of equilibrium, was, of course, simultaneously determined with all of them so that there was no point at all in looking for any particular element that 'caused' interest." (Schumpeter, 2006, 892.)

in the fact that the uncontrolled self-excitation and self-inhibition of the economy continues until the critical turning points are reached - the maximum production possibilities and the minimum consumer opportunities. Therefore, without state regulation of the economy, it is impossible in principle to eliminate cyclical fluctuations.

c) Nonlinear properties of the “Symmetric Model”

1. "Symmetric model" is a model of an economic system in which recursive processes take place. It demonstrates the unique properties of self-referential dynamic systems, which is what a decentralized economy is. It is easy to see that this model is inspired by the ideas of L. Walras, but, unlike his model, in the "Symmetric Model" the role of the mystical auctioneer and "groping" (*tdtonnement*) is performed by recursive processes, which makes it more realistic.¹¹³ Recursive processes show which economic processes lead the system to equilibrium.¹¹⁴ Feedbacks play the role of built-in stabilizers of the system, which ensure its stability. Although this model is theoretical, and shows not a real, but only a mathematically achievable equilibrium, but this model shows that in case of deviation from this equilibrium, there will be discrepancies between the prices of demand and supply prices (the prices of primary resources and final products, shown in sectors 2 and 3.) In this case, the model

¹¹³ This model shows the universal relationship between economic phenomena. This relationship, first discovered by L. Walras, was of great importance for economic theory. However, to ensure the "operability" of his model, he had to artificially introduce into his model an *auctioneer* that does not exist in the real economy. "It was but slowly that the fact began to dawn upon analysts that there is a pervading interdependence between all economic phenomena, that they all hang together somehow.... But they never bothered to investigate *how* things hang together. ... They were very far from realizing that this all-pervading interdependence is the fundamental fact, ... and that the most fundamental of all specifically scientific questions is the question whether analysis of that interdependence will yield relations sufficient to determine—if possible, uniquely—all the prices and quantities of products and productive services that constitute the economic 'system.' Isnard, A.Smith, J.B.Say, Ricardo, and others all struggled or rather fumbled for it, every one of them in his own way. But the discovery was not fully made until Walras, whose system of equations, defining (static) equilibrium in a system of interdependent quantities, is the Magna Carta of economic theory The history of economic analysis or, at any rate, of its 'pure' kernel, from Child to Walras might be written in terms of this conception's gradual emergence into the light of consciousness." (Schumpeter, 2006, 232-233.)

¹¹⁴ M. Blaug writes about the theory of general equilibrium (GE) of Walras: "In one sense, GE theory makes no predictions: it attempts to establish the logical possibility of GE without showing how it will come about and even without claiming that it will actually come about as a result of spontaneous forces. To be sure, Walras himself believed that he had provided an explanation of how real-world competitive markets would reach equilibrium via the process of *tdtonnement* or "groping." But there are serious deficiencies in the Walrasian notion of *tdtonnement* , and to this day it is not possible to show that a final equilibrium in the economy as a whole is independent of the path taken towards equilibrium or that, of all the possible paths chosen, the one that is actually adopted will and must converge on equilibrium. All modern work on GE theory of the Arrow-Debreu variety has been confined to "existence theorems" - theorems that state the conditions under which a GE system has an unique solution - and to questions of the stability of equilibrium once equilibrium is attained. In other words, we are almost as far away as Walras was from discovering the real-world counterpart of the equilibrating forces invoked by GE theory." (Blaug, 2006,162)

logically assumes the emergence of such economic forces and recursive processes that "work" to restore equilibrium.

The model assumes only the pure logic of economic processes, and not the real state of the economy, which can be achieved in historical time. Of course, real states are the result of a sequence of real events and reactions to them and are far from ideal equilibrium, which is theoretically assumed by the system of equations in the mathematical model. The model can only show the *logic of the interaction* of economic forces in the real economy, ensuring its ability to homeostasis.

2. This model reflects the state in which the decisions of all actors are fully coordinated so that they have no incentives to change their choice. That is, the economy is in a state of *Nash equilibrium*. No one will increase the price of his goods above the equilibrium price because he will not be able to sell them, and no one will lower the price below the equilibrium price because he will not receive a normal profit.

3. All macroeconomic processes are derived from microeconomic foundations. The main commodity and money flows at the macro level are formed on the basis of the economic actions of actors at the micro level. The dynamics of the interaction of these flows gives rise to cyclic fluctuations, which are characteristic of nonlinear dynamic systems.

4. The model implies that the slightest changes in a particular price, quantity, production or consumer coefficients, as a result of recursive processes, give rise to significant changes in the entire system. That is, the "Butterfly Effect" occurs, which is also inherent in nonlinear systems. For clarity, the process of the birth of this effect in the "Symmetric Model" is shown below.

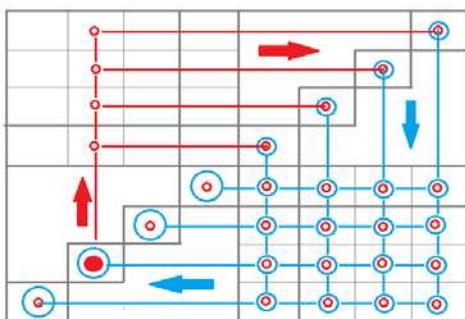


Fig. 4. A slight change in the price of one of the primary resources in the third sector leads to significant changes in *prices* and *quantities* of goods, as well as *expenditure coefficients* in the entire system. (The arrows show the direction in which, step by step, the prices of goods change.)

5. The model assumes operational closure and causal openness of the economic system. This is manifested in the fact that expenditure coefficients (production and consumer norms) are set from the outside and depend on changes in the external environment (technology, science, natural factors, social and political processes, culture, traditions, consumer preferences, etc.). On the other hand, prices, quantities, rates of profit, rates of savings, and interest rates - are variables, depending on internal system processes, are in a functional relationship with each other, and respond to any changes in expenditure coefficients in such a way that intrasystem equilibrium is maintained. With the help of recursive processes, they

ensure the self-regulation of the system and its constant striving for equilibrium as its *attractor*.¹¹⁵ Expenditure coefficients are a kind of link between the system and those changes in the external environment that are important for the system. They change under the influence of the environment. However, the reaction of the system to these changes leads to a feedback effect of the system on the environment. This is manifested in the fact that the technologies used, consumer preferences, etc. are changing, which, in turn, changes the consumption coefficients themselves, which transmit these changes in the external environment to the system itself. The system responds to these changes in the environment by changing the structure with the help of prices and quantities of goods in order to maintain its integrity. The system remains indifferent to all those changes in the environment that are not reflected in the expenditure coefficients.

6. Due to operational closure, the system retains its autonomy. In the model, this is reflected in the fact that the sum of the elements of each row, as well as the sum of the elements of each column, is equal to zero. However, the autonomy of the system does not mean its isolation. For, as was shown above, although the system is influenced by the environment, but, in accordance with its interests, it selectively responds only to those changes that are vital to maintaining its integrity and viability.

This model assumes the autonomy of the economic system also in another sense. The national economy is a subsystem of the world economy. But in a competitive environment, the national economy retains autonomy when interacting with the world economy. This is possible due to the fact that the system can maintain internal balance. Its trade balance, expressed in *national prices*, is completely balanced. But in terms of *world prices*, it may run a trade deficit or surplus. This does not violate its autonomy. Below is a diagram that allows you to visualize the aforesaid.

¹¹⁵ “On the graph, the attractor looks like a convergence of trajectories to one point or a closed loop, within which the state of the system regularly fluctuates. The convergence point does not depend on where the trajectory is drawn from on the graph, that is, on the initial conditions of motion. In synergetics, they speak of the cone of attraction of the attractor, which, as it were, draws into itself the set of possible trajectories of the system, determined by different initial conditions. The funnel of attraction pulls together the disparate initial lines of trajectories into a common, ever narrower beam. The paradox of the attractor's action lies in the fact that it carries out, as it were, determination by the future, more precisely, by the upcoming state of the system. The state has not yet been reached, it does not exist, but in some mysterious way it stretches tentacles from the future to the present. This is where the philosophical problem of the possibility of goal-setting in inorganic nature arises. Can an attractor be regarded as a kind of target of the system's motion? In synergetics, the answer is: in the ontological sense, it is unlikely. But in a methodological sense, looking at an attractor by analogy with a goal, as if it were a goal chosen by the system, often turns out to be effective.” (Knyazeva, ..., 2000, 169.)

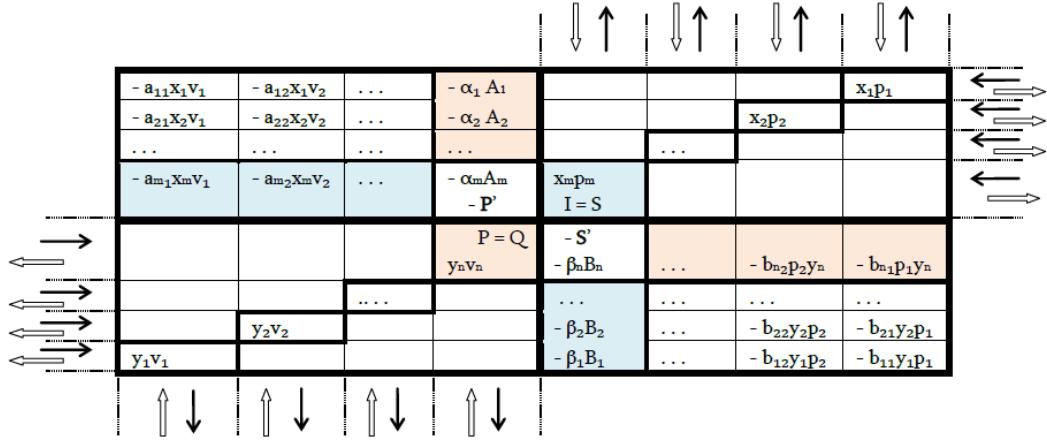


Fig. 5. Exports and imports of goods and services balance each other when expressed in national prices, but in terms of world prices there may be a trade deficit or surplus. (Black arrows show exports and imports in the case of a negative trade balance, and white arrows in the case of a positive trade balance.)

7. In the case of taking into account the production of intermediate products and the service sector, the model will take on a more complex form, although the functional closure of the system and the very essence of the ongoing processes remain unchanged. (See Fig. 6 and 7.).

$x'_m p'_m$				$-a'_{11}x'_1 v'_1$	\dots	$-a'_{m(p-1)}x'_m v'_{(p-1)}$	$-P'_m$
	\dots			\dots	\dots	\dots	\dots
		$x'_1 p'_1$		$-a'_{21}x'_2 v'_1$	\dots	$-a'_{2(p-1)}x'_2 v'_{(p-1)}$	$-P'_1$
			$x'_1 p'_1$	$-a'_{12}x'_1 v'_1$	\dots	$-a'_{1(p-1)}x'_1 v'_{(p-1)}$	$-P'_1$
$-P'_m + \sum a' x' v'$	\dots	$-P'_2 + \sum a' x' v'$	$-P'_1 + \sum a' x' v'$	$-a_{11}x_1 v_1$	\dots	$-a_{1(p-1)}x_1 v_{(p-1)}$	$-P_1$
\dots	\dots	\dots	\dots	\dots	\dots	\dots	\dots
$-P'_m + \sum a' x' v'$	\dots	$-P'_2 + \sum a' x' v'$	$-P'_1 + \sum a' x' v'$	$-a_{(m-1)1}x_{(m-1)} v_1$	\dots	$-a_{(m-1)(p-1)}x_{(m-1)} v_{(p-1)}$	$-P_{(m-1)}$
$-P'_m + \sum a' x' v'$	\dots	$-P'_2 + \sum a' x' v'$	$-P'_1 + \sum a' x' v'$	$-a_{mm}x_m v_1$	\dots	$-a_{m(p-1)}x_m v_{(p-1)}$	$-P_m$
						$y_2 v_2$	$-S_2$
						$y_{(p-1)} v_{(p-1)}$	$-S_{(p-1)}$
			$y_1 v_1$				$-S_1$

Fig. 6. Matrix of the "Symmetric model", taking into account the production and consumption of intermediate products.

$-P_1$					$x_1 p_1$			
\dots					\dots			
$-P_{(n-1)}$		$x_{(n-1)} p_{(n-1)}$						
$-P_n$	$x_n p_n$							
$y_n v_n$	$-S_n$	$-b_{n(n-1)} y_n p_{(n-1)}$	\dots	$-b_{n1} y_n p_1$	$-S'_1 + \sum b' y' p'$	$-S'_1 + \sum b' y' p'$	\dots	$-S'_1 + \sum b' y' p'$
$y_{(n-1)} v_{(n-1)}$	$-S_{(n-1)}$	$-b_{(n-1)(n-1)} y_{(n-1)} p_{(n-1)}$	\dots	$-b_{(n-1)1} y_{(n-1)} p_1$	$-S'_1 + \sum b' y' p'$	$-S'_1 + \sum b' y' p'$	\dots	$-S'_1 + \sum b' y' p'$
	\dots	\dots	\dots	\dots	\dots	\dots	\dots	\dots
	$-S_1$	$-b_{1(m-1)} y_1 p_{(m-1)}$	\dots	$-b_{11} y_1 p_1$	$-S'_1 + \sum b' y' p'$	$-S'_1 + \sum b' y' p'$	\dots	$-S'_1 + \sum b' y' p'$
	$-S'_1$	$-b'_{1(m-1)} y'_1 p_{(m-1)}$	\dots	$-b'_{11} y'_1 p_1$	$y'_1 v'_1$			
	$-S'_2$	$-b'_{2(m-1)} y'_2 p_{(m-1)}$	\dots	$-b'_{21} y'_2 p_1$		$y'_2 v'_2$		
	\dots	\dots	\dots	\dots			\dots	
	$-S'_n$	$-b'_{n(m-1)} y'_n p_{(m-1)}$	\dots	$-b'_{n1} y'_n p_1$				$y'_n v'_n$

Fig. 7. Matrix of the “Symmetric Model”, taking into account production and consumption in the service sector.

The prices of primary inputs also include the prices of services produced in the fourth sector, just as the prices of end products include the prices of intermediate products produced in the first sector.

3.14. Business cycles

a) Causes of occurrence

1. A fundamental property of the behavior of nonlinear systems is the periodic alternation of acceleration and deceleration of processes, integration and disintegration.¹¹⁶ These properties are “embedded” in the very nonlinearity of the processes. All these features are characteristic of economic systems.

The fluctuations of the economic system and its evolution are a spontaneous result of the interaction of millions of independent agents, each of which purposefully acts in its own interests. And since the economic relations of the agents are based on voluntary principles

¹¹⁶ "Stability and instability, replacing each other, give rise to an oscillatory regime. ... Open nonlinear systems constantly balance between chaos and order in a state of dynamic equilibrium Such an oscillatory process prevents the collapse of a complex structure due to its instability near the moment of escalation, harmonizing the pace of development various fragments of a complex structure. There are some universal, inherent to both living and non-living, laws of rhythm, cyclic change of states: rise - fall - rise, etc. Only by following the “rhythms of life”, oscillatory regimes, systems can maintain their wholeness and develop dynamically." "Chaos and order are two sides of a single dialectical principle of nature." (Metelev, 2011, 38-39). The existence of economic cycles is necessary for the self-regulation of a decentralized economic system. Without such cycles, the economic system cannot exist. Inadequate methods of conducting a countercyclical policy cause a breakdown in the market mechanism of self-regulation. In such cases, there is an accumulation of intrasystemic deformations, which later manifest themselves in the form of deep and prolonged crises (an example of this is the 2008 crisis).

and no one is forcing anyone to enter into relations with other agents, the ties between them easily arise and are easily broken. This circumstance gives rise to both the possibility and the necessity for self-regulation of the market economy as a complex non-linear system. Under such conditions, the economic order is born out of the chaos of randomly emerging and broken economic ties between the economic actions of independent agents.

2. Economic cycles in a competitive environment are endogenous. Although external factors have repeatedly caused economic crises, both before and after the birth of a market economy (the latest example, the Coronavirus pandemic), they were not recurring, cyclical crises. Moreover, exogenous factors can contribute to or hinder the change in the phases of the economic cycle, accelerate or slow down expansion or recession. But since they themselves are not periodic, they cannot be the cause of an economic cycle that is periodic. The internal causes and logic of the emergence of economic cycles are due to the non-linear properties of the economic system itself, its homeostasis.¹¹⁷ Economic cycles represent the "eigen-behavior" of the economy as a complex system that specifically responds to the effects of the environment.

3. The existence of a overall interconnection between the actions of market agents, in itself, causes a coordinated growth and decline in their economic activity, overall waves of acceleration and deceleration of economic processes in the system as a whole. The integrity of the economy, as a system of economic activities, is due to the fact that all subjects produce goods for each other and exchange them among themselves. This is possible only due to the mutual coordination of their actions and the establishment of a certain order in the functioning of the system as a whole. But this order is established spontaneously and periodically violated. The alternation of order and chaos in the system of collective action takes the form of an economic cycle.

4. The actual dynamics of the economy, as a complex system, is the result of the combined action of internal and external factors. Therefore, the randomness of external factors, together with the randomness of endogenous fluctuations, causes a complex trajectory of economic development in the form of periodic waves. But the problem is also complicated by the fact that the waves of economic activity of different levels, generated by short-, medium- and long-term cycles, overlap each other, as a result of which the development of the economy acquires extremely complex dynamics. Therefore, without studying the nature of complex systems, it is difficult to identify any regularity in it.

5. Fluctuations in economic activity are the acceleration and deceleration of economic processes.¹¹⁸ What do they depend on? As a social action, economic action involves not only the transformation of one commodity into another, but also a *transaction*. Accordingly,

¹¹⁷ Studies of systems of various types based on the homeostatic approach essentially already imply a systematic approach to research. Homeostatics studies the ability of open systems to maintain a state of dynamic equilibrium with the help of coordinated reactions and thereby ensure the preservation of the vital parameters of the system within acceptable limits and, thereby, within certain limits, ensure the independence of the system from the influences of a changing environment.

