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FINANCIAL SYSTEM: IN SEARCH OF A NEW PARADIGM

The article offers a new approach to the financial system studies and considers its elements and their particular functions. The application of the methodological apparatus of the systems theory made it possible to distinguish a system-forming factor which is represented by the exchange in the financial system. The category "architectonics of the financial system" has been introduced to describe the in-system relations and the cash flows dynamics. There has been determined the approach to the financial system studies basing on its three-dimensional area stipulated by risk, return and information. The role of trust in the financial system has also been put under consideration and its application for measuring information has been grounded.

Keywords: financial system architectonics; trust; a system-forming factor; information.

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ФІНАНСОВА СИСТЕМА: У ПОШУКАХ НОВОЇ ПАРАДИГМИ

У статті запропоновано новий підхід до дослідження фінансової системи. Описано її елементи і визначено роль кожного з них. На підставі застосування методологічного апарату теорії систем виділено системоутворюючий чинник, яким у фінансовій системі є обмін. Для опису зв'язків усередині системи і руху фінансових потоків введено категорію «архітектоніка фінансової системи». Запропоновано підхід до розгляду фінансової системи, що ґрунтується на її дослідженні в тривимірному просторі, визначеному ризиком, прибутковістю та інформацією. Розглянуто роль довіри у фінансовій системі і обґрунтовано її застосування як вимірника інформації.

Ключові слова: архітектоніка фінансової системи; довіра; системоутворюючий чинник; інформація.

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ФИНАНСОВАЯ СИСТЕМА: В ПОИСКАХ НОВОЙ ПАРАДИГМЫ

В статье предложен новый подход к исследованию финансовой системы. Описаны её элементы и определена роль каждого из них. На основании применения методологического аппарата теории систем выделен системообразующий фактор, которым в финансовой системе является обмен. Для описания связей внутри системы и движения финансовых потоков введена категория «архитектоника финансовой системы». Предложен подход к рассмотрению финансовой системы, основывающийся на её исследовании в трёхмерном пространстве, определённом риском, доходностью и информацией. Рассмотрена роль доверия в финансовой системе и обосновано её применение в качестве измерителя информации.

Ключевые слова: архитектоника финансовой системы; доверие; системообразующий фактор; информация.

Introduction. The development of the global financial crisis of 2007–2008 moved into the recession the national financial markets and caused depression in real world economy. These events put forward the problem of what the financial system is: a transmission mechanism that transmits the crisis into a national economy or a sustainable institution protecting national economy from global financial turmoil. These diametrically opposite points of view establish the ground for the research field which requires the development of a new paradigm of the financial system.

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The current scientific thought i.e. the developments in behavioural finance, econophysics, methodology of flexible systems offer the methods for analyzing and solving the problems of the financial system.

The urgent scientific problem to be solved by the science of finance is working out the prescriptive definition of financial system with the help of the methodological tools of the systems theory and the updated categorical apparatus of the science of finance.

Understanding of the current financial system is still presented in terms of descriptive definition. That is why the fundamental and applied researches are of aspective, sectorial nature.

The descriptions of financial market processes are not limited by the determination of their influence on the budgetary sphere, the dynamics of economic entities development is not followed by revealing the changes in other elements of the financial system.

The absence of the system approach when considering the financial system and its elements does not give an opportunity to define the dynamics of changes and the perspectives of the whole system growth.

It is not possible to expose connections between its elements, to describe current changes and estimate how much they influence the whole system.

The indicated problems substantially limit the possibilities of revealing the current processes in the financial system, determination of the system deformations and make it impossible to forecast its development with any certainty.

Literature review. *The research is based on the works* by the IMF researchers (Vinals et al., 2013), by Romanian scholar A. Iancu (2011) which present the basics of contemporary understanding of the financial system by economists from developed countries and also an analysis comparing the financial systems of different countries.

When analysing the sector of public finance there have been used the works by C. Zaman (2011) and when considering the role of households we refer to G. Becker (1976). The selection of the trends of public systems progress is built on (Baudrillard, 1998), where the principles of the consumption society are revealed. D. Korten (1995) described the tendencies of the financial economy functioning, while H. Minsky (1977) offered the alternative hypothesis on the financial system instability. We also referred to the works by social scientists (Bradach and Eccles, 1989; Gambetta, 1988; Ostrom, 1998; Seligman, 1997) to provide the ground for the research on trust as an element of financial system and its role in the society. The works by L. Hurwicz (1960), E. Maskin (1977) and R. Myerson (1981) outline the development of the financial system functioning on the basis of conceptually new principles of its understanding.

The goal of the research paper is to work out the theoretical approaches to the prescriptive definition of financial system and introduce new categories which enable studying the financial system in terms of the system theory.

To achieve the goal the following tasks have been set up:

- to define the system-forming factor of the financial system, estimate its role and decisive character in managing the financial resources flow within the financial system;
- to work out the apparatus critic us to study the system construction of the financial system and ground the necessity and expediency of its application in further scientific researches;

- to differentiate between the environment around the financial system and the space in which it operates;
- to consider the compensatory mechanism of financial decision-making in terms of asymmetric information made by economic agents carrying out their activity in the financial system.