¹¹⁸ As a rule, fluctuations in economic activity are expressed in terms of changes in GDP, i.e. using fluctuations of the final product created per time unit in terms of value. But these fluctuations can also be expressed in terms of fluctuations in the length of time required to produce the value of the annual product in the starting year. Economic processes either accelerate or slow down.

economic action itself implies *transaction costs*.¹¹⁹ It is clear that if, as a result of the rupture of economic ties, transaction costs of time increase, then economic processes will slow down.

During crises, economic ties are broken. As a result, despite the fact that the subjects have resources, they cannot use them and cannot carry out economic actions. They cannot buy because they cannot sell, and therefore they cannot consume or produce, and so on. But no one can understand - why? After all, no one wants this? On the contrary, everyone wants to consume, produce, buy and sell. Some "invisible hand" dominates them against their will.

There are producers, consumers, resources, and products in society. There are no only necessary *links* between agents, without which they cannot carry out coordinated economic actions. *Links* are severed. But the links are exactly what Chaos Theory or Synergetics studies. That is, the reason is not in the lack of resources, but in system capabilities, in the laws of functioning of complex nonlinear systems. Agents do not have the ability to *transact* and, as a result, they are unable to *transform* one commodity into another.

But why are ties broken? Because not the products that consumers need are produced. Therefore, they are not bought. And if products are not bought, they cease to be produced and, consequently, primary resources cease to be bought. Therefore, consumers (owners) have no income. And this means that there are no expenses and products are not bought. And so on. And why is produced what is unneeded and not produced what is needed? Because in a market economy, products are first produced, and then they find out on the market whether buyers need them. This is the reason for the increase of entrepreneurial risk in a market economy, which requires its payment in the form of profit.

6. It is important to note that the economic cycle, as such, is conditioned by monetary relations. In a barter economy, crises can be born by external factors, but endogenous crises of overproduction and economic cycles cannot occur there.

“..... On what basis can a general commodity overproduction arise if the demand for commodities is determined by the same commodities, and the supply of each new commodity is a new demand that has appeared on the market? ... Let us take, for example, bartering - the exchange of product for product without the mediation of money. Let, for example, cloth be directly exchanged for bread. In this case, if bread is produced in excess in comparison with cloth, then its price in relation to cloth will fall, but the price of cloth in relation to bread will rise: an excess production of bread will be tantamount to an insufficient production of cloth, a decrease in the price of one product will be compensated by an increase in the price of another. Obviously, there cannot be a general overproduction of both products, because the price of both bread in relation to cloth and cloth in relation to bread cannot simultaneously fall. Overproduction, like the fall in prices, can in this case be only partial.

Let us now assume a money exchange. Let the price of bread and cloth be expressed in terms of the third commodity, money. Let us suppose that more bread is produced than the manufacturer of cloth needs; the money price of bread will then fall. This reduction can be so significant that the total amount of money earned by the producer of bread will decrease: for more bread, the producer will receive less money. Thus, the producer's purchasing means will

¹¹⁹ Transaction costs imply costs (time, money, labor, etc.) that are associated with participation in market processes. These are the costs associated with the collection and processing of information, negotiation, conclusion of contracts, decision-making, control over compliance and legal protection of the terms of contracts. With respect to these costs, time costs are particularly sensitive.

decrease. And since the producer of bread buys cloth with these funds, it means that the money demand for cloth will also decrease, which will cause a decrease in the price of cloth. And cloth will fall in its money price following the fall in the money price of bread.

In other words, there will be a general excess of the supply of commodities in comparison with the monetary demand for them, a general decrease in prices; and the general fall in prices is felt by the market as an expression of a general overproduction of commodities.

But the basis of the general overproduction of commodities in this case is a partial overproduction, a disproportionate distribution of the people's labour. More than enough production of one commodity causes its money price to fall; and as there is a certain connection between the money prices of commodities, the fall in prices embraces other commodities as well. Thus, the general overproduction in this case is nothing but a peculiar expression, in the conditions of money exchange, partial overproduction, disproportionate distribution of social labor." (Tugan-Baranovsky, 2008, 313-314.)

7. As in all complex systems, the protection of the economic system from the destructive scope of fluctuations of its vital parameters occurs with the help of negative feedbacks. They ensure the preservation of the structure and integrity of the system, which is lost when there is an excessive deviation from the state of equilibrium. But if, under the influence of external factors, the deviation from equilibrium goes beyond the permissible values, then positive feedbacks begin to act. Processes begin to develop under a completely different scenario in the «escalation mode». In an economic system, this means that the equilibrium *structure* of the system breaks down and a recession begins. After a recession, the system can no longer restore the former equilibrium and is moving towards a new equilibrium state.

b) Self-regulation of economic activity

1. Economic cycles are evidence of the market's ability to self-regulate. In conditions of competition, the *deviation* of the system from the optimal state excites forces for its *self-elimination*, which are proportional to the magnitude of the deviation. However, the nature of the market's self-regulation is due to the very nature of the functioning of the market system. The theoretical analysis of the economic system's self-regulation mechanism in its purest form assumes the absence of a regulatory center in it. No one allocates resources between different branches or between different entities within branches. No one knows in advance what total resources society has, what are the total needs of society, what are the parameters for the optimal functioning of the economy.

Business cycles are an integral part of the self-organization mechanism of economic system. With them, it seeks to eliminate periodically accumulated branch disproportions and restore macroeconomic equilibrium. "The equilibrium of the system is maintained homeostatically, primarily through negative and sometimes positive feedbacks that shake the system, take it out of equilibrium, in order to return it again at a different level and with mutually transformed components. The transition to a different mode of functioning through

the stage of greater or lesser chaos and desynchronization of processes is the way to extend the “life” of any complex organizations.” (Князева, 2014, 19.) In the economy, this is manifested in the fact that after each crisis, the system tends not to the previous equilibrium, but to a new equilibrium at a new level.

2. Economic agents independently make decisions based on market prices. And their actions are coordinated by the market itself on the basis of a system of spontaneously formed prices. Under such conditions, the fluctuation of the economic activity of society cannot be carried out except in the form of movement by inertia from one extreme state of the economy to another. The ups and downs of activity amplify themselves and continue until they reach the peak or bottom of the economic cycle. Briefly, we can say that the upper limit of economic activity is due to the fact that society cannot produce more, and the lower limit is due to the fact that it does not want to consume less, because it has reached the threshold of tolerance.

When the phase of the economic cycle changes, the processes continue according to the principle of self-excitation or self-inhibition until a new turning point is reached. The market cannot restore macroeconomic equilibrium except through fluctuations between extreme peaks and bottoms, driven by maximum production possibilities and minimum consumer needs.

3. The fluctuation of economic activity is due to the alternation of activation of positive and negative feedbacks between the value flows of goods and money. *Positive* feedbacks are based on optimistic and pessimistic expectations, which cause self-excitation or self-inhibition of the economy. *Negative* feedbacks are based on Keynes' "psychological law" regarding the marginal propensity to consume and save, which causes a change in the phases of the economic cycle.

When overcoming the crisis, when the needs of society are far from being saturated and consumer demand begins to revive, optimistic moods intensify. As a result, the demand for investment goods begins to grow. The more the production of consumer goods grows, the stronger the optimism, the faster the demand for investment goods grows. Employment and incomes of workers are increasing in investment sectors. This further increases consumer demand, which is again followed by an acceleration in demand for investment goods, and so on. The processes proceed in the self-excitation mode.

4. With the growth of production, incomes and the saturation of necessary needs, another trend begins to dominate. Namely, according to Keynes' psychological law, with an increase in income, savings in their composition grow faster, and consumption - more slowly than the income itself. And when incomes fall, savings decline faster and consumption slower than incomes. Those. saving is the most variable part of income. Accordingly, with an economic recovery, the share of consumption in the composition of growing incomes decreases. After a certain critical point, consumer demand begins to lag behind the growing supply of consumer goods. The supply only with some delay in time begins to respond to the backlog of demand. Difficulties in the sale of consumer goods cause entrepreneurs to change their optimistic expectations to pessimistic ones, as a result of which the demand for investment goods is reduced.

As the peak of economic activity approaches, there is a mismatch between *savings*, whose share rises as part of rising incomes, and *investment demand*, which begins to decline

as a result of growing difficulties in the sale of goods and the resulting pessimism. Such a gap between savings and investment demand causes a leakage of income from the real sector to the financial sector of the economy. (Securities are bought, savings are made, speculative transactions are financed, real estate is bought, etc.). Therefore, part of the income does not participate in the formation of aggregate demand. Aggregate demand, which until then more or less matched aggregate supply, begins to lag behind it, and the economy begins to fall. That is, there is a change in the phase of the economic cycle. The rise is replaced by a decline.

5. The more the production of consumer goods is reduced, the stronger the pessimistic expectations and the faster the demand for investment goods decreases. In investment branches, incomes are shrinking, which accelerates the decline in consumer demand, followed by an even greater decline in investment demand, and so on. The decline in production continues until the economy reaches the bottom of the cycle. Along with the decline in production, incomes are reduced, in which, according to Keynes, the reduction in consumption slows down relative to the reduction in incomes themselves. Accordingly, the decline in consumer demand relative to supply slows down, and then stops.

When the majority in society reaches the threshold of tolerance and does not want to put up with a further drop in living standards, it begins to spend money savings and sell off assets. Therefore, in a crisis, asset prices fall sharply and they are bought with great profit by agents that have accumulated money resources that have flown out of the real sector during the economic downturn due to weakening investment demand.¹²⁰ Thus, money from the financial sector returns to the real sector and increases consumer demand. Between the supply and demand of consumer goods, equilibrium begins to restore.

Thus, after the cumulative decline, having reached the lowest point of the cycle, the negative feedback turns on again and the phase of the cycle changes again. Processes are developing in the opposite direction. Pessimistic moods are replaced by optimistic ones. Demand for investment goods begins to grow, needed to replace wornout capital and increase new capital. And this means that employment and incomes in investment branches are increasing, which leads to an acceleration in the growth of demand for consumer goods, etc. That is, positive feedback is switched on again.

6. In a crisis, resources remain unused, and needs remain unsatisfied. For resources are not owned by those subjects who can satisfy their needs with them. As long as there is no effective demand for the products of a particular industry, the needs of this industry itself for the resources necessary for production also remain insolvent. Since production and consumption are out of sync, money circulation is also out of tune. As noted, economic entities cannot buy because they cannot sell. And they can't sell because they can't buy. So, also, they cannot consume and produce.

Economic recovery is possible only in the mode of dynamic equilibrium. For each branch must produce in accordance with the needs of all other branches. Therefore, the growth rates of each branch are formed in coordination with the growth rates of other branches. No branch can increase the production of products without increasing the

¹²⁰ At the same time, there is a concentration of wealth and an increase in the polarization of society into rich and poor.

consumption of resources. And no branch can increase its consumption of resources if its suppliers do not increase the production of products that are resources for branches that consume them, and so on. Therefore, the rise is gradual. But the economic downturn occurs spontaneously and does not require compliance with the proportionality of branches. Having reached the climax in the process of economic recovery, imbalances between branches begin to spread in a chain reaction. A decline begins that cannot stop until it hits the bottom. And everything repeats. In the process of recovery, a new branch structure is being formed, which takes a long time. And during a recession, the branch structure is destroyed. This is a cumulative process and occurs quickly in a chain reaction.

7. Although starting from the bottom of the crisis, free resources are gradually introduced into those branches that grow in harmony with other branches, but no one regulates this process. Order arises spontaneously. "Indeed, maintaining communication within the order requires that dispersed information be utilised by many different individuals, unknown to one another, in a way that allows the different knowledge of millions to form an exosomatic or material pattern. Every individual becomes a link in many chains of transmission through which he receives signals enabling him to adapt his plans to circumstances he does not know." (Hayek, 1991, 84.) All agents separately make decisions, guided only by their own interests. The only coordinator of their actions are spontaneously formed market prices. In the conditions of such a spontaneous formation of order, although each branch produces in accordance with the needs of other branches, nevertheless, as the economy approaches the peak of the economic cycle, interbranch imbalances accumulate in it. The integrity of the economy is being disrupted.

One of the main reasons for this is that the production and supply of capital goods requires forecasting future demand, sometimes many years into the future. Of course, it is impossible to make accurate forecasts in a decentralized economy. Therefore, over time, as production expands, the discrepancy between the actual and equilibrium branch proportions that ensure the harmonious functioning of the economy increases more and more.

8. In a crisis, the balance is restored. But it is restored not by expanding deficit branches, but by reducing less deficit (relatively surplus) branches. Those branches that have not yet been reduced enough are being reduced. They are coming into line with those branches that can no longer shrink and have reached the "bottom". But why can't they shrink more? Because society has reached the threshold of tolerance and does not want to put up with a further reduction in the consumption of essential products produced by these branches. Economic values are being reassessed. Accordingly, there is a redistribution of solvent demand from other branches. Therefore, the demand for the products of these branches ceases to fall due to the accelerated decline in demand for the products of other branches. Also, additional monetary resources from the financial sector are pouring into the real sector of the economy. At the bottom of the economic cycle, the proportions and integrity of the economic organism are restored.¹²¹ The rise again begins in a state of dynamic equilibrium.

¹²¹ "Cyclic crises are, respectively, phases of the cycle when there is a clear and significant equalization of the proportions of reproduction, primarily between capital-forming factors, on the one hand, and consumption, on the other. ... Crises form, as it were, the boundaries of cycles: each crisis clears the way for expanded reproduction, which then becomes impossible due to the development of contradictions, and the next crisis has to "settle" it." (Pokataev, 1978, 47.)

c) "Natural selection" in economy

1. As a result of the redistribution of assets mentioned above, structural changes are taking place in the economy. Along with the process of concentration and centralization of capital, there is a flow of capital between branches and a change in the branch structure of the economy. The *supply* begins to form in accordance with the structure of growing *demand*, and the structure of *production* is brought into line with the newly formed structure of solvent *needs*.

2. The crisis is the removal from the system of everything obsolete and unviable. On the wave of expansion, in the process of moving from depression to a new peak, new functional links and structures are born in the economic system, new markets, new needs are born, new technologies are introduced, etc. However, some of them are viable, some are not, some are progressive, some are regressive. During a recession, everything that is random, non-viable, and regressive dies. And what is progressive, viable and necessary is preserved. That is, the end result of such an undulating movement of the system is that only progressive changes and innovations are preserved. Therefore, the general trend for the development of the system remains, and fluctuations occur relative to this trend of long-term development.

However, this trend is only implied, and the actual trajectory of the development of the system has a zigzag shape, in which each next peak is higher than the previous one, and each next bottom is higher than the previous one. Depending on the scale and solidity of this "creative destruction" generated by the economic cycle, we get, respectively, small, medium and large waves of this cycle, which overlap each other, forming a complex configuration of wave movement.

This process is analogous to Darwin's natural selection process. Introducing this or that innovation, no one knows in advance how viable and necessary it is. Only time will show this. The principle of "trial and error" is the only way of evolution when the system functions spontaneously and there is no regulation on the basis of deliberately chosen goals. Such development is a spontaneous result of the interaction of millions of people, each of whom acts only in his own interests.

3. Economic agents are interconnected by "weak ties" that are easily broken and easily created. To an external observer, it seems that the specific actions of specific agents depend on random circumstances. And it seems to the agents themselves that they are independent in their actions. However, under the conditions of the division of labor, each agent can act only as an actor in one or another branch. But the interaction of these branches is subject to the "iron law" of the proportionality of branches. As it was pointed out, for the normal functioning of the economy, all branches must produce in accordance with the solvent needs of each other, and the corresponding branch structure must be maintained. In this sense, being part of the collective actions of various branches, the actions of all agents are subject to the invisible action of this law of proportionality of branches. Through the operation of this law, the actions of all agents are interconnected. As long as the economy is functioning normally and sectoral proportions are maintained, agents more or less freely make decisions and do not see this relationship. For the very optimal structure of branches is the invisible deep structure of the economic system, and belongs to the sphere of the essence of the economy, and not to

the world of economic phenomena. The existence of this structure is only indirectly manifested in the fact that during a crisis, due to the deformation of branch proportions, the normal functioning of the economy as a whole is disrupted.¹²² When, as a result of the rupture of ties between the externally independent, but internally interconnected actions of economic entities, the sectoral structure is deformed, the integrity of the economy is violated. This is manifested in the economic crisis. Below we once again quote Marx, which reveals the essence of this process.

“No one can sell unless someone else purchases. But no one directly needs to purchase because he has just sold. Circulation bursts through all the temporal, spatial and personal barriers imposed by the direct exchange of products, and it does this by splitting up the direct identity present in this case between the exchange of one's own product and the acquisition of someone else's into the two antithetical segments of sale and purchase. To say that these mutually independent and antithetical processes form an internal unity is to say also that their internal unity moves forward through external antitheses. These two processes lack internal independence because they complement each other. Hence, if the assertion of their external independence [*iiusserliche Verselbstiindigung*] proceeds to a certain critical point, their unity violently makes itself felt by producing – a crisis.” (Marx, 1976, 209.)

Such processes, which "form a certain internal unity", but are "externally independent" in addition to the sale and purchase about which Marx writes, are also production and consumption, supply and demand, investment and consumption in debt, lending and borrowing. And in a broader sense, "internal unity" and "external independence" are inherent in products and resources, utility and costs, profits and savings, and so on. All these processes and phenomena are internally interconnected at the level of essence. Here, commodities are produced by commodities, actions are functionally interconnected into a single system, branches complement each other and form the economy as integrity, as an indissoluble unity of the processes of *production, consumption, distribution, and exchange*. They form a single operationally closed nonlinear system, the self-regulation of which is carried out due to positive and negative feedbacks. But since the actions of the actors are interconnected on the basis of "weak ties" that easily arise and are easily broken, the

¹²² “necessary for the existence of what we call economic thought is a level of abstract inquiry – an inquiry directed not at the “facts” of economic life but at some structure or principle “behind” the facts. In this second of its tasks, economics deals with empirical data only as indications – necessarily incomplete and very often misleading – with respect to the object of its investigation. It looks beyond appearances for essences, as Marx would say; or beyond the data for covering laws, in the positivist vocabulary. Economics now becomes an inquiry into the systemic properties, the structural attributes, the tendencies and sometimes even the *telos* of the provisioning process. Thus behind empirical investigations into allocation problems we have theoretical premises as to the “workings” of the price mechanism; behind the functional equations of econometric models there are assumptions as to the “laws of motion” of the capitalist system; behind input-output matrices are “production functions”, equally abstract representations of the idealized behavior of the industries in question.” (Heilbroner, 1988, 106-107.)

formation of the necessary interbranch proportions occurs spontaneously. As a result of this spontaneity, the uninterrupted functioning of the system is periodically hindered, the *mismatch of branches* increases, and “their unity violently makes itself felt by producing – a crisis.” (Marx).