The novelty elements of the article are as follows:

1. The system-forming factor of the financial system is the exchange of goods and services within the society. Exchange as a public phenomenon suggests the formation of the system of financial resources flow which in fact leads to the financial system emergence and development.

2. There has been introduced the term "financial architectonics" defined as a special mechanism of the financial system responsible for its inner nature which provides efficient financial flows accumulation and movement.

3. The space of financial system functioning has been given theoretical grounding as a range of possible responses of the financial system elements defined by risk, return and information. Transition to the three-dimensional space and information as one of the parameter to measure the financial system can be considered as innovative elements of this paper.

4. The role of trust as a mechanism allowing economic agents make financial decisions under asymmetric information. Under these conditions trust acts as a means of measuring the subject's attitude to information in the space of the financial system functioning. The difference of the suggested approach from the existing scientific ideas is that trust is considered as an element of the space suggested by the author where the relations of trust are treated jointly in relation to risk and return.

Key research findings.

1. Elements of the financial system. Functional definition of the financial system, based on the interaction of institutional units and markets was given in the Financial Soundness Indicators Compilation Guide (2007), developed by the IMF (Vinals et al., 2013) analyzed the creation of a secure financial system in terms of the structural changes. The stability of the financial system as one whole unit depends on the stability of each element. C. Zaman (2011) developed a method of public finance sector assessment. Conclusions reached by this scientist about the excessive debt can be extrapolated to the entire financial system. A common problem for all the elements of financial system is the increase in the proportion of debt financing. The unity of the problems of the elements of financial system can be explained by the circulation of financial flows within the system. If cash flow is generated by debt resources, multiplication of debt component occurs in the process of its circulation, thus, public finance, financial intermediaries, firms and households are drawn into the debt economy and risks transition takes place at financial market.

A new concept of the financial system and its role in the modern network society should be based on the best scientific developments of different schools of economic thought. The issue of the relationship of state regulation and market mechanisms is one of the central issues of economics of the past, present and future. Market is the basis for building-up an economic system that seeks sustainable development.

Let us consider the elements of financial system and give a brief description of each of them.

The state, along with the establishment of the "rules of the game" for all participants at financial market, plays an active part in financial system as an organizer and performer of budget process, the conductor of social protection and the owner of public sector enterprises. In the financial system the most active participants are financial corporations that form the sector of financial intermediation. It is the financial intermediaries that implement various forms of investment. According to (Minsky, 1977) there are three of them: hedge or secured, speculative and Ponzi finance. So it is the financial intermediation sector where the fragility of the financial system is formed, stipulated by its functioning. Accordingly, crises have not exogenous but endogenous nature and are the results of the financial system functioning. Firms provide and receive financial resources by buying or selling financial assets and are indirectly represented at the financial market.

Companies enter the financial relationships with households by paying wages. Households play an important part in the financial system: along with businesses they obtain and provide financial resources through financial intermediaries, use budgets of all levels aimed for social protection and they are the ultimate consumers of financial products and services. The role of households in the financial system is generally underestimated and limited to supplying and receiving financial resources. The problems of human behaviour from the perspective of economic approach have been studied by (Becker, 1976). Households as an element of the financial system perform a very important institutional role – build up a relationship of depersonalized public confidence in the financial system. Today's financial instruments are becoming more virtual, having no value, abstract, detached from the real sector. D. Korten (1995) focuses on the detection of changes in the market value of financial assets without changing their real value. The possibility to change the market value of financial instruments under the influence of speculative tendencies without regard to the actual valuation of assets by the issuer, in fact, cuts apart the financial market from the rest of the financial system and from the real sector of the economy. The emergence of virtual capital existing only in the form of prices for securities breaks the connection between the financial market and other elements of the financial system. Virtual value circulation, on the one hand, closes the financial market space in itself, but, on the other, affects the whole economic system. The development of financial innovations and financial institutions promoting new financial products is the systemic condition for financial crises as it leads to the confusion of assets and liabilities, debt instruments and property. The formation of network society has transformed the financial system from the area serving the real economy by providing loans and other financial services into the main part of the economic system where the change in the value of financial assets takes place.

Financial crisis refuted completely the common notion of "too big to fail" by the example of bankruptcy of "Lehman Brothers", sales under the threat of bankruptcy of one of the largest US investment banks "Bear Stearns" and "Merrill Lynch" and significant losses which led to management change in "Citigroup".

In this case, financial market signals are distorted by irrational expectations of financial intermediaries. Asymmetric information distribution conditions standard for the financial market, as shown in (Hurwitz, 1960; Maskin, 1999; Myerson, 1981) are distorted, causing in turn, the deformation of economic mechanisms.