4. During crises and recessions, money is withdrawn from circulation in the real sector, and on the other hand, a certain part of the production factors is idle, and therefore does not generate income. The presence of free money and unused production factors give rise to economic incentives to redistribute ownership of the means of production. As a result, structural changes occur in the economy during crises. The services of these production factors are redistributed to those branches for whose products the demand is growing. Thus, the gradual incorporation of free production factors into these branches allows them to develop faster than other branches. A new configuration of the sectoral structure is being formed, and the economy is beginning to emerge from the crisis while maintaining dynamic balance.

Summing up, we note that during crises, when the mass of free money and free production capacity increases, the most large-scale redistribution and consolidation of property takes place. Regularly repeating ups and downs of economic activity, crises and booms, is accompanied by an irreversible process of concentration and centralization of production. This creates the preconditions for the monopolization of the economy. Competition itself generates and strengthens monopolization and makes its own death inevitable.

Section 4.

Monopolized economy

4.1. Monopolization

1. Competition itself gives rise to monopoly and oligopoly.¹²³ If under conditions of competition the quantity and prices of goods were regulated by market forces, then under conditions of monopoly they are regulated by the monopoly itself. Using market power, monopolies reduce the quantity and increase the price of goods compared to competitive ones. That is, they artificially create a deficit by which each unit of cost accounts for more utility of the goods produced (or less cost per unit of utility) than in a competitive equilibrium. The principle of even-utility of costs, which is necessary for the optimal functioning of the economy, is violated. In this way the monopolies earn profits above the average rate. In a competitive economy, local and global optimality criteria organically complement each other, which leads to the equalization of profit rates in various branches, and the general trend towards the even-utility of costs. But the market power of the monopolies enables them to keep high rates of profit from equalizing with the rate of profit of competitive branches. This leads to the dominance of the local optimality criterion over the global one and, accordingly, private interests over public ones. This leads to deformations of the optimal sectoral structure, deviation from the principle of even-utility of costs and radically changes the conditions for the sale of goods. Systemic problems are emerging that lead to economic stagnation.

2. Unlike the equilibrium price, the monopoly price of a good does not reflect the equality between its social utility and social costs. By artificially creating deficit, monopolies obtain an *economic surplus*.¹²⁴ It represents the excess of use value over the production value of a commodity, that is, the excess of value perceived from the side of utility over value perceived from costs. The economic surplus is the surplus product which the monopolies

¹²³ In what follows, unless otherwise stated, the term monopoly will mean both monopoly and oligopoly.

¹²⁴ By "economic surplus" here is meant not all surplus value, but that part of it which is created thanks to the monopoly power of the producer and which exceeds the normal surplus value. Surplus value is created by all entrepreneurs, but only monopolists create economic surplus. Surplus value underlies money profit; profit is its monetary expression. And economic surplus underlies the increment of monopoly profit over normal profit.

create in addition to the surplus product underlying normal profit. The monetary expression of the economic surplus is the *surplus profit* - the excess of monopoly profit over normal profit; surplus resulting from the overestimation of the utility of goods over the cost of its production.

3. The existence of monopoly incomes sharply increases economic inequality. The one with the most market power wins the competition. Accordingly, the rich get richer, the poor get poorer. The huge increase in the share of profits in the composition of national income, caused by monopolization, can occur only at the expense of a reduction in the share of other factor incomes (Wage, Rent, Interest). Accordingly, an increase in the share of the surplus product bought by entrepreneurs from each other can occur only at the expense of a decrease in the share of the necessary product bought by the recipients of Wage, Rent and Interest. In other words, an economic surplus arises from a decrease in the necessary product. And if we take into account that agents providing entrepreneurial services often also combine the functions of owners of Land and Capital, then it turns out that the economic surplus is obtained mainly by reducing the share of the necessary product that is bought by the Wage. That is, the redistribution of the produced product occurs basically between Profit and Wage.

4. As inequality rises, more and more income is concentrated in the hands of a smaller group of oligarchs. The share of consumer spending in their total profits is getting smaller and smaller, and the share of unconsumed *excess* of profits is increasing. At the same time, in comparison with a competitive economy, in the conditions of growing monopolization, the share of the monopoly profit itself in the national income sharply increases. As a result of this, the *excess* of profits increases so much that no matter how the oligarchs "base in luxury", due to the glut of their needs, the oligarchs' consumption is not able to commodify the huge purchasing power that is concentrated in their hands. Difficulties arise with the realization of the *excess* of the surplus product.

5. In a competitive economy, normal gross profit and its corresponding surplus product are used for 1) personal consumption of entrepreneurs, 2) government spending (through tax redistribution), and 3) investment. But in today's monopolized economy, monopoly profits are so much greater than normal profits that after spending on entrepreneurs' private consumption and paying taxes, there is still a huge excess.

This surplus cannot be fully used for investment either. Because of the difficulties in the realization of goods, there are problems with finding profitable investment projects. "It is an inescapable truth of the capitalist economy that the uneven, class-based distribution of income is a determining factor of consumption and investment. How much is spent on consumption goods depends on the income of the working class. Workers necessarily spent all or almost all of their income on consumption. ... In contrast, those high up on the income pyramid – the capitalist class and their relatively well-to-do hangers-on – spend a much smaller percentage of their income on personal consumption. The overwhelming proportion of the income of capitalists (which at this level has to be extended to include unrealized capital gains) is devoted to investment. It follows that increasing inequality in income and wealth can be expected to create the age-old conundrum of capitalism: an accumulation (savings-and-investment) process that depends on keeping wages down while ultimately relying on wage-based consumption to support economic growth and investment. Under these circumstances, in which consumption and ultimately investment are dependent on the

spending of those at the bottom of the income stream, one would naturally suppose that a stagnation or decline in real wages would generate crisis-tendencies for the economy by constraining overall consumption expenditures.”.(Foster, ... 2009, 27-28.)

A reduction in the demand for investment goods for branches that produce final products also reduces demand for branches that produce investment goods for the investment branches themselves, and so on. This further reduces employment in investment branches and, accordingly, further reduces wage-based aggregate demand. A positive feedback is triggered, the overall result of which is an accelerated fall in aggregate demand relative to aggregate supply and the stagnation of the economy.

6. The real incentive for entrepreneurs is money, and the production and sale of goods is only a means for them. Therefore, the excess that is not consumed by either entrepreneurs or the state, and does not find areas for profitable investment in the real sector of the economy, is taken out of it and invested in the financial sector. Thus, part of the money or purchasing power that was created in the process of producing the final product and intended for the purchase of this product is leaking from the real sector of the economy.

Due to the leakage of the excess of monopoly profit, the equivalent part of the surplus product created in the real sector of the economy remains without solvent demand. As a result of this, equality is violated between the monetary value of the goods produced, on the one hand, and, on the other hand, the incomes created in the process of their production and intended for their purchase, as required by the conditions of economic equilibrium. Therefore, it turns out that aggregate supply is greater than aggregate demand. The equilibrium is disturbed and intrasystem disproportions arise. The economic surplus generated by the monopolists does not find a profitable investment area and tends to stagnate. “In a series of articles in *Monthly Review* and in *Monthly Review Press* books during the 1970s and 1980s, Harry Magdoff and Paul Sweezy proposed that the general economic tendency of mature capitalism is toward stagnation. A shortage of profitable investment opportunities is the primary cause of this tendency. Less investment in the production economy (the “real economy”) means lower future growth. Marx wrote about the possibility of this very phenomenon: “But if this new accumulation meets with difficulties in its employment, through a lack of spheres for investment, *i.e.*, due to a surplus in the branches of production and an over-supply of loan capital, this plethora of loanable money-capital merely shows the limitations of *capitalist* production. ... obstacle is indeed immanent in its laws of expansion, *i.e.*, in the limits in which capital can realise itself as capital.” (Marx-Engels Collected Works, Volume 37 - Marx: Capital III. Moscow. Progress Publishers 1998, p.505.) Stagnation, of course, does not mean that there is no growth whatsoever. Rather, the economy functions well below its potential – with appreciable unused productive capacity and significant unemployment and underemployment.” (Foster, ... , 2009, 39.)¹²⁵

7. As a result of the disproportions created by the monopolies, it is not the monopolies that suffer the most, but the competitive branches. Due to the fact that the monopolies sell

¹²⁵ “Alvin Hansen (1939) popularized the term “secular stagnation,” and we are now, at the suggestion of Larry Summers (2014), considering the application of Hansen’s term to the current US economy, because the pace of output recovery in the five years since the business cycle trough of 2009 has been so slow.” (Gordon, 2015, 54.)

deficit products, they "pull" the demand for themselves, reducing it for small and medium-sized businesses, thereby depriving them of the opportunity to receive a normal profit. As a result, the average profit in competitive branches is lower than in the absence of monopolies. The decline in profits below normal profits leads to the stagnation of competitive branches.

8. Inequality caused by monopolization is one of the main reasons for the slowdown in economic growth both in developed countries and in the world economy. This is caused by an excessive concentration of purchasing power in the hands of a wealthy minority, which is unable to realize it and withdraws its excess from the real sector of the economy. Society does not have enough purchasing power to present demand for all the commodities produced. The market economy is the economy of mass production. It produces commodities for the whole of society, but under conditions of monopolization it is unable to provide the majority of society with the income necessary for the full realization of the commodities produced. Monopolization leads the market economy into a systemic crisis.

9. The *inequality* born of monopolization leads to stagnation in the world economy too. In the world economy, the capacities of developed countries are underutilized due to weak demand, while poor countries do not have enough funds to demand their goods. And they do not have enough money because, using their monopoly power, rich countries impose on poor countries high prices for their products, and low prices for the resources they buy. This imbalance and the weakening of feedbacks between prices in the world markets for products and resources is one of the reasons for the underutilization of the production capacities of developed countries and the insufficient purchasing power of poor countries.

At the same time, it should be noted that despite such imposition of monopoly world prices and injustice in mutual trade between rich and poor countries, this trade is still mutually *beneficial* for both. For in terms of national economic values, both poor and rich countries receive certain benefits from such trade (some more, others less). But in the form of unused potential, both those and others, and the world economy as a whole, suffer huge losses.

Rich countries are trying to compensate for this imbalance with military spending to maintain the existing world order. But this order is constantly violated because of the obvious injustice and unacceptability of the monopoly imposing terms of trade on other countries. This gives rise to ideological and political disagreement between countries. This order must be defended by force. Therefore, the need for huge military spending and political pressure remains, which perpetuates the existing problems.

In addition, the super profits of transnational companies in developed countries, obtained due to monopoly power in world markets, without finding enough areas of application in the real sector, are directed to financial markets and increase the instability of world finance and the world economy as a whole.

10. The monopolization of the economy, which began at the end of the 19th century, reached its climax by the 21st century and led the market economy to a systemic crisis. Monopolies are increasingly pushing competition out of the market economy. But a market economy without competition is nonsense. The very idea of a market economy implies spontaneous self-regulation, which is inconceivable without competition. The economic meaning of competition is not simply rivalry, which is also possible between monopolies.

The main sign of competition is the multitude of producers, none of which can impose their prices on others. Therefore, prices are spontaneously formed by the market itself. But prices are precisely the main factor in the distribution of income. Together with monopoly prices, the distribution of income in favor of monopolies is imposed on society. Hence the contradiction arises - goods are produced for the majority, and incomes are appropriated by the minority. A discrepancy arises between the production of goods and the distribution of income, which slows down the economy.

Competition itself implies that in a competitive struggle, someone wins and someone loses. Someone begins to dominate the market and regulate prices in their own interests and dictate them to the market. Prices are no longer regulated by the market, but by monopolies. Monopolization kills the very essence of competition. Moreover, competition itself gives rise to monopoly as its direct opposite. As a result, market self-regulation is replaced by monopolistic regulation. In turn, it becomes inevitable to supplement regulation by monopolies (in the interests of individuals) with state regulation (in the interests of the whole society). Otherwise, the monopolized economy will be completely blocked. These became clear already during the Great Depression at the beginning of the 20th century. The growing role of state regulation is a historical trend of economic development that accompanies the trend of growing monopolization of the economy.

11. A competitive economy is a self-regulating system of economic actions that always strives for equilibrium, but never reaches it due to the variability of the external environment. A monopolized economy not only does not reach equilibrium, but does not strive for it. On the contrary, it perpetuates a state of imbalance and, as monopolization grows, deviates more and more from dynamic equilibrium. But the preservation of the imbalance itself is possible only by balancing it with some external forces. Economic imbalance implies an imbalance between the value flows of goods and money. But in order to keep these flows in a non-equilibrium state, an external force is needed to balance the internal imbalance of competitive market forces. Such an external force is the political and market power of the monopolies. In such circumstances, the power of the market shifts to monopolies. They regulate the quantity and prices of goods in their own interest. But since prices are the main factor in income distribution, by regulating prices they regulate income distribution to their own advantage and to the detriment of society.

4.2. Financialization

1. Competition gives rise to monopolization, and monopolization gives rise to financialization. The fact is that under conditions of monopolization, as a result of huge inequality, there is an excess of purchasing power for the wealthy minority and its deficit for the poor majority. The former do not want to buy consumer products due to a glut of needs, while the latter cannot buy them due to lack of money. Some of the products are left without a buyer. If the goods not selling, it becomes increasingly difficult to find a profitable investment area. Therefore, the excess of the purchasing power of monopolists turns out to be

redundant both for consumption and for investment in the real sector and profit-making. But profit is the main incentive for entrepreneurs. They invest where there are more opportunities for profit. Therefore, income excesses tend to be withdrawn from the real sector and invested in financial operations, where the profit rate is higher.

2. The more money is injected into the financial sector, the more the prices of financial assets, real estate, securities, etc. rise. But this rise in prices itself increases the opportunities to profit from financial asset speculation. This increasingly encourages the growth of the average rate of profit in the financial sector and the inflow of money from the real sector, where the rate of profit is declining. Thus, the outflow of money from the real sector to the financial sector caused by monopolization simultaneously causes both a decrease in the profit rate in the real sector and its growth in the financial sector.

3. Economic activity is increasingly switching to speculative operations. The financial sector is self-expanding. "Finance (banks, investment firms, insurance companies, and real estate consortia) develops an ever-growing number of new ways to try to make money with money – M-M' in Marx's formulation. Thus, finance is not only the "glue" that connects the various parts of the capitalist system and the "oil" that lubricates its workings, finance has become a dominant activity in mature capitalist economies." (Foster, 2009, 54.)

The financial sector is characterized by instability, alternating rises and falls in prices for financial assets. This allows using speculative operations to profit both on ups and downs. But the value of the financial services themselves, which is created in this sector, is negligible compared to the value of the goods that this sector absorbs for its functioning.¹²⁶ There is mainly a redistribution of financial assets. Therefore, the profit of some actors is obtained at the expense of the losses of others. There is a concentration of funds and increasing inequality. And the economy is becoming more and more "making money with money" than "production of commodities by means of commodities", i.e., more and more becoming the so-called "casino economy".¹²⁷

4. If the money income generated in the production process flows from circulation in the real sector to the financial sector, then production will not be able to continue in the same volume. Without an additional influx of purchasing power into the real sector, part of the surplus product will remain unrealized and the economy will begin to fall. Consumer credit and deficit financing can serve as a source of additional purchasing power.¹²⁸ But in this case, consumption in debt increases both on the part of consumers and the state. Therefore, money flows back from the financial sector to the real sector.

¹²⁶ In a developed economy, the financial sector is a huge area with a very developed infrastructure, a large number of highly paid workers and huge operating costs. This sector of the economy, previously serving the real sector and providing a huge contribution to economic progress, has become an ever-increasing parasitic growth on the body of the modern economy.

¹²⁷ «As the economy of production of goods and services stagnate, failing to generate the rate of return from M-C-M' that capital desires, a new type of "investment" has emerged. It seeks to leverage debt and embrace bubble-like expansions aimed at high, speculative profits through financial instruments. The depth of stagnation, and its tenacious hold on the mature capitalist economy, is amply testified to by the flight of investment into what we have called "the giant casino".» (Foster, 2009, 61.)

¹²⁸ In this case, we consider a closed economy and do not take into account external economic relations..

5. The state itself is the largest monopoly in existence. If private monopolies pump out financial resources from society in favor of a small group of individuals, then the state, on the contrary, redistributes these funds back to society with the help of the tax system and deficit financing. The state finances social programs and makes military orders, thereby supporting falling demand and economic growth. Without income redistribution, a monopolized market economy would not be able to function. The history of the development of a market economy shows that as monopolization developed, the public sector and the scale of redistribution of income for social and military programs increased. Apart from all other motives, it was necessary from a purely pragmatic point of view, to maintain the functionality of the monopolized economy. But the scale of redistribution is insufficient to fully compensate for the excess profits that monopolists withdraw from the real sector, because the state itself is under the tacit control of large corporations (which lobby for tax cuts and put limits on state redistribution of income).

6. Before the stagflation of the 1970s, falling demand caused by the leakage of excess monopoly profits was supported by the tax system and budget deficits financed by government debt or money printing, and after stagflation, by credit expansion. Accordingly, before stagflation, Keynesian policies were pursued, and after it, neoliberal policies. The financialization of the economy is a consequence of neo-liberal policies, which, after the stagflation of the 70s, replaced the long-term Keynesian policies of the post-war period. But one way or another, artificial support for demand financing was and remains necessary to prevent stagnation.

7. In the context of lagging demand behind supply and the absence of profitable investment projects, the structure of loans issued has changed significantly. Demand for loans for productive investment has fallen sharply, while the share of consumer loans has risen to enormous proportions. In such conditions, when the production of goods does not increase, but the artificially supported demand for goods increases, the prices of goods rise. Although, as a result of rising prices, producers' incomes increase, the increased incomes are again distributed in favor of large monopolists, and not medium and small businesses. Their incomes rise even more, and they invest the monopoly surplus in the financial sector even more and, in doing so, reproduce the scarcity of purchasing power in the real sector on an increased scale. As a result of these processes, prices rise, but the gap between demand and supply does not disappear.

8. A wealthy minority enforces high standards of consumption in society. Orientation to these standards, in the absence of adequate income, forces the majority in society to resort to consumer loans, mortgages, car loans, etc. The increased consumer demand for loans, on the one hand, and, on the other hand, low investment demand, cause the redirection of credit resources from the sphere of production to the sphere of consumption.

That is, a new pattern of money flow emerges. On the one hand, part of the money of the wealthy minority flows from the real sector to the financial sector, and on the other hand, part of the money from the financial sector returns to the real sector in the form of consumer credits for the poor majority. Both the interest rate and fluctuations in economic activity in the real sector largely depend on the ratio of outflows and inflows of money.

9. Due to the difficulties of investing in production, fewer credits are issued for production purposes and more for consumer purposes. But, at the same time, if crediting of

production investment creates incomes from which credits will be serviced, then consumption credits does not create new sources of income to cover it. But if new sources of income are not created to service credits, then from future incomes will have to be reduced consumption spending, which will resume the decline in demand and the economy as a whole. That is, the economic downturn is only shifted from the present to the future.

Thus, along with the credits, financial bubbles and financial instability are involuntarily built into the monetary circulation of the real sector. But these are already recessions, periodically generated by the financial system itself and having an unpredictable character. For it is impossible to predict when the "Minsky Moment" and the sudden loss of confidence by market participants will come, that is, it is impossible to predict when the financial bubble will burst.

10. Money taken on credit is not the property of the debtor. But when the debtor buys goods with borrowed money, i.e. other people's money, then this money becomes the property of the seller. Therefore, monopolists, by selling goods paid for by credits, receive money as their property. That is, by withdrawing surpluses from the real sector to the financial sector, they withdraw their own money. But buyers, buying goods, are increasingly buying them with borrowed money, i.e. other people's money involved from the financial sector. It turns out that some oligarchs *withdraw* their own money from the real sector, while others *inject* it back into the same sector, increasing the debt overhang and enslaving society with debt.

More and more consumers are becoming increasingly indebted to a small group of financial magnates. And society is becoming more and more borrowed. Wage-based demand is increasingly being replaced by credit-based demand. This leads to financial instability. In addition, the real sector is becoming increasingly dependent on the financial sector, which supplies it with credits; which, on the one hand, sucks money out of him, and on the other hand, pumps him with credits. And this process cannot stop, otherwise the whole economy will be blocked.

11. *Excess savings* of monopolists that are not used in the real sector arise through the monopoly redistribution of incomes, resulting in the formation of *negative savings* of consumers. And this excess of expenses over incomes has to be paid by debts. If, before monopolization, savings from the consumption sector flowed into the production sector for productive investment, then under monopolization, on the contrary, surpluses of monopoly profits from the production sector (through the financial sector) flow into the consumption sector to finance consumer demand. But investing in physical capital increased productive potential and developed the economy, and investing in consumption does not contribute to this. Investing in consumption becomes necessary only to prevent a recession.

12. From the above, it turns out that the financial sector begins to work as a "financial pump". It sucks money out of the production sector and, in the form of credit resources, pumps it into the consumption sector.¹²⁹ This allows the economy to function but does not allow it to grow.

¹²⁹ The result of this process is that since few credits are issued for productive investment, we have a "secular stagnation" of the economy, and since consumer credits are booming, we have inflation. But stagnation accompanied by inflation is stagflation. The economy is moving towards "secular stagflation". This is precisely what monopolies do, for they reduce production and increase prices. In the context of slowing economic growth - 1) due to increased inequality, the state is forced

This process cannot be stopped. For in conditions where the tendency for demand to lag behind supply is built into the mechanism of the functioning of the economy, supporting demand with credit resources becomes necessary to prevent a recession. At the same time, in order to maintain acceptable economic growth rates, the growth rates of credits should outpace them. "For 50 years, private-sector leverage — credit divided by GDP — grew rapidly in all advanced economies; between 1950 and 2006 it more than tripled. ... Leverage increased because credit grew faster than nominal GDP. In the two decades before 2008 the typical picture in most advanced economies was that credit grew at about 10–15% per year versus 5% annual growth in nominal national income. And it seemed at the time that such credit growth was required to ensure adequate economic growth. ... We seem to need credit to grow faster than GDP to keep economies growing at a reasonable rate, but that leads inevitably to crisis, debt overhang, and postcrisis recession." (Turner, 2016, 7.) The result of this process is a trend towards the growth of the financial sector and the stagnation of the real sector. But the credit expansion of commercial banks is not the solution as such.

13. Counter flows of goods and money form prices in the markets of products and resources. The feedback between the prices of products and resources underlies the self-regulation of a market economy. But when, on the one hand, money flows out of the real sector uncontrollably, and on the other hand, it flows in from outside, and these inflows and outflows are not balanced in any way, then the feedback between prices is distorted. Moreover, as will be shown below, in contrast to a competitive economy, not all purchasing power is created in the very process of producing goods, but a huge part of it is created "out of nothing" in the form of bank credits in the financial sector. The very idea of self-regulation based on counter flows of goods and money and a feedback system is dying. For there is instability in the circulation of money. Price movements in the market of final products and in the market of primary resources are not synchronized. Equality is violated between the total monetary value of goods produced and the income necessary for their sale.

14. The financial sector, which does not create real values and only redistributes assets, is growing more and more in relation to the real sector, which creates real benefits and subordinates this sector to itself. More and more money is pumped into the real sector from the financial sector. Since commercial banks create credits out of "air", it all looks like inflating a financial bubble, which must inevitably burst and give rise to a financial crisis, which often develops into an economic crisis. Waves of financial instability "swing" the real sector of the economy, periodically bringing it to a crisis.

Cyclical fluctuations in a competitive and monopolized economy have various causes. In a competitive economy, these are periodically arising branch imbalances that are eliminated with the help of crises. But in a monopolized economy, these disproportions are conserved and distort money flows, which periodically give rise to financial bubbles and develop into economic crises.

Financialization leads the market system to the end of its existence. Appropriate economic policy can slow this process down, but it cannot be reversed in the same way as the

to increase deficit financing of social programs and this contributes to inflation; 2) credit expansion is growing to maintain demand, which also contributes to inflation. "Secular stagflation" is a consequence of these processes.

very monopolization that gave rise to it. The economy seems to be more and more drawn into the funnel of an attractor leading to a deep systemic crisis. A crisis of the market system itself, based on private property, competition and self-regulation, is brewing. A market economy cannot coexist for long with monopolies, government regulation, automation of production, a huge abundance of goods, the digitalization of the economy, a universal basic income, etc. etc. Therefore, its replacement by a new, more adequate economic system is a historical inevitability.

4.3. Banking system

1 . The existing fractional reserve banking system plays a huge role in the destruction of feedbacks and mechanisms of self-regulation of the economic system. The ideas spread in society about modern money, credit and the banking system are radically different from reality.

The textbooks indicate that: 1) banks are mere intermediaries between savers and borrowers; 2) banks issue credits to entrepreneurs for investment in business projects. Both of these statements are false. Banks are not intermediaries; they themselves create and distribute money in the process of lending. And for the purpose of industrial investment, only a small part of loans is issued. The bulk of loans are issued for the purchase of real estate, speculative transactions and to finance consumer demand. The banking system quite legally (but veiled) redistributes society's income in its favor. That is, the law itself provides them with such an opportunity.

2. What banks call the issuance of credit, from a legal point of view, is not the issuance of credit. Since, from a legal point of view, the issuance of credit implies that the thing issued in the form of a credit (whether it be a thing or money) is physically withdrawn from the sphere of use of one subject and transferred for use to another subject. But when issuing credits by modern banks, there is no transfer of the right to use money from one agent to another. Here, the money as purchasing power is not withdrawn from anywhere. Therefore, this process is not the issuance of a credit in the truest sense of the word. As Richard Werner writes: “The money was not withdrawn by the bank from other uses. It was not diverted or transferred from any other part of the economy. Most of all, although it is shown as a deposit, it was not actually deposited by anyone. The bank simply created the money by writing the figures into its books and the customer’s account book. In effect, the bank pretends that its borrower has made a deposit that was not actually made. Unlike the textbook representation, we see that each individual bank can thus create money when it extends a loan. ... *The bank just pretends it has the US\$9900, credits someone’s books with them, and nobody knows the difference.*” (Werner, 2005, 178.)¹³⁰

¹³⁰ “These banking Credits are, for all practical purposes, the same as Money. They cannot, of course, be exported like money: but for all internal purposes they produce the same effects as an equal amount of money. They are, in fact, Capital created out of Nothing ” (Macleod, 1906, 408). “...the bank has monetized credit. It has created purchasing power which did not exist before, since it has supplied the borrower with a means of paying his debts, without in any way reducing the amount of

What banks do is similar to trading in securities. When a customer signs a credit agreement, a security is created by law. This is a debt obligation of the client to the bank. The bank buys this promissory note from the client and pays for it with a counter-obligation. The bank opens a demand deposit in the name of the client. This newly opened deposit is precisely the new money, the new purchasing power, which the bank has created from "nothing" by simply writing numbers into the client's deposit account. This money was not transferred from anywhere to this account. All this suggests that banks are not just intermediaries between savers and borrowers, but creators of money.

3. It is not true that textbooks claim that banks lend to entrepreneurs to invest in production. With the stagnation of the economy, the share of credit issued for productive investment has fallen sharply.¹³¹ History shows that banks prefer to issue loans for operations that involve financial speculation, the purchase of existing assets (such as real estate, old cars), etc., which quickly yield profits, or are associated with little risk. But these operations do not contribute to the increase in GDP. Transactions that have an impact on GDP growth represent only a part of the transactions carried out in the economy as a whole.

4. From the point of view of the impact on purchasing power or on prices, bank money or electronic money, in the form of credit, does not differ from cash. "As soon as we realize that there is no essential difference between those forms of 'paper credit' that are used for paying and lending, and that demand, supported by 'credit,' acts upon prices in essentially the same manner as does demand supported by legal tender, we are on the way toward a serviceable theory of the credit structure and, in particular, toward the discovery of the relations between prices and interest." (Schumpeter, 2006, 718.) In today's economy, more than 95% of transactions occur "from account to account" and not "from hand to hand." Therefore, everything comes down to manipulating the numbers stored in the memory of computers. But to meet cash requirements, banks need very little reserves because, in the real economy, the cost of cash transactions is less than 5%. But ignoring this circumstance in theory and, accordingly, in economic policy, cannot remain without extremely negative consequences.

5. If money is created during the issuance of credits, then they are also destroyed when the debts are repaid. The entire period from the issuance of credits to the return of debts, banks receive interest. Banks must constantly create new credits in order to be able to replace the returned debts. Depending on the propensity for risks, how actively new credits are issued, and on how many debtors repay debts, and on the pessimistic or optimistic mood of

money in the hands of the other members of the community. Each addition to the existing volume of bank loans, therefore, results in a net increase in the total supply of money in the community, and any diminution in that volume will decrease the total volume of money" (James, 1930, 194.) "When a bank grants me a \$1000 loan, and so adds \$1000 to my checking deposit, that \$1000 of 'money that I have in the bank' is new. It was freshly manufactured by the bank out of my loan and written by pen and ink on the stub of my check book and on the books of the bank... Except for these pen and ink records, this 'money' has no real physical existence." (Fisher, 1935, 3.)

¹³¹ "With very few exceptions, the banks' primary business consisted of non-mortgage lending to companies in 1928 and 1970. In 2007 banks in most countries had turned primarily into real estate lenders. . . . The intermediation of household savings for productive investment in the business sector—the standard textbook role of the financial sector—constitutes only a minor share of the business of banking today." (Jorda, . . . , 2014, 2, 10.)

banks, the money supply in the economy, aggregate demand and, accordingly, economic growth rates will increase or decrease. In order to better understand the importance of this problem, let us consider it in more detail and follow the logic of credit relations.

6. Loans not backed by real savings weaken the market's ability to self-regulation. In a market economy, subjects produce goods for each other and then exchange them. But different goods require different times for production. Since the production of some products takes a long time, then, until the end of the production process, their producers are forced to consume on credit every day a number of other products (production and consumer goods). During all this time they become debtors. Those who provide them with these products and resources for daily consumption become creditors. The debtors will pay the debt with the produced products after their production is completed. Accordingly, until they are paid, the resources and products they consume daily must be saved from current consumption by those who provide them with credit. That is, the same exchange of products takes place, but on the basis of credit relations. This is what happens in barter. In the case of a monetary economy, the essence of the crediting process does not change. Only credit is given in money. With this money, the debtor himself buys the products and resources he consumes daily. And when returning the debt, he will first sell his product and with the money from the sale he will return the debt along with interest.

The emergence of the banking system will also not change the essence of credit relations. The bank, in theory, is just an *intermediary* between savers and borrowers. The savers provide the bank with their savings in the form of credits, and the bank provides the credits to its borrowers. That is, the bank itself is both a borrower and a creditor. For intermediary services, the bank receives compensation in the form of the difference in interest paid by borrowers and paid to savers. But the bank itself is not designed to *create* credit resources.

Resources issued in the form of credits, whether real or monetary, represent the real purchasing power with which its owner can present a demand for any other goods of equivalent value. In general, issuing a money credit to a borrower means that the creditor temporarily renounces the use of the purchasing power of the money issued on credit and temporarily transfers this right to the borrower. But behind this whole process, the exchange of some goods for others is still implied. Although, both the issuance of credits and the repayment of debts take place in money, but behind them are real commodities equivalent to them in value. Cash flows only mirror the movement of commodity flows.

7. The functions of the bank change radically when it begins to create money "out of nothing" and issues it to borrowers in the form of credits. Such an opportunity appears in the system of fractional reserve banking. In this case, the money that is issued as loans is not backed by savings of real goods. The borrower gets the opportunity to present a demand for real goods, although he will pay for their value with "paper" that is not secured by real goods. That which has no value, he exchanges for that which has a real value; "nothing" exchanges for real goods. He wedged into relations between producers who produce goods for each other. Thus, he without compensation appropriates a certain part of the products and resources that were intended for other producers producing other goods. Accordingly, these producers will not be able to produce in the proper volume the products that they produced according to their specialization within the existing division of labor. Thus, the issuance of

credits that are not secured by real savings disrupts the coordination between the economic actions of agents interconnected by a single system of division of labor. This undermines the very principle of the organization of economic life, according to which everyone produces for others and consumes what is produced by others.

8. The provision of unsecured credits floods the economy with means of payment that are not backed by savings of real goods. Owners of unsecured money appear, who demand real goods and offer nothing in return. The *law of value* is violated, the very principle of the equivalent exchange of goods, on which market self-regulation is based. Feedbacks between the prices of final products and primary resources are destroyed. The proportions of the exchange of goods are distorted, that is, relative prices are distorted. The market is starting to generate false signals for economic actors. The interest rate drops sharply, the correspondence between it and the average rate of profit and the average savings rate is violated. The total value of goods produced no longer corresponds to the income received in the process of their production and sale.

9. Created "out of thin air" money, credit and purchasing power give rise to "financial bubbles" that, sooner or later, lead the economy to an economic crisis.¹³² And the reason for all this is the fractional reserve banking system. This process was deeply analyzed by Ludwig Mises, Knut Wicksell, Irving Fischer, Friedrich Hayek and other well-known economists. "A lowering of the gross market rate of interest as brought about by credit expansion always has the effect of making some projects appear profitable which did not appear so before. (Mises, 1996, 561) The essence of the credit-expansion boom is not overinvestment, but investment in wrong lines, i.e., malinvestment. The entrepreneurs embark upon an expansion of investment on a scale for which the capital goods available do not suffice." (Ibid, 559.)

10. As already noted, when credits are issued, money is created, and when debts are returned, they are destroyed. But credits carry interest. This means that more money must be returned to the bank than was created during the issuance of credits. Clearly, in the case of individual borrowers, the source of interest payments is their future earnings. If someone's income is insufficient to repay debts, he will go bankrupt and the bank will appropriate the pledged property. But if we consider the economy as a whole, the logic of the processes changes. In general, more money must be returned in the banking system than was issued in the form of credits. And since 95% of the money in circulation is bank money created at the time of issuing credits, then the money needed to cover interest also needs credits, which also accrue interest, etc. As a result, the amount of interest and credits is constantly growing. Accordingly, the money supply and inflation are growing, and the purchasing power of money is decreasing.

11. If at the micro level each private bank itself creates and distributes money and purchasing power, this means that at the macro level the distribution of money and purchasing power in the economy depends on the decisions and interests of private banks. Therefore, the collective interests and decisions of commercial banks largely determine in

¹³² "This power to create money, in the hands of commercial banks, has been highlighted as one of the root causes of both the Great Depression of the 1930s and the financial crisis of 2007-2009." (Dyson, ..., 2016, 3.)

which sectors of the economy investments will be made, which industries will develop, what will be the ratio of exports and imports, employment, inflation, growth rates, etc. In fact, the owners of commercial banks, a small group of individuals, based on their private interests, informally decide how the national economy, and even the world economy, should develop, despite the fact that no one has given them this right. The banking system itself gave them the opportunity to do so.

12 As we can see, not only large corporations in the production sector, but the entire banking system, jointly block the mechanisms of market self-regulation and reallocate resources in their own interests, increasing economic inequality. The creation of deposits and the issuance of banknotes "generate considerable assets for banks, who gradually take this wealth from all economic agents in the market through a process the agents cannot understand or identify, one which leads to small decreases in the purchasing power of the monetary units all use in society. Credit expansion is backed by the creation of new deposits or bills, ..., In this way banks appropriate a large volume of wealth, which from an accounting standpoint they guarantee with deposits or bills that permit them to disguise the fact that economically speaking they are the only beneficiaries who completely take advantage *de facto* of these assets. Thus they have found a perennial source of financing which will probably not be demanded from them, a "loan" they will never have to return (which is ultimately the same as a "gift"). (de Soto, 2009, 248.)¹³³

13. Permanent inflation caused by credit expansion leads to a permanent decrease in the purchasing power of money deposited in banks. Therefore, from banks, depositors receive back depreciated money, that is, less purchasing power than they deposited in the bank. But this process is less noticeable due to the constant increase in productivity and the decrease in the cost of final products. However, this decrease in the cost of final products is not reflected in the decrease in their prices. Thus, inflation absorbs the results of technological progress. Technological progress and the abundance of goods generated by it is the patrimony of society. But under the guise of artificially provoked inflation, the banks appropriate these results of progress.