2. The system-forming factor of the financial system. The first stage of the systemic research presupposes determining the basic interactions of the backbone factor with the environment where the financial system operates. As a result of this interaction the basic elements are formed and combined in the environment. During the primary consolidation settlement, a backbone factor deprives the elements of the degrees of freedom, but due to the synergistic effect and the emergency the number of the degrees of freedom becomes greater than the sum-total of the degrees of freedom of the elements before their joining the system. The new concept of financial system should be based on identifying such unifying elements that will enable applying the categories of the system theory. The problem of determining the system boundaries requires separating the system from its environment. In terms of complex systems this problem is often solved by means of arbitration. Defining the system-forming factor is a straightforward method to determine the system boundaries.

This operation is an important methodological tool which gives an opportunity to sort out the elements related to the financial system from non-relevant elements. determining the backbone factor enables, in terms of methodology, to consider the historical stages of the financial system development as well as work out its development prospects. When selecting the elements of the financial system, finances act as a common element by which the primary selection is carried out. The system-forming factor which joins and consolidates financial institutions into a single integrated system is the relationship of exchange at the social level. Regarding the financial system, it can be said that the factor that formed it reduces the number of possible reactions of each of its elements in particular, creating a greater number of the degrees of freedom for the system as a whole. The system-forming factor creates the emergency of the system, i.e. provides the system with special properties, which are not typical for its elements. The emergency of the system is caused by the backbone factor and is reflected in the extension of the properties of the system compared with the aggregate of the properties of its constituent elements. Determination of the system-forming factor is of great scientific importance as it enables separating parts and elements of the system from the environment in which the system operates. The disclosure of the system-forming factor increases the gnoseological status of the system under consideration. Accordingly, the emergency of the financial system is attributed to the ability to form institutional channels and organize the financial flows movement through them. Exchange as a system-forming factor involves the movement of goods and money flows within community and requires effective ways to carry out transactions.

3. Architectonics of the financial system. Changes transform the links between elements. To describe them, in our opinion, it is appropriate to introduce a new category "financial architectonics" to study the links between the elements of the financial system. By financial architectonics we will further refer to the structure of the financial system where the conditions are created to reveal its nature and efficient movement of financial flows within the system. The necessity to enrich the categorical apparatus of financial science is also a trend towards the general humanitarian knowledge. The term "architectonics" is common in a number of sciences: architecture, literature and others. In these fields of knowledge, the term "architectonics" is also referred to revealing the essence of the holistic system forming a compositional unity of elements. The introduction of a new term into further scientific studies and

applied research works provides an opportunity to study any deformations in the movement of financial flows in terms of network economy as well as to develop the ways to overcome the revealed contradictions.

Particular feature of the modern network economy is its trend for changing the type of current relationships: instead of the hierarchy there are simple structure less relations. Transformations taking place at the level of the whole society also affect the financial system. Within the financial system there is a contradiction between the institutionalized relations based on hierarchy and structure less relations based on a simple interaction between economic agents. The new reality of social and economic life multiplies the degrees of freedom of action of economic agents. The revealed contradiction allows considering the origin, development and consequences of the recent global financial crisis under a new perspective. Financial institutions repeatedly increased the freedom of choice and disposal of financial resources due to the widespread use of methods and techniques of financial engineering. Financial institutions create new financial products combining property and loan instruments. The crisis has clearly demonstrated the danger of the issue and circulation of such financial assets not only for issuers and owners but for all participants in the financial system at national and global levels. The simultaneous existence of complex hierarchical relationships by which financial institutions are connected with monetary and credit systems as well as network links which determine their functioning is expressed by the growth of entropy and uncertainty at financial markets.

Network economy is developing under the conditions of consumer society. Theoretical bases of consumer society have been considered in (Baudrillard, 1998) but today we can speak about the transformation of consumer society into the society of loan or debt consumption. The danger of such a change had also been clearly demonstrated by the crisis that started from the began mortgage lending sector. The first signs of crisis began to develop in the household sector due to excessive consumption and the inability to pay back obligations. Financial, economic and social consequences of debt consumption were not expected at the social level, they were considered as a private matter of borrowers and lenders.

When the system-forming factor interacts with the elements the system is separated from its environment where a special area is created i.e. system functioning space. We define the system functioning space as certain, specified by parameters, range of possible reactions of the elements of the system. In relation to financial system the basic parameters within which the formation of the system functioning space takes place are the following: risk, return and, in our opinion, information. The ratio of risk and return in the form of the two-dimensional model has sufficiently been described in economic literature. The transition from two-dimensional to three-dimensional measurement system enables describing the functioning of financial system and its elements in a more accurate way. Information is the third element to be added as a means of measuring financial processes in order to carry out a comprehensive systemic analysis of financial institutions, financial and economic processes.

Today the role of information in the society has radically changed, namely the access to getting information has been facilitated due to its increased volume. So there is a problem of excessive information that, in its turn, extends data verification time and transaction costs for this verification. The dilemma of time appears: during

the time spent on data procession and verification, information changes. Asymmetric distribution of information and desubjectivation of information space extend in the society. These phenomena encourage changes in the attitude to information at the level of the society.

The financial system space, determined by the author, is represented by 3 non-orthogonal axes: risk, return and information. By risk we mean here the probability