So, summing up, we can state the following: instead of society enjoying the benefits of technological progress, its results are appropriated by banks and monopolies. Banks *raise prices* by increasing the amount of fiat money, and monopolies – by reducing the amount of goods produced and creating shortages. But rising prices with stable wages increases their profits, thereby increasing inequality and the problems associated with it.¹³⁴

¹³³ "In short, banks amass tremendous wealth, mainly by generating means of payment to the detriment of third parties. The harm done is very generalized and diluted, however, and takes the form of a gradual relative loss of purchasing power. This phenomenon occurs constantly and stems from the banking system's *ex nihilo* creation of means of payment. This continuous transfer of wealth to bankers persists as long as the banking business suffers no disruptions and assets keep increasing bankers' balances in the form of loans and investments backed by the corresponding deposits created from nothing." (de Soto, 2009, 196-197.)

¹³⁴ According to statistics, in developed countries, real wages have not actually increased since the 1970s, although labor productivity has not stopped growing. However, according to the existing economic regularity, real wages should grow along with the growth of labor productivity. This relationship between wages and labor productivity is reflected in the "Symmetric Model". In this model, technological and consumer coefficients are inversely related to each other. This means that

Conclusion

1. As a result of the dialectical analysis of economic phenomena, the economy appears as a complex, non-linear, self-referential system. Like other similar systems, it has a number of unique properties that are studied by theory of complex systems, synergetics, neural network theory, second-order cybernetics, and constructivism. The economy is subject to the same universal laws as all reality. To discover the specific form in which these general laws manifest themselves in the economy as one of the spheres of social activity, to see the order behind the seeming chaos of the economic routine, is in itself of scientific interest. But besides this, it becomes possible to obtain a rational explanation of a number of unresolved problems of economic theory, which will make it possible to develop an adequate economic policy.

The study of the economy, which is a complex non-linear system, based on the positivist methods of neoliberal theory, is obviously doomed to failure. The mainstream has excluded dialectics from its arsenal of methods for scientific knowledge of economic reality. And synergetics, although it is used to analyze individual problems of economic science, but this is clearly not enough. Only after the economy as a whole is presented as a complex non-linear system of economic actions on the basis of a dialectical analysis of expedient activity, in its study it will be possible to fully apply the conceptual apparatus of the theory of complex systems and bring it out of the crisis in which it is.

2. The primary, constitutive element of the economic system is economic action. Since, under the conditions of the division of labor, the subjects satisfy *each other's needs* in order to satisfy *their own needs*, links arise between their economic actions that form a single system. In the conditions of division of labor and specialization, in order to satisfy their interests, each subject must satisfy the interests of others by his actions. Each produces for others, and others produce for him. Accordingly, the exchange of products becomes a necessary link in satisfying needs, which connects economic entities with each other. As a result of their interaction, a complex, non-linear system of economic actions is formed. This is exactly what a market economy is, self-regulating on the basis of positive and negative feedbacks between the actions of actors.

3. The *structure* of the system of economic actions is understood as a set of relatively stable relationships between actions that perform certain interdependent functions, thanks to which the system retains its integrity and functionality despite the variability of the external environment. Concrete individuals are born and die, begin and end socially active life, replace each other, but economic structures remain. That is, the structures are not rigidly tied to the actions of specific individuals. Accordingly, the primary elements of the economic system are not people, but their actions. By performing certain functions by their actions, they support the functioning and the very existence of this system of actions. And to perform these actions in a certain sequence necessary to maintain the integrity of the system, they are forced by this very system of actions in which they are involved due to the division of labor and specialization.

the decrease in technological coefficients caused by technological progress leads to an increase in consumer coefficients. This means an increase in real incomes and well-being.

These structures themselves have amazing harmony and internal symmetry, and the ability to self-organize based on positive and negative feedback. One of the interesting features of a decentralized economy, as a closed, self-referential system, is that recursive processes are carried out in it, as a result of which so-called “eigen values” and “eigen behavior” arise in it. In a market economy, they manifest themselves in the form of equilibrium prices, which provide the ability for self-regulation of the economy, and in the form of a tendency to equilibrium.

4. From the very beginning of the formation of economics as an independent discipline, scientific research has been aimed at identifying the economic mechanism for the formation of market prices capable of spontaneous self-regulation of the economy. Therefore, the problem of value, which underlies prices, was at the center of attention of the classics. However, this problem of value turned out to be so difficult that in the end economists abandoned further searches and concentrated only on the problem of market prices. But price is only an indicator of exchange proportions, simply a coefficient. And if you do not know what underlies these proportions, then prices cannot be explained. And without this, it is impossible to explain anything at all in economics, because price is one of the central categories of economic theory.

5. Under the conditions of division of labor and specialization, one can satisfy one's needs only by satisfying the needs of others. Therefore, each satisfies the needs of others not out of altruistic motives, but for purely selfish reasons. In such conditions, when exchanging goods, each subject seeks to obtain maximum utility at a minimum cost. But in the conditions of competition and the absence of monopoly power, the interaction of subjects on the basis of compromise agreements gives rise to a general trend in the system towards establishing the *even-utility of costs*.

Even-utility of costs is achieved only in a state of general equilibrium of the system, when complete harmony is achieved between the actions of individuals and the interests of the whole society. In this state, the system functions optimally. This tendency to equilibrium is formed *spontaneously* as a result of the actions of a huge number of actors, each of which is guided by its own interests. Therefore, the system's tendency to equilibrium is carried out in the form of constant changes in the branch structure and cyclical fluctuations, behind which the state of equilibrium is only implied, as that ideal stable state, relative to which the actual states of the system are perceived as deviations from it.

6. The “Symmetric Model” presented in the work is a model of that outwardly invisible structure that links economic actions and the functions they perform into an operationally closed autopoietic system that generates these very actions, of which it consists. This is an ideal, theoretically conceivable structure, to the formation of which a real competitive economy always strives, but never achieves. It reflects the absolute equilibrium, which does not exist in reality and is only an “attractor-structure”. This is the structure relative to which fluctuations and deviations occur. This structure, which is the center of attraction for all deviations and structural deformations, can only be discovered through a scientific analysis of economic processes. That is, it reflects something stable in the chaos of changeable and transient economic phenomena. In reality, the economy deviates significantly from the equilibrium state, which is manifested not only in the deformation of the sectoral structure

and the asynchrony of economic processes, but also in cyclical fluctuations in economic activity, in periodic crises.

7. In a market economy, in the very process of producing final products, those incomes are created, that is, the purchasing power which is necessary for the sale of goods produced. Incomes of production factors (Wages, Interest, Rent, Profit) are those primary incomes on the basis of which the aggregate demand for produced products is formed. If the aggregate demand is insufficient for their realization, the economy will begin to decline. Therefore, a necessary condition for the normal functioning of the economy is not only the correspondence of the gross product and gross income, but also the correspondence of the structure of production to the structure of solvent needs, which is necessary for the correspondence between aggregate demand and aggregate supply. Although the economy is never in a state of equilibrium in which such a correspondence is achieved, but thanks to competition, it always strives for it. Behind the sharp fluctuations between economic ups and downs, one can only imply such an equilibrium state, which, like an "attractor", pull the economy to itself from any state in which it actually is at that moment. Thanks to this mechanism of functioning, the competitive market economy has provided a huge progress in the development of society. However, over time, competition itself gives rise to a monopoly, which deforms this economic mechanism and hinders further development.

8. At the turn of the 19th and 20th centuries, significant changes took place in the economies of developed countries. Second half of the 19th century and the beginning of the 20th century. there is a period of the Second industrial (technological) revolution. Industrial giants are being created, the technological base of production is being updated. This required huge finances that were not available to individual investors. Therefore, joint-stock companies began to appear, which accumulated the capital of many owners. At the same time, through the acquisition of controlling stakes in joint-stock companies, banks could exercise control over entire branches. The consolidation of enterprises took place more and more actively. Centralization and concentration of capital created all the conditions for monopolization. The competitive economy has more and more obviously transformed into a monopolized one.

The first clear sign of the structural deformations that had taken place, caused by monopolization, was the crisis of 1873. This was a very deep and prolonged crisis, and in its dynamics it was clearly different from previous cyclical crises that took place in a competitive environment. This was the beginning of the era of monopolization. The final confirmation of the complete dominance of large monopolies was the Great Depression of the 30s, which began in the United States, swept the world economy and lasted 10 years.

9. In a competitive economy, demand lagged behind supply during the downward phase of the economic cycle, which caused prices to fall. At the bottom, structural disproportions were eliminated and an economic recovery began, prices began to rise again and the formation of a new, more adequate branch structure of the economy began. But in a monopolized economy, the shortage of demand is born not by periodic fluctuations in economic activity, but by the increased inequality in the distribution of income caused by the monopolization itself.

Using their monopoly power, the monopolies artificially create shortages, inflate prices and make super profits. This means that in the products they produce, the cost per unit of

utility is less (respectively, the utility per unit of cost is greater) than the average for the economy. Thanks to this, monopolists are able to make profits that are much higher than the average rate of profit and in this way redistribute national income in their favor by reducing the income of other economic agents. Huge income inequality appears. The profits of the monopolists far exceed their personal needs, and most of it is saved. On the other hand, the relatively low incomes of most consumers lead to a weakening of demand. Goods are not sold, and prices are falling. Therefore, monopolies cannot invest their excess savings, and withdraw them from the real sector to the financial sector. The outflow of money from the real sector of the economy leads to a drop in demand relative to supply, and the rate of economic growth begins to fall. Under the conditions of liberal economic policy, as a result of monopolization and inequality, the shortage of demand was no longer of a periodic nature associated with cyclical fluctuations, but took on the form of a permanent trend. Such a steady gap between demand and supply, although it can increase or decrease depending on the economic situation, gives rise to a general trend towards economic stagnation. This is an irreversible process, for monopolization cannot go back to the competition from which it was born.

10. The reaction to the Great Depression was Keynesian theory, on the basis of which the counter-cyclical policy was developed. At the same time, Keynes assumed that the Great Depression was the regular crisis of the economic cycle, although the deepest of all the previous ones due to the loss of price and wage elasticity. He did not consider it a manifestation of the systemic crisis of the capitalist economy in general. Keynes believed that crises arise as a result of fluctuations in the marginal efficiency of capital. He did not believe that economic inequality causes a *constant* outflow of money from the real sector to the financial sector and that this circumstance is a factor that is the reason for the *constant* lagging of demand behind supply. Therefore, he did not consider that demand *constantly* needed artificial stimulation. He believed that this should be done only *periodically*, when required by the downward phase of the economic cycle.

The neo-Keynesians also did not believe that the structural deformation of the economy caused by monopolization gives rise to a structurally determined tendency for aggregate demand to lag behind aggregate supply permanently. From this it is clear that the counter-cyclical policies subsequently developed by the neo-Keynesians were intended not only to mitigate periodic downturns, but also to limit the excessive economic booms generated by the cycle. Accordingly, with the help of budget deficits and surpluses, the Government had to regulate demand - stimulating it during a crisis and weakening it during booms. However, in practice, it turned out that the economies of developed countries almost constantly had to be stimulated by maintaining demand and not by keeping them from overheating.

11. Keynes' widely quoted remark that "in the long run we will all die" resulted from an underestimation in his conception of the long-term results of such a policy. But in reality, it was the long-term period that turned out to be the "vulnerable point" of his counter-cyclical policy. Ignoring them just became one of the main factors of stagflation in the 70s.¹³⁵ For the

¹³⁵ Although the "oil shock" served as the trigger for stagflation, its underlying cause was the monopolization of the economy (including global oil production), inequality, and the Keynesian policy of deficit financing generated by them.

leakage of excess savings of monopolists from the real sector occurred constantly. Accordingly, the demand was constantly weakening and it was also constantly necessary to artificially stimulate it with deficit financing, i.e. just in the long term. But such a policy gave rise to inflation and led to the incorporation of inflationary expectations into the functioning of the economy and, at the same time, for a long time did not allow the economy to enter into a crisis and eliminate structural deformations. The crisis was constantly suppressed. And this meant not the elimination of structural disproportions, but their conservation, postponing their elimination to an indefinite future. At the same time, the Keynesian policy of stimulating demand turned out to be an inadequate response to the "cost shock" generated by the rise in oil prices in the 70s. The result of this was stagflation. Disproportions burst out at once during stagflation, in front of which the Keynesian policy turned out to be powerless.

12. The sharp rise in prices for oil and oil products in the 70s. led to an increase in production costs. Now goods could only be produced at high costs and sold at high prices. This created great difficulties for the economy as a whole. However, price takers and price makers react differently to such conditions. Small and medium businesses that dominate the competitive sector of the economy find it more difficult to maintain production and income than large corporations that dominate the monopolized sector and operate on the basis of long-term contracts. Inequality is rising sharply and the middle class is shrinking. There is a consolidation of enterprises. This supports the general trend of increasing monopolization. And the Keynesian policy of pumping money into the economy to stimulate aggregate demand gave birth to a wage-price spiral, and the rate of inflation rose rapidly.¹³⁶

13. The coexistence of inflation and unemployment created a situation in which the Keynesian policy was powerless. This led to the discrediting of Keynesian politics and it was replaced by neo-liberal politics, which shifted the focus from government *regulation* to market *self-regulation*. The basic principles of the policy pursued by neoliberalism have been called the Washington Consensus.¹³⁷ The continued dominance of neoliberal politics has led

¹³⁶ The sharp rise in costs is splitting the economy in two. The monopolized and competitive sectors react differently to rising costs. In a monopolized sector, price makers continue to produce goods and pass on high costs to prices. This allows them to maintain sufficient income to maintain market demand in a high-price environment. In a competitive sector, price takers cannot pass on costs to prices. Therefore, in the competitive sector, the production and supply of goods is reduced. Accordingly, the income of those employed in this sector is declining. However, their solvency is reduced to a much greater extent due to the sharply increased prices caused by the "shock of costs". In such conditions, in order to maintain solvency, they are forced to take credits, spend savings, and use income from the sale of assets. Thus, the decline in output in the competitive sector is not sufficiently reflected in the reduction in demand from those employed in this sector. In general, a situation arises when the volume of production in the economy is reduced (especially in the competitive sector), but, nevertheless, the demand for goods is more or less preserved (on the part of agents of both sectors). But cost-driven price increases and production cuts, while credit-supported demand persists, provoke stagflation. And if we take into account that all this is happening against the backdrop of permanent inflation generated by the banking system, and, moreover, if the Keynesian policy of stimulating demand is the reaction to the reduction in production, then the acceleration of inflation in conditions of stagnation, i.e. stagflation becomes inevitable. As a result of stagflation, small and medium-sized businesses shrink, while large businesses survive; the share of the competitive sector is decreasing, while the share of the monopoly sector is increasing; the poor get poorer and the rich get richer.

¹³⁷ The Washington Consensus was supposed to provide economic growth for all and overcome global stagnation. But the stagnation of the industrial sector continued. "The surge upward of the

to an intensification of the process of monopolization and financialization, an increase in inequality and an increase in intrasystem deformations.¹³⁸

Disproportions, which accumulated over a long period of time, eventually had to break out. The formation of financial bubbles and the subsequent global crisis of 2008 were an inevitable consequence of neoliberal policies. The crisis began in the United States and spread to all developed countries. “Yet however much Wall Street’s daredevil antics in the 1920s and in the 2000s were proximate causes of the giant bubbles of these two eras, the bubbles also reflected the deeper problems — the growing imbalance between what most people earned as workers and what they spent as consumers, and the increasingly lopsided share of total income going to the top. In both eras, had the share going to the middle class not fallen, middle-class consumers would not have needed to go as deeply into debt in order to sustain their middle-class lifestyle. Had the rich received a smaller share, they would not have bid up the prices of speculative assets so high.” (Reich, 2013, 34.) This reasoning holds true for other developed countries as well. Inequality, sharply increased as a result of neoliberal policies and the shrinking middle class, weakens demand and slows down the economy.¹³⁹

14. According to the neo-liberal concept, a state controlled by oligarchs pursues a “trickle-down” policy, according to which, tax cuts on business will increase investment and jobs and, consequently, the income of workers. However, as a result of lower tax rates, the highest income recipients benefit the most. This increases the wealth of the rich and increases inequality. Therefore, this policy is counterproductive, because excessive inequality is precisely the cause of stagnant phenomena in the economy.

In conditions of monopolization, large corporations, even before the implementation of this policy, could not invest their savings due to problems with the sale of products and transferred part of their income to the financial sector. It is clear that also after the tax cuts, their additional income was not invested in the real sector, but withdrawn to the financial sector. Therefore, the supply sider policy did not have the expected effect.

15. Jobs create market demand, just as demand creates jobs. More generally speaking, production and consumption, supply and demand, incomes and expenditures depend on each

stock markets everywhere was based not on productive profits but largely on speculative financial manipulations. The distribution of income worldwide and within countries became very skewed — a massive increase in the income of the top 10% and especially of the top 1% of the world’s populations, but a decline in real income of much of the rest of the world’s populations.” (Wallerstein, 2008.)

¹³⁸ “The rise of inequality has been one of the most profound changes in modern societies since the early 1980s. ... since the early 1980s the rise of Neoliberalism has brought about important economic and societal changes, including the deregulation of financial sector ... Several macroeconomic imbalances have emerged: growing trade imbalances across countries; rising household debt levels, namely in the debt-led economies; a rise in the size of the financial sector relative to others; and a rise of asset and property prices. These imbalances are at the root of the crisis. They have been facilitated by financial deregulation, but most of them are intrinsically linked to the rise of inequality.” (Stockhammer, 2012, 2 - 3.)

¹³⁹ “Unless America’s middle class receives a fair share, it cannot consume nearly what the nation is capable of producing, at least without going deeply into debt. And debt on this scale is unsustainable, as we have seen. The inevitable result is slower economic growth and an economy increasingly susceptible to great booms and terrible busts.” (Reich, 2013, 140.)

other. If the balance between them is upset, the economy will start to slow down. Economic growth is slowing down not because the producers do not have enough money, but because, due to the incorrect distribution of income, there is not enough money for the vast majority of the society for which goods are produced. If instead of redistributing income, money is pumped into the real sector of the economy in order to increase demand, then demand will begin to grow, however, inflation will also gradually increase and the real purchasing power of society will decrease again. But consumer spending is corporate income. Therefore, inflation will increase, but income inequality will not decrease. Corporations will still withdraw excess profits to the financial sector and everything will be repeated at increased prices.

16. Since the lag in demand is due to the outflow of money from the real sector, the financial sector compensates for this outflow of money by credit expansion. Money is pouring into the real sector in the form of credits and revitalizing sluggish demand. Demand rises again and the rapid growth of the economy begins. But in a decentralized economy, no one controls the ratio of inflow and outflow of money in the real sector. Therefore, firstly, ups and downs in economic activity are not eliminated, and secondly, on the wave of optimism, credit expansion gives rise to a financial bubble, which sooner or later bursts and gives rise to a financial crisis, which in turn develops into an economic crisis.

17. As we can see, both the Keynesian policy pursued before the crisis of the 1970s and the neoliberal policy pursued after it turned out to be ineffective. The first ended in stagflation, and the second ended in the Great Recession. The reason for their failure is that none of them took into account the bifurcation of the economy into competitive and monopoly sectors and the scale of inequality generated by this. Both of these policies are pursuing an anti-crisis policy, preventing the economy from entering such a deep crisis as to eliminate the accumulated structural deformations. Thus, crises are postponed “for later”. But later, very deep crises appear with very serious consequences, during which the elimination of deformations that have accumulated over a long period of anti-crisis policy occurs.

18. Just as in the domestic market, producers buy labor at relatively low prices and sell products to them at high prices, so in the external market, using monopoly power, large corporations buy resources from poor countries at relatively low prices and sell their products to them at relatively high prices. That is, they do not give poor countries enough money to buy goods from developed countries. This reinforces the economic disparity between rich and poor countries. Accordingly, there is also a shortage of demand in world markets. Therefore, loans are given to poor countries so that they can buy goods from rich countries. That is, similar processes are taking place in foreign and domestic markets. In both cases, the feedback between production and consumption is disrupted, and everyone suffers the damage.

Competition itself gave rise to monopolization, and it, in turn, gave birth to inequality and the logic of the development of events that follows from it. Namely, as a result of inequality, on the one hand, there is a excess of savings, and on the other hand, a shortage of domestic demand. In conditions of demand deficit, savings cannot be invested in the real sector of the economy within the country. Therefore, the need for foreign markets is escalating. This leads to a conflict of economic and political interests of various countries. Previously, this led to the First and Second World Wars, today - to economic wars, political

tensions and local military conflicts. This contributed to World War I and World War II in the past, and today to economic wars, political tensions and local military conflicts.

19. As a result of neoliberal policies, the polarization between rich and poor is increasingly growing both within and between countries. The degree of inequality in the world and in separate regions can be judged from the data provided in the World Inequality Report 2022. In 2021, at purchasing power parity (PPP), the bottom 50% of the world's population received 8% of total income and owned 2% of total wealth. The top 10% of the world's richest people owned 76% of all household assets and received 52% of total income.¹⁴⁰

The increased interest of economists around the world in the problem of inequality after the Great Recession is quite natural. However, before this crisis, many economists underestimated this problem, considering it a problem of justice and morality, but not of economics. In the neoclassical paradigm, the influence of distributive relations on the efficiency of the economy is clearly underestimated. However, in reality, the problem of inequality is one of the main reasons for the stagnation of the economy. For in the economy, products are produced to meet the needs of the whole society, but the money needed to purchase them is concentrated in the hands of a relatively small group of people. The economy is slowing down. It is impossible to eliminate this problem either by Keynesian or neoliberal methods. The source of all problems is the distortion of distribution relations caused by monopolization, the discrepancy between the production of products and the distribution of income.¹⁴¹

20. In the pursuit of profit, every producer tries to save on labor and resource costs. Tries to replace labor with machinery, robots, computers, reduce resource costs by using modern technologies; hires cheaper labor, uses the labor of immigrants. However, all this creates new problems. If all manufacturers reduce the wages of workers and replace their labor with machinery, then the purchasing power of workers will decrease. They make up the majority of consumers; and goods are produced for them. Commodity production is mass production. If the majority of consumers do not have enough income, they will not be able to buy the goods produced and the economy will decline. This means that the producers' profits will decrease.

21. In order to reduce costs and increase profits, production is moved from developed countries to developing countries where there is cheap labor and resources. The result is even greater cuts in jobs, wages and purchasing power in the developed countries themselves. On

¹⁴⁰ World Inequality Report 2022, World Inequality Lab, p. 10.

¹⁴¹ “.... income distribution will have to be a central consideration in policies dealing with domestic and international macroeconomic stabilisation. The avoidance of crises similar to the recent one and the generation of stable growth regimes will involve simultaneous consideration of income and wealth distribution, financial regulation and aggregate demand. It is this first element – the distribution of income and wealth – that has not conventionally been incorporated in macroeconomic analysis. Put more bluntly, creating a more equal society is not an economic luxury that can be taken care of after the real issues, such as financial regulation, have been sorted out. Rather, a far more equitable distribution of income and wealth than presently exists would be an essential aspect of a stable growth regime: wage growth is a precondition of an increase in consumption that does not rely on the growth of debt. And financial assets are less likely to be used for speculation if wealth is more broadly distributed.” (Stockhammer, 2012, 18.)

the other hand, due to low wages and low resource prices, poor countries do not have sufficient purchasing power to present high demand for the products of developed countries. Therefore, developed countries are losing both their domestic markets and foreign markets, and remain without sufficient demand for their products. It turns out that in pursuit of profit, producers produce more and more goods for consumers, but give them less and less money to buy these goods. This is a systemic contradiction that leads the economy to a dead end.

Society needs goods, and producers of goods need money. Producers, using monopoly power, distribute the national income in their favor. By appropriating more and more money, they cut the incomes of the bulk of consumers who cannot buy goods. But without the purchase of goods, producers will not be able to get the money for which they produce these goods. In conditions of monopolization, with their greed, they block the economy, while in conditions of competition, it was precisely this greed that developed it.

22. Given the above circumstances, the state should pursue a differentiated policy in relation to the monopoly and competitive sectors. This will simultaneously stimulate both demand and supply. To this end, it is necessary to establish the maximum allowable rate of profit for monopolies and oligopolies, and, on the other hand, to sharply reduce taxes for small and medium-sized businesses. And if necessary, apply "negative taxation" for small businesses. Under such conditions, small and medium-sized businesses will receive additional incentives for production.

As for the monopoly sector, if the excess of profit over the profit rate established by law is withdrawn to the budget, then the very logic of the behavior of monopolies will change. They will begin to increase the mass of profits not by reducing output and raising prices, but, on the contrary, by increasing output and lowering prices. In order to sell more and make a large mass of profit, the monopolist needs to lower prices. And along with lower prices, they will also reduce costs in order to get the maximum possible profit without violating the rate of return allowed by law. Thus, the monopolists will not be interested in either creating a deficit or producing a surplus. In the first case, part of the income that exceeds the allowable profit rate will be withdrawn to the budget, and in the second case, if costs are not reduced in parallel with prices, then part of the profit will be lost due to price reduction. In addition, since the monopolies will not create deficits, raise prices and, pulling demand, take away buyers from small and medium-sized businesses, this will serve as an additional factor in activating small and medium-sized businesses by stimulating demand for their products.

It is also necessary to sharply increase taxes on the income of a wealthy minority, on the one hand, on the other hand, to reduce taxes for the middle class and apply "reverse income taxation" for low-income segments of the population.¹⁴² It is also necessary to

¹⁴² "The most immediate way to reestablish shared prosperity is through a "reverse income tax" that supplements the wages of the middle class. Instead of money being withheld from their paychecks to pay taxes to the government, money would be added to their paychecks by the government. A similar idea was proposed by the prizewinning economist Milton Friedman, and we now provide this for low-income workers through the Earned Income Tax Credit. The EITC has not only helped reduce poverty but has also increased the incomes of families most likely to spend that additional money, and thereby create more jobs. In 2009, the EITC was the nation's largest antipoverty program. Over 24 million

increase the scale of the budgetary redistribution of financial resources in favor of low-income segments of the population by increasing social programs.

23. The market economy and democracy have achieved unprecedented progress by putting the vices of human nature, such as the greed of entrepreneurs and the ambition of politicians, into the service of society. However, the foundations of a market economy were formed when there were no monopolies, and the foundations of a modern form of democracy were formed when there were no modern means of manipulating public consciousness. But by now, this system has already outlived its usefulness. Monopolies kill the very idea of a market economy and self-regulation, and the manipulation of public consciousness kills the existing form of democracy. They not only hinder progress, but they themselves have become a source of new problems - economic, political, environmental, moral, etc. They have reduced to the absurdity of a world in which billions of dollars are spent on armaments, wars, financial speculation, luxury and drug dealing, while millions of people suffer from poverty, hunger, epidemics and disease, and nature is destroyed before our eyes every day. As a result of this madness, insane dictators like Hitler, Stalin, Hussein, Putin, and others are democratically elected. It is hard to imagine that such madness can continue for a long time. Radical changes are needed, both in the economic and political systems.

24. Monopoly and competition are mutually exclusive. Monopolization is due to the growth of productive forces. It is inevitable and will continue. At the same time, the state itself is the largest monopoly. But who will dominate in making decisions that regulate the economy - the Government (in the interests of society), or private monopolies (in the interests of individuals)?

In a democratic system, a contradiction is born between economic and political forces. Under conditions of monopolization, the minority gets richer, at the expense of the relative impoverishment of the majority. As a result of polarization, economic power is concentrated in the hands of a small elite, while the electorate, that is, society, remains the source of political power, according to the constitutions of democratic countries. As long as the Government is under the effective control of the economic elite, it protects their interests. But when the electorate realizes the real problems, they will re-elect political power. The new Government will express the interests of the whole society. It will establish a meritocracy and be under the influence of the intellectual rather than the economic elite. Fundamental transformations will begin in all spheres of society, including the economic one.¹⁴³

households received wage supplements. Given what's happened to middleclass incomes, the EITC should be expanded and extended upward." (Reich, 2013, 142.)

¹⁴³ Monopolies crowd out competition and self-regulation; large corporations separate the function of ownership from the function of management. This requires new economic relations. The economy of the era of robotization, nanotechnology and digital economy is possible only under conditions of state ownership of the means of production and synthesis of centralization and decentralization of the economy. Therefore, the state, as the largest monopoly, will gradually buy out all privately owned means of production. In conditions of enormous labor productivity, such an abundance of goods will be created that material incentives will not be able to remain the main engine of the economy. The labor market will be the only primary resource market that will remain until the full automation of production. Wage labor will be pushed out of production more and more intensively. But not unemployment will increase, but the "creatosphere" (Buzgalin). In all spheres of social life, instead of hired labor, creative labor will prevail, which does not need external stimulation

25. A competitive economy always strives for equilibrium, as its optimal state, but never reaches it. But a monopolized economy even never strives for it. On the contrary, it deviates more and more from the optimal state. The modern economy is in the funnel of an attractor leading to a systemic crisis of capitalism. This movement can be slowed down, but cannot be undone. Replacing the existing system with a fundamentally new one is only a matter of time. Today, scientists should think not about how to save the "atherosclerotic" system, but about what the new system should be like and how to make the process of restructuring the existing system into a new one less painful.

(its incentives are contained in itself), but only in the creation of the necessary conditions provided by the state. Ultimately, only the market for consumer goods will remain, where prices will be formed on the basis of supply and demand. These prices of consumer goods will serve as input information for the "fine tuning" of economic models in the "online mode" of the digital economy. And the Universal Basic Income will become the main source of purchasing power for all members of society.

Appendix

Economy as a non-linear system

1. Formation of social systems

1. Sociology has long and with great success used a functional approach to the analysis of social systems. The analysis of economy as a social system in the context of some ideas of «metatheories», developed by Talcott Parsons and Niklas Luhmann, will clarify many issues of economic theory. In this regard, many of the ideas of T. Parsons regarding the system of social actions, and N. Luhmann, regarding operational closeness and causal openness, autopoiesis and self-reference of social systems, etc., are of particular importance. As a result of such an analysis of a decentralized economic system as one of the subsystems of society, we will get a new interpretation of economic processes, economic categories and the relationships between them.

2. Any social system has its own environment and, accordingly, a boundary that distinguishes the system from the external environment and fixes the difference between them. If this distinction is erased, then both the system and its environment will disappear. The system and its environment cannot exist without each other. The formation of the system at the same time means the formation of its environment and, accordingly, its borders. (See, Luhmann, 2007, 43). But how is the system formed? Who draws its border? This is done by the system itself. The system distinguishes itself from everything else by its own operations.

“If an operation of a certain type has started and is, ... capable of connectivity - that is, if further operations of the same type ensue from it - a system develops. For, whenever an operation is connected to another, this happens selectively. Nothing else happens; the unmarked space or the environment remains outside. The system creates itself as a chain of operations. The difference between system and environment arises merely because an operation produces a subsequent operation of the same type.” (Luhmann, 2013, 52.)

According to the presented concept, the operation that “produces a subsequent operation of the same type” and thereby creates a social system is a social action. Economic action, as one of the forms of manifestation of social action, is the only operation that forms the economic system. It divides the unmarked social space into economic, internal and the rest, external,

non-economic. N. Luhmann writes: "the system always operates on the inside of the form - that is, in itself, and not on the outside. But this operation on the inside - that is, in the system as opposed to the environment - presupposes that there is in fact an outside, an environment. ...a system cannot operate in its environment ... its operations thus always take place within the system. If systems operations did actually take place in the environment, the distinction between system and environment would be undermined." (Luhmann, 2013, 64.)

3. The functioning of the economic system is the permanent reproduction of its difference from the environment and, consequently, the reproduction of its borders. This difference arises from the fact that since an economic action can only arise from another economic action, then economic actions can only exist within a system of economic actions and no action can go beyond that system.¹⁴⁴

2. Social action

1. Each system can be divided into parts and smaller subsystems only until we reach its primary element. Further division of this unit *within the framework of this system* is impossible. In the case of its further division, the system itself loses its emergent properties and, therefore, cannot be considered as a system.

As already noted, the operation that creates a social system is a *social action*. In the economic subsystem of society, social action takes the form of *economic action*. Social action is the constitutive and, within a given system, the indivisible element of that system. But, as an act of purposeful action in general, outside the context of a social system, social action itself is a teleological structure.¹⁴⁵ Its components are goal, means, conditions, results, and values.

2. T. Parsons was the first sociologist who recognized social action as the primary element of the social system.¹⁴⁶ (See Parsons, 1949). The very term "social action" T. Parsons adopted from the sociological theory of Max Weber. M. Weber writes: "We shall speak of "action" insofar as the acting individual attaches a subjective meaning to his behavior – be it overt or covert, omission or acquiescence. Action is "social" insofar as its subjective meaning takes account of the behavior of others and is thereby oriented in its course." (Weber, 1978, 4.) "Thus, money is a means of exchange which the actor accepts

¹⁴⁴ "... that a system cannot use its own operations to get in touch with the environment. And this is precisely the point made by the thesis of operational closure. Operations are from beginning to end (or, in other words, if seen as events) always possible only inside a system, and they cannot be used to make an intervention in the environment. For, in that case, when a border is crossed, they would have to become something other than system operations." (Luhmann, 2013, 64.)

¹⁴⁵ Just as the cell is the elementary unit of a living organism, the cell itself is also a system. However, the element of the organism as a system is only the cell, and not the components that make up the cell.

¹⁴⁶ Explicitly or implicitly, the category of "human action", including "social action", was at the center of attention of many social thinkers M. Weber, T. Parsons, N. Luhmann, A. Schutz, J. Habermas, and others. Economist, philosopher and sociologist L. Mises dedicated the fundamental treatise Human Action (1949) to this problem. But in the economic mainstream, this category has not received the attention it deserves.

in payment because he orients his action to the expectation that a large but unknown number of individuals he is personally unacquainted with will be ready to accept it in exchange on some future occasion. . . . The economic activity of an individual is social only if it takes account of the behavior of someone else. Thus very generally it becomes social insofar as the actor assumes that others will respect his actual control over economic goods. Concretely it is social, for instance, if in relation to the actor's own consumption the future wants of others are taken into account and this becomes one consideration affecting the actor's own saving. Or, in another connexion, production may be oriented to the future wants of other people." (Ibid., 22)

Based on M. Weber's category of "social action" T. Parsons was able to present society as a *system* of social actions. In turn, the systematic approach of T. Parsons to the analysis of society was enriched by his student N. Luhmann with the ideas of autopoiesis, operational closure and causal openness, positive and negative feedback, self-reference, and other ideas of constructivism and second-order cybernetics.¹⁴⁷ But, unlike T. Parsons, as the primary element of the social system, N. Luhmann presented not social action, but *communication*. Accordingly, society for him was not a system of social actions, but a system of communications. In the concept of a social system Luhmann replaced the primary element for he believed that "Only with the help of the concept of communication can we think of a social system as an autopoietic system, which consists only of elements, namely communications, which produce and reproduce it through the network of precisely these elements, that is, through communication." (Luhmann, 1992, 71.).¹⁴⁸

3. According to the concept we propose, as a primary element of a social system, as an autopoietic system, it is not only possible, but even more adequate, to represent *social action* rather than communication. Social action, like any human action in general, is a teleological

¹⁴⁷ Constructivism had a strong influence on sociology. The German scientist Niklas Luhmann (1927–1998) was one of the first who built a system of social philosophy on the fundamental ideas of constructivism, the theory of complex, self-organizing systems, autopoiesis, operational closure and causal openness, self-reference, structural coupling and contingency, etc. The works of N. Luhmann represent a sociological version of constructivism and are already mentioned as classical works along with the works of E. Glaserfeld, H. von Foerster, H. Maturana, F. Varela, and other well-known constructivists.

¹⁴⁸ Interestingly, N. Luhmann himself hesitated for a long time when choosing the primary element of the social system, but in the end, out of two alternatives - social action and communication - he preferred the latter. In one of the interviews, Prof. R. Stichweh recalls: "I think, in fact, that it was the transition to the theory of autopoiesis that outstripped the need for a solution to this issue. I remember when I was still a student, Luhmann - it was somewhere in the late 70s. - often repeated that he needed to resolve the issue of fundamentality, or the basic element in favor of action or communication, and he did not yet know what would be preferred. This went on for a couple of years." (Stichweh, 1999.) N. Luhmann himself wrote: "The most important piece of work on the concept of society remains to be done. It is posed by the question: which is the operation which produces the system of society ... My proposal is that we make the concept of communication the basis and thereby switch sociological theory from the concept of action to the concept of system. This enables us to present the social system as an operatively closed system consisting only of its own operations, reproduced by communications from communications. With the concept of action external references can hardly be avoided. ... Only with the help of the concept of communication can we think of a social system as an autopoietic system, which consists only of elements, namely communications, which produce and reproduce it through the network of precisely these elements, that is, through communication." (Luhmann, 1992, 71.).

act. Although its external correlate may be an empirical process, this empirical process in itself is not action. "Every physical phenomenon must involve processes in time, which happen to particles which can be located in space. It is impossible to talk about physical processes in any other terms, at least so long as the conceptual scheme of the classical physics is employed. Similarly, it is impossible even to talk about action in terms that do not involve a means-end relationship with all the implications just discussed. This is the common conceptual framework in which all change and process in the action field is grasped. Thus the action frame of reference may be said to have what many, following Husserl, ^ have called a "phenomenological" status. It involves no concrete data that can be "thought away," that are subject to change. It is not a phenomenon in the empirical sense. It is the indispensable logical framework in which we describe and think about the phenomena of action." (Parsons, 1949, 733.)

It is very important to distinguish between actions themselves and empirical processes. Ludwig Mises' point of view is interesting in this regard: "Economics is not about things and tangible material objects; it is about men, their meanings and actions. Goods, commodities, and wealth and all the other notions of conduct are not elements of nature; they are elements of human meaning and conduct. He who wants to deal with them must not look at the external world; he must search for them in the meaning of acting men." (Mises, 1996, 92.) Production is not something physical, material, and external; it is a spiritual and intellectual phenomenon. (Ibid, 141.)

Each action, by its result, arouses the need for a reaction to it, provokes a response to it in one way or another. For the result of each action is a means for another action, the product is a resource for another action. The product of each action generates a need, in relation to which it itself becomes a resource, i.e. generates a need for another action in which this product will be consumed.¹⁴⁹ Moreover, if a product fails to transform into a resource, then it will not be considered a product. The product is deliberately produced as a resource for future actions. Thus, each action in itself implies the need for another action. And if it cannot find its continuation, then it itself will turn out to be invalid, fictitious. (See Leiashvily, 2012.)

4. Such an approach to the construction of a theory of society, in which the elements of the system are represented not by subjects, but by their actions, is fully justified. Naturally, this also applies to its subsystems. If we consider, for example, only the economic subsystem of society, then all subjects of society, whether they are individuals, firms, households, various organizations, etc. - all of them, in one form or another, participate in the economic process, perform one function or another in it. But none of these subjects is a purely economic subjects, and to some extent each of them is involved in the functioning of other, non-economic subsystems. That is, to one degree or another, all subjects are multifunctional. Therefore, naturally, a unit or an indivisible element of the economic subsystem cannot be an integral subject that performs not only economic functions, but which is also an actor in other subsystems of society. The economic subsystem does not cover all the actions of specific subjects, whether individuals or groups. An element of the economic subsystem can only be those actions of the subject that perform certain economic functions,

¹⁴⁹ "the satisfaction of the first need (the action of satisfying, and the instrument of satisfaction which has been acquired) leads to new needs;..." (Marx, 1998, 48.)

that is, only *economic action*.¹⁵⁰ Therefore, being a subsystem of society, the economy is a system of economic actions, and not a system consisting of subjects.

But in this case, it turns out that, from an analytical point of view, the *actor* of the economic system itself (as a *purely economic subject*), also appears as a certain *system of economic actions* that performs certain economic functions.¹⁵¹ This applies to all economic actors, whether individuals, firms or households. And economic facts are the results of these actions.

5. Facts themselves are not economic facts. Everything depends on the subject's attitude to the facts. Subjects perceive the same objective facts differently. For example, objectively there is no production or consumption as such. Objectively, there are only transformations of some objects into others according to the laws of nature. But whether a person calls it production or consumption depends on his attitude to this process. Accordingly, he himself will be called a producer, or a consumer. It also depends on whether certain objects are products or resources for him, and whether he will perceive them as the embodiment of costs or utilities. Etc. etc. It is the same with all other economic categories - they are relative and exist only in the human mind.

That is, to be a producer, consumer, product, resource, etc. - all this is not the inalienable real properties of objects or subjects, but the functions that they perform. It is impossible to produce a product without being a consumer of resources. Therefore, he is also a consumer. But he is not only a producer and consumer. He is also a seller and a buyer, an investor and a saver, a creditor and a debtor, and so on. And in the conditions of the division of labor, each of these functions can be performed only as one side in interaction with other economic actor. Thus, in a market economy, he can be a producer only because someone else is a consumer; may be a seller - because someone else is a buyer; creditor - because someone else is a debtor; etc. In this case, a circular organization of interrelated functions is formed. These functions cannot exist without each other. They form a single whole, a closed structure. But these functions are performed by economic actions. (See Leiashvily, 2012, 2015)

3. Autopoiesis

1. There is an interaction between the system and its elements. The economy, as a system of economic actions, gives rise to economic actions in itself, and economic actions, together, create an economic system. The system and actions give birth to each other. When a system gives birth to the elements of which it itself consists, then we are dealing with circular causality. Such a system is a substance that is the cause of itself and, as such, acquires independence. But the independence of the economic system, its autonomy, is limited because it is a subsystem of society as a more global system. Accordingly, other social

¹⁵⁰ Not all social actions are economic, and not all economic actions are social. In what follows, by economic action we mean only social economic action.

¹⁵¹ See: Talcott Parsons regarding personality as a set of social actions in *The Structure of Social Action* (1949).

subsystems (politics, law, culture, etc.), as well as Nature, represent the environment for the economy. Such a process of self-generation, which is the basis of the autonomy of a complex system, by constructivists is called *autopoiesis*.

“According to Maturana's definition, autopoiesis means that a system can generate its own operations only by means of the network of its own operations. And the network of its own operations is generated, in turn, by these operations. On the one hand, we are dealing here with the thesis of operational closure. The system generates itself. Not only does it produce its own structures, ..., but it is also autonomous at the level of operations. It cannot import any operations from its environment. ... Such operational closure is merely another way of formulating the statement that an autopoietic system by means of the network of its own operations generates the operations that it needs in order to generate operations.” (Luhmann, 2013, 77.)

2. But in what sense does a social system give rise to social action? After all, the action is carried out by a person? The system gives rise to social actions with the help of a person. It provokes a person to carry out social actions.¹⁵² In the context of social reality, the above reasoning means the following: every social action is associated with another action, since the social action of some actor achieves its result when other actors recognize its result as a means or condition for their actions. Since the result of one action is a means or condition for other actions, therefore, each action carries in itself the germ of a future action. And if it does not find its continuation, then, as a social action, it will itself turn out to be fictitious. This applies not only to economic actions, but to all social actions in general. This is the mechanism that ensures the coherence of social actions. In addition, any social action gives rise not to any other action, but specifically to “its other” action, i.e. an action that performs

¹⁵² “In a certain sense, action is the expression of the intention or will of actors, and to this degree it is subsidiary. In Parsons's theory the situation is reversed. Parsons supposes that action happens once these preconditions have been fulfilled - that is, once means and ends can be distinguished, once there are collectively given values, and once there is an actor available to execute the action. The actor is only one moment in the realization of action. One might say that he occupies his place merely accidentally. For someone else could also execute this particular action - but some sort of readiness for action, some sort of concretization of an action potential, must occur in a society for action to happen. Thus, it is not action that is subordinated to the actor. Rather, the actor is subordinated to the action.” (Luhmann, 2013, 9.) The individual performs social actions to satisfy his needs and he performs those actions of his own free will. But the needs themselves (the majority of them) in him are generated by society, as well as the means and conditions for their satisfaction, society provides him, that is, the system of social actions itself. Therefore, a person is free in his decisions and actions, but not free in the formation of needs. His needs are imposed on him (as well as the possibilities for their satisfaction are provided to him) by the social and cultural environment in which he is born and formed as a person. But the epoch, ethnos, culture, society and microsocial environment in which he is born does not depend on him. Although each individual in a certain range is given the opportunity to freely choose their roles, functions and scope of activity, depending on individual abilities and interests. But the range of alternatives itself does not depend on it. Ultimately, the separate individual and his activity depend on the system, and not the system on the separate individual. The system is formed and depends only on the totality of social actions of many individuals.

an associated function. Thus, this mechanism preserves the existing intra-system organization of social actions and, hence, the integrity and stability of the system.

The product of each action gives rise to real opportunities to meet new needs. It is these new opportunities that excite new real needs, and transform potential needs into actual ones, on the basis of which new goals are formed and new actions are performed. It is with the help of actual needs that the spiritual energy that underlies any expedient action is generated. It turns out that as a result of each action, not only the satisfaction of one or another need occurs, but also new needs are born along with the possibilities of their satisfaction. That is, as a result of each action, all the prerequisites for subsequent actions are generated. It is an endless process of self-generation of the system of social actions.¹⁵³

4. Neural network of economic actions

1. The result of each action is obtained through the interaction of *many* means and conditions, and the result obtained is itself *one* of the means or conditions for realizing other goals and obtaining other results. Similarly, each economic agent and each industry, under the division of labor, specializes in the production of *one* type of good, but for this they must consume *many* other types of goods, *each* of which is also produced as a result of the consumption of *many* other types of goods. On the other hand, the produced good will also be used in the production of various other goods. At the same time, in the production of each of them, it will be only *one* of the resources among many other resources needed for production. And since each agent produces for others and consumes what others have produced, a necessary link in their activity, along with production, is the exchange of goods due to which the actions of all agents are interconnected into a single system that has a network pattern.¹⁵⁴

¹⁵³ “Autopoiesis is a notion that requires systemic closure. That means organizational, but not necessarily thermodynamic, closure. Autopoietic systems are thermodynamically open, but organizationally closed. Without going into details I would like to mention that the concept of closure has recently become very popular in mathematics by calling upon a highly developed branch of it, namely, Recursive Function Theory. One of its concerns is with operations that iteratively operate on their outcomes, that is, they are operationally closed. Some of these results are directly associated with notions of self-organization, stable, unstable, multiple and dynamic equilibria, as well as other concepts” (Foerster, 2003, 281).

¹⁵⁴ The very principle of the division of labor, which underlies the market system, implies that each agent specializes in the production of one product, and for this it consumes many other goods produced by other agents. At the same time, the exchange of goods becomes a necessary link in the functioning of the economy. As a result of this organization of the economy, relations between agents (as well as relations between actions) have a network pattern, reminiscent of the neural network of the brain or living organisms. “... more and more researchers began to use network terminology to explain the modern realities of social life. Whatever network is considered ... the central point is always the structure of the network's relations - the model of connections, represented in the form of patterns of interaction of social actors. ... Social network subjects can be both individual members of society and collective social associations, which allows researchers to consider a wide range of structures - from micro to macro level. ... The network structure includes not only social subjects, the connections between them, but also the resource flows that network members exchange with each

“Whenever we encounter living systems-organisms, parts of organisms, or communities of organisms-we can observe that their components are arranged in network fashion. Whenever we look at life, we look at networks. ... The first and most obvious property of any network is its nonlinearity- it goes in all directions. Thus the relationships in a network pattern are nonlinear relationships. In particular, an influence, or message, may travel along a cyclical path, which may become a feedback loop. The concept of feedback is intimately connected with the network pattern.” (Capra, 1996, 82.)

The network of economic actions, like a neural network, consists of many elements of the same type and is organized according to the principle of neural networks of living organisms or the brain.

2. In a neural network, each neuron is connected through its dendrites to the axons of other neurons, and through its axon to the dendrites of many other neurons. Due to this configuration of connections, each neuron is either directly or indirectly connected to all other neurons. As a result, we have a closed system in which all neurons are interconnected.

According to a similar scheme, the economic actions of subjects are interconnected, as well as various branches of the economy. The market prices of produced and consumed goods are analogous to the *weight coefficients* of interneuronal connections. Such networks are non-linear in nature. However, unlike a neural network consisting of the cells of a living organism, the network of economic actions is not a material object. Action is a process. Accordingly, the network of economic actions has a procedural nature, exists in the form of a network of interrelated processes.¹⁵⁵

Concrete action is a single act or process existing in time. It appears once, performs its function and disappears. Although actions cannot be stored in time, the types of relationships between certain actions are preserved, in the form of *relationships* between the functions they perform. Some actions disappear after they have performed their functions, but instead of them new actions appear that perform the same functions. Moreover, the functions of all actions are interconnected in a strictly defined sequence, closing in a circle. Schematically, this can be represented as follows: production - exchange - consumption - production - again exchange, etc.

other. ... Today, network theory, which is a complex, generalized system of views on social life and human experience, is one of the most influential trends in modern sociological thought. In our opinion, this is due to the fact that, firstly, the network theory allows one to go beyond traditional explanatory schemes, presenting the structure of interactions and its emergent properties as the main determinant of social behavior. Secondly, it makes it possible to study connections at all levels, from interpersonal relations to the world system, thereby presenting social reality in the form of a network space and establishing an analytical connection between the daily activities of individuals and heterogeneous social changes.” (Knyazeva, 2006. 82-88.)

¹⁵⁵ “In the development of systems thinking during the first half of the century, the process aspect was first emphasized by the Austrian biologist Ludwig von Bertalanffy in the late 1930s and was further explored in cybernetics during the 1940s. Once the cyberneticists had made feedback loops and other dynamic patterns a central subject of scientific investigation, ...” (Capra, 1996, 42.)

3. At the same time, the actions are interconnected by "weak ties". Therefore, the actions of various subjects can potentially perform one and the same adjacent function. That is, it does not matter who specifically performs the action, it is only important that it performs the required function. For example, it doesn't matter who buys the product being sold, or who sells this or that product, who produces or who consumes, etc. The only important thing is that all the commodities that are consumed will be produced and that all the commodities that are produced be consumed. Accordingly, it is important that all those goods for which there is a demand be supplied, and that there is a demand for all those goods that be supplied, etc. And in case of discrepancy between them, in the order of self-regulation, forces arise that bring them into line.

In this process, actions give birth to actions, thereby forming a network that, standing out against the background of everything that is not an economic action, delimits itself from everything else, and already by this creates its own border. "An important characteristic of living systems is that their autopoietic organization includes the creation of a boundary that specifies the domain of the network's operations and defines the system as a unit." (Capra, 1996, 98-99.) As has been shown, the economy is a system of economic actions that has a network structure. The network of actions and the actions themselves give birth to each other in the mode of continuous functioning of the system. There is a self-production of the system.

4. Accordingly, the fractal character of actions acquires great importance. Due to the fact that each economic action can potentially take any specific form of economic action (production, consumption, purchase, sale, investment, etc.), this action takes the exact form that the adjacent action that generates it imposes on it. Each action performs a certain function, which gives rise to another action that performs some other function, but is associated with the function of the previous action. For example, under the conditions of the division of labor - production gives rise to supply, supply - gives rise to demand, demand - to purchase, purchase - to consumption, and consumption is again production, etc. They are all actions and have the same teleological structure, and represent the unity of goal, means and result. All this is possible because each action has a fractal nature and can potentially perform any function that the action that generates it imposes on it.

5. Each action generates "its other" action and is itself generated by other actions, for it is itself "its other" for "its other". Due to this, they reproduce the structure of the system. The functionally closed structure of the system, or the circular organization of intrasystem functions, is reproduced by the very sequence of actions performed. For the reproduction of this sequence of actions is conditioned by the very functions that are performed by each of these actions. The sequence of actions determines the reproduction of the circular organization of functions. And their circular organization determines the sequence of the actions themselves. This is due to the fact that each action generates "its other" action, which performs exactly the function that is the necessary link for the reproduction of the circular organization of functions.

6. In a decentralized economy, the actions of subjects are interconnected by "weak" ties. Under conditions of competition, these connections between the actions of specific subjects constantly arise and disappear, are replaced by new ones, because they have many alternatives. This allows actors, along with changing market conjuncture or other social or

natural conditions, to constantly find more profitable partners, break contracts and establish new connections, etc. Due to the presence of "weak links" between actions, the implementation of patterns of functional relationships can be carried out through a huge variety of alternative trajectories, chains of economic actions of various subjects, due to which *feedback loops* appear in the system.

"A feedback loop is a circular arrangement of causally connected elements, in which an initial cause propagates around the links of the loop, so that each element has an effect on the next, until the last "feeds back" the effect into the first element of the cycle The consequence of this arrangement is that the first link ("input") is affected by the last ("output"), which results in self-regulation of the entire system, as the initial effect is modified each time it travels around the cycle. (Capra, 1996, 56-57.)¹⁵⁶ The concept of self-organization arose from the awareness that the *network* is a pattern inherent in life as such; this concept was further developed by Humberto Maturana and Francisco Varela in their theory of autopoiesis. The society is also an autonomous system, and the social life and economic activity of the society has a network character.

5. Operational closure and causal openness

1. N. Luhmann uses the concept of operational or functional closure to explain how order is born in social systems. Each subsystem can function normally only if all other subsystems also perform their functions normally. This means that all functions performed by various subsystems in society are interdependent and necessary for each other and for the system as a whole. This also applies to the economy. All its branches and each action perform certain functions that are necessary for other branches and for other actions. They are functionally interconnected and constitute a functionally closed whole. "By "closure," I do not mean thermodynamic closure but only operational closure, which means the recursive enablement of a system's own operations through the outcomes of its own operations." (Luhmann, 2012, 51.)

2. Operational or functional closure implies that the performance of one function is a condition for the performance of another function. Thanks to this, self-reference and, accordingly, self-determination of the system takes place. That is, recursive operations appear in the system, which are the basis of the autonomy of the system. At the same time, operational closure is not a deliberate result of the actions of any actor. Operational closure is self-reproducing by the fact that each economic action logically gives rise to "its other" action. And this chain of interconnected functions is transformed into a closed system in

¹⁵⁶ "Wiener and his colleagues also recognized feedback as the essential mechanism of homeostasis, the self-regulation that allows living organisms to maintain themselves in a state of dynamic balance. ... Thus the concept of the feedback loop introduced by the cyberneticists led to new perceptions of the many self-regulatory processes characteristic of life. Today we understand that feedback loops are ubiquitous in the living world, because they are a special feature of the nonlinear network patterns that are characteristic of living systems. The cyberneticists distinguished between two kinds of feedback-self-balancing (or "negative") and self-reinforcing (or "positive") feedback." (Capra, 1996, 58-59.)

which all functions give birth to each other.¹⁵⁷ Unlike individual actions, which, having once arisen and having fulfilled their function, disappear forever, these functions themselves and their interconnections remain as long as the system itself exists. Thus, the continuity of the fulfillment of all interconnected functions is maintained due to one-time appearing and disappearing actions.

3. As a result of the circular organization of these functions, the sequence of actions performed is repeated indefinitely as long as these functions are performed and, therefore, as long as the economic system exists. It turns out that the circular organization of functions gives rise to such a sequence of actions, due to which the functions performed by these actions have a circular organization and form a closed structure. But this just means that the functioning of the social system depends on itself. And dependence on oneself is autonomy (i.e. independence). Functional or operational closure is the basis of this autonomy.

4. Social actions correspond to certain causal processes in the empirical world. But social actions and causal processes exist in different dimensions. Social actions are perceived in the teleological frame of reference, and causal processes in the spatio-temporal frame of reference. (См. Парсонс, 2002). It makes no difference, from the empirical point of view, whether chance or the mind and will of man determined these causal processes; whether they meet human needs or not. In the real world, what happens is that one type of matter and energy is converted into another. All these transformations obey the laws of nature. But whether they will be provoked by chance or human will - this does not affect the course of the process itself.

5. The results of some actions become means for realizing the goals of new actions. And the results from the realization of new goals will be means for the following goals, and so on. Thus, all economic actions, as teleological structures, are functionally or organizationally interconnected by their goals, means and results and form a closed self-referential system. Thanks to this circular organization of interconnections, the system of economic actions depends only on itself and as such is an autonomous system. But the empirical processes through which these actions are realized do not represent any closed structure. These processes are included in the usual causal relationships with external reality and are subject to objective natural and social laws. Therefore, the empirical processes through which the economic system is implemented are causally interconnected with natural and social processes outside this system. In this sense, the economy is an *organizationally closed*, but *causally open* system of economic actions. In other words, economic actions as teleological structures are connected only with each other, and the causal processes through which they are implemented are connected with the external environment.

6. On the basis of economic values, a person makes decisions and performs actions, and on the basis of these actions, some objects are transformed into others. Economic values are

¹⁵⁷ “You all know about the unprecedented successes of the recursive functions that are in constant use in chaos theory and indeed elsewhere. But I have the feeling that these results of chaos research can be applied by sociology only metaphorically. Why? All chaos research is concerned with functions, and functions are only relations between numbers, at best, complex numbers. ... It operates only on numbers, but sociology doesn't work with numbers: sociology is interested in functions. And functions of functions one calls functors. A functor is, so to speak a system that is intended to coordinate one group of functions with another group, ...” (Foerster, 2003, 306).

the teleological attitudes of the subject to objects, reflecting the degree of accordance of the objects transformed by him to his needs. And the *transformation coefficients* show the proportions according to which, as a result of his actions, some objects are transformed into others. These proportions are determined by the person's knowledge and needs. Thus, with the help of the system of economic values and transformation coefficients, economic actions transform the objective reality in accordance with the system of the subject's needs.

7. Economic values determine economic actions, and these, in turn, determine certain causal processes (physical, chemical, biological, etc.) that change reality. As a result of these empirical processes, both the person and his environment change. But as a result of a change in the environment and the person himself, his needs and his values also change, including economic values. For, as indicated above, value is nothing but the teleological attitude of a person to the existing reality, in which he sees the possibility of satisfying his needs.

A person acts under the influence of his values and decisions. And being a living organism and, as such, a part of objective reality, it is included in causal interactions with other objects and purposefully causes changes in them in accordance with its needs. At the same time, he seeks, with the help of a system of values, to carry out such actions, and change reality in such a way that the even-utility of costs is achieved, as a sign of the optimal satisfaction of all needs by the available opportunities. At the same time, a person selectively reacts to changes in the external environment. For changes in it are carried out not only by his economic actions but also by other processes that he perceives as random external factors (natural processes, natural disasters, influences on the economic subsystem of other social subsystems - political, legal, moral, etc.).

8. Impulses received under the influence of causal processes from the external environment experience a specific continuation within the system of actions in accordance with the peculiarities of the structure of intrasystem functional connections, which has a "circular" organization. "The thesis states that systems are operationally closed. They rely entirely on internal operations. Now, this formulation could give rise to the suspicion that all of this is merely a return to the old thesis of closed systems and thus to the problem of entropy. But this is not the case. For within the theory of operational closure one must now distinguish between operation and causality." (Luhmann, 2013, 64.) In other words, the system begins to respond in a specific way to the influences of the external environment and, accordingly, it also begins to specifically influence its external environment by transforming "input" impulses into "output" impulses in a peculiar way.

9. Although in the process of development the degree of autonomy of the system gradually increases, but the open system always remains only partially autonomous. That is, it depends on the external environment only in some aspects, but in other aspects it does not depend on it. "... it is not possible to assume a zero-sum principle in these matters, according to which a system's independence from its environment increases to the same degree as its dependence on it decreases. Numerous experiences indicate that very complex systems that are highly autonomous (if one may relativize this word) increase equally their independence and their specific dependencies. In modern society, the economic system, the legal system, and the political system possess a high degree of independence but also an equally high degree of dependence on their respective environments. If the economy is not booming, political difficulties ensue. And when politics is not able to provide certain securities - say,

via the legal system - or if politics intervenes too massively, this becomes a problem in the economy. Returning to the thesis of operational closure, we cannot help but distinguish between causal in/ dependence, on the one hand, and self-generated operations, on the other." (Luhmann, 2013, 82-83.)

The system reacts only to certain external factors and is indifferent to other factors occurring in the external environment (if they do not destroy the system). Therefore, not all influences can be considered as "inputs", but only a small part of them. In this sense, the system is closed, because causal processes from the outside world do not penetrate into it. It is open in the sense that it is not isolated from the external environment. Thanks to values, it selectively reacts only to changes in the external environment that are important for the system. At the same time, it ignores all other external factors that do not have any significance for the system.

6. Self-reference

1. Operationally closed systems are self-referential systems that are studied by synergetics, constructivism and second-order cybernetics. Such systems have unique properties. Louis H. Kauffman classifies such systems as "reflexive domains". "Reflexive" is a term that refers to having an object's connection to itself. A person can be aware of his own thoughts. The organism produces itself through its own action and its own production. The market or the financial system is made up of actions and people, and the actions of these people affect the market in the same way that global information from the market affects the actions of people. "Reflexive" is a term that refers to the presence of a relationship between an entity and itself. One can be aware of one's own thoughts. An organism produces itself through its own action and its own productions. A market or a system of finance is composed of actions and individuals, and the actions of those individuals influence the market just as the global information from the market influences the actions of the individuals. Here it is the self-relations of the market through its own structure and the structure of its individuals that moves its evolution forward. Nowhere is there a way to cut an individual participant from the market effectively and make him into an objective observer. His action in the market is concomitant to his being reflexively linked with that market. It is just so for theorists of the market, for their theories, if communicated, become part of the action and decision-making of the market. Social systems partake of this same reflexivity, The existence of fixed points for arbitrary transformations shows us that the domain we have postulated is indeed very wide. It is not an objectively existing domain. It is a clearing in which structures can arise and new structures can arise. A reflexive domain is not an already existing structure. To be what it claims to be, a reflexive domain must be a combination of an existing structure and an invitation to create new structures and new concepts. The new will become platforms from which further flights of creativity can be made. Thus in the course of examining the concept of reflexivity we will find that the essence of the matter is an opening into creativity." (Kauffman, 2009, 121.)

A good example of reflexive relations is the dependence of the cognition of economic reality on the results of cognition. Actor and reality change each other in the process of interaction. After all, as a result of observations, the subject receives knowledge about reality. The actions of the subject cannot be the same before and after obtaining new knowledge about the existing reality. Along with the change in knowledge, the nature of these actions also changes. It is also obvious that the results of observations, i.e. knowledge cannot remain unchanged before and after the actions of the subject, because the observed reality changes as a result of his actions.¹⁵⁸

2. In operationally closed systems, recursive operations are carried out. Recursive operations mean that the result of each operation is the basis for performing the next operation. A recursively performed function calls itself endlessly. They seem to blur the line between cause and effect.

“First of all, the idea of closed circular causality has the pleasant characteristic that the cause for an effect in the present can be found in the past if one cuts the circle at one spot, and that the cause lies in the future if one does the cutting at the diametrically opposed spot. Closed circular causality, thus, bridges the gap between effective and final cause, between motive and purpose. Secondly, by closing the causal chain one also appears to have gained the advantage of having gotten rid of a degree of uncertainty: no longer does one have to concern oneself with the starting conditions—as they are automatically supplied by the end conditions.” (Foerster, 2003, 230).¹⁵⁹

3. An interesting feature of such systems is that they have so-called "eigen-forms", "eigen-values", "eigen-behavior". The fact is that in the processes of interaction of such a system with the external environment there is no one-to-one correspondence between "input" and "output". The reaction of such a system to the impact of the external environment depends not only on the nature of this impact, but also on the state of the system itself, which, in turn, is determined by the previous state and previous impacts of the environment. And the output reaction affects its subsequent change. That is, “output” is not a direct reaction to “input”.

¹⁵⁸ “.... social systems are quite different from physical systems. When theories of physical phenomena change, we assume that the phenomena themselves do not change. For example, when physicists changed their thinking from classical Newtonian mechanics to quantum mechanics, the behavior of atoms did not change. But when theories of social systems change, social systems operate differently. For example, the theories of Adam Smith, Karl Marx, John Maynard Keynes, and Milton Friedman did change the way social systems operated. Hence, in the social sciences there is a circularity or a dialogue between theories and phenomena. This circularity does not occur in the natural sciences, or at least not in the same way. Our use of technology affects the environment, which leads to new technologies, but theories in the natural sciences remain mostly unchanged.” (Umpleby, 2001, 2.) “Social sciences like economics differ from the hard sciences in that beliefs affect reality: beliefs about how atoms behave don’t affect how atoms actually behave, but beliefs about how the economic system functions affect how it actually functions.” (Stiglitz, 2012, 91)

¹⁵⁹ “To be sure, this is the case, but the matter is anything but simple: only certain values of those conditions provide a solution for the processes within the circle; the problem has become an “Eigen-value” problem. What also causes complication is that now the suspicion will be raised that the whole matter of circular causality might be mere logical mischief. We already know this from the theory of logical inference—the infamous vicious cycle: cause becomes effect and effect becomes cause. It is my intent not only to liberate the “*circulus vitiosus*” from its bad reputation,⁶ but to raise it to the honorable position of a “*circulus creativus*”, a creative cycle. (Foerster, 2003, 230).

The "output" depends on the structure of the system, its current state and those recursive processes that were initiated by the previous "input". Such behavior of the system acquires the character of "eigen-behavior" and it is no longer a reaction to external influences in the truest sense of the word. According to the closure theorem, as H. Foerster writes: "The closure theorem: "In every operationally closed system there arise Eigen behaviors." (Foerster, 2003, 321).

4. A characteristic feature of recursive processes is that when the system deviates from a certain state, they return the system to its previous state. An example from the field of economy is recursive pricing processes. Goods are produced by goods. Accordingly, the prices of goods produced are formed on the basis of the prices of goods consumed. At the same time, for the production of final products, the consumption of primary resources is necessary, and for the reproduction of primary resources, the consumption of final products is necessary. Therefore, as was shown in the "Symmetric Model", the prices of final products depend on the prices of primary resources, and vice versa. In other words, pricing is a recursive process. Formally, this can be expressed as follows: $p = F(p, v)$; $v = G(v, p)$; where: p – prices of final products; v - prices of primary resources.

In "Understanding understanding" (2003), H. von Förster gives similar formulas $x' = D(x, u)$, and $u' = S(u, x)$, in which the variables (x, u) are represented as functions of themselves . You can also take into account the passage of time by entering the parameter "time" in the form of an increasing sequence of time units: t is the current period, $t+1$ is the next unit of time: $x_{t+1} = D(x_t, u)$, and $u_{t+1} = S(u_t, x)$. Further he writes: «Those of you who are occupied with chaos theory and with recursive functions will recognize at once that these are the fundamental equations of recursive function theory. Those are the conceptual mechanisms with which chaos research is conducted; it is always the same equations over and over again. And they give rise to completely astonishing, unforeseen operational properties. Viewed historically, even early on one noticed a convergence to some stable values. An example: if you recursively take the square root of any random initial value (most calculators have a square root button), then you will very soon arrive at the stable value 1.0000. . . . No wonder, for the root of 1 is 1. The mathematicians at the turn of the century called these values the "Eigen values" of the corresponding functions. To the operation of taking roots belong the Eigen values 1 and also 0, since any root of 0 is 0. The essential difference between these two Eigen values is that for every deviation from 1, recursion leads the system back to 1, while at the least deviation from 0 the system leaves null and wanders to the stable Eigen value "one".» (Foerster, 2003, 315-316.).

As in the above example, the actual prices "tend" to the equilibrium prices, more precisely, the equilibrium prices are "attractors" for the actual prices. Thanks to this, the entire economic system moves towards equilibrium, as towards its "eigen-state". And although, due to the variability of the external environment, the economy cannot reach an equilibrium state and constantly deviates from the trajectory leading to it, but recursive processes constantly return the system to the previous trajectory.

5. Physicist, biologist and cybernetician H. von Foerster scientifically described the processes occurring in a closed system, which are recursive in nature and with the help of which "eigen-values" appear. It turned out that in social behavior, as well as in biological processes and in mental processes occurring in individual and collective consciousness, one

can find something similar to "eigen-values" - a kind of analogue of "fixed points" ("attractors") well known from mathematics and physics.

In his book „Understanding understanding” (2003) H. Foerster gives examples of recursiveness, with the help of which he tries to show what conclusions follow from the scientific concept, according to which the actions of the subject are recursive. He convincingly shows that “eigen-values” are formed by themselves exclusively as a result of recursive processes, exist only in the perception of subjects and in intersubjective space. They don't exist in the real world.

“... Eigenvalues represent equilibria, and depending upon the chosen domain of the primary argument, these equilibria may be equilibrial values (“Fixed Points”), functional equilibria, operational equilibria, structural equilibria, etc.

... that Eigenvalues, because of their self-defining (or selfgenerating) nature imply topological “closure” (“circularity”) ...” (Foerster, 2003, 265)

“Ontologically, Eigenvalues and objects, and likewise, ontogenetically, stable behavior and the manifestation of a subject's “grasp” of an object cannot be distinguished. In both cases “objects” appear to reside exclusively in the subject's own experience of his sensori-motor coordinations; that is, “objects” appear to be exclusively subjective? Under which conditions, then, do objects assume “objectivity?” (Ibid., 266). “Apparently, only when a subject, S1, stipulates the existence of another subject, S2, not unlike himself, who, in turn, stipulates the existence of still another subject, not unlike himself, who may well be S1. ... With this I have returned to the topology of closure where equilibrium is obtained when the Eigenbehaviors of one participant generate (recursively) those for the other ... and where cognition computes its own cognitions through those of the other: here is the origin of ethics.” (Ibid., 267).

6. Indeed, a product of production becomes a commodity only if its production and exchange for other commodities (or money) is constantly repeated. If this is not a constantly recurring action, if the product was not created specifically for sale and the exchange occurred once as a result of a combination of random circumstances, then such a product is not yet a commodity. And production itself is *commodity production* if it is a constantly repeating process. And the exchange ratio between commodities becomes the *market price*, only as a result of constantly repeating acts of exchange, and exists in the minds of subjects as an abstraction, as a number, as an indicator of the exchange ratio, as a coefficient of exchange.

It seems to the actors (observers) that production, goods, money, etc. – that all this exists objectively, independently of them. But in fact, they exist only in the minds of the subjects and only due to their repeated interactions. Due to repeated perceptions of certain phenomena, they take the form of concepts, evaluations, ideas, and symbols in the mind of the subject. And all of them acquire meaning only in mutual connection, forming a more or less consistent, coherent system of concepts, ideas and values. They just represent a "logical

framework" that allows us to think and build models of external reality, to which we do not have direct access.

7. The interaction of a person as a living organism, as one of the really existing objects, with other objects, obeys the laws of nature, is based on *causal relationships* and takes place in the real world. However, these objects (including the body of the person himself), and the interaction between them, are presented in the human mind in the form of ideas, concepts, representations, mental constructs. For in consciousness there can be nothing but these ideal entities.

Consciousness cannot go beyond its limits and observe itself against the background of everything else. Therefore, it does not see the difference between itself and the external environment. But since the boundary cannot be seen if one does not cross it, the consciousness does not see its boundary from within, does not see where it ends and where something else begins. Therefore consciousness is boundless for itself. Therefore, his ideas about individual objects and about reality as a whole seem to him to be direct reality, and not his subjective ideas about them, but not his own created model of reality, about which he does not and cannot have reliable knowledge.

The adequacy of his ideas about individual phenomena of reality is subjectively assessed by the degree of their consistency with each other; between them and his complete picture of the world. The subject constantly coordinates his ideas, models and values in the hermeneutic circle of transitions from the perception of parts to the meaning of the whole and clarifying the understanding of parts from the standpoint of the whole. Thus, in all processes of consciousness, it refers to itself. Self-referencing of consciousness is based on recursive processes.

Similarly, the self-reference of social consciousness occurs. But here it takes on an intersubjective character and is realized through communications, as a result of which social ideas, norms and values are formed. Here, the knowledge and representations of various subjects must confirm each other in the social space and serve as a sign of the reliability of the knowledge, representations, values, and other mental entities that dominate in society. Without this, the subjects could not coordinate their actions (including economic actions), realize joint interests. Also, in a recursive form, the relationship between individual and social values, unit and market prices, etc. is carried out. Thanks to recursive processes and self-reference, social consciousness is unified and infinite, formed from various ideal entities.

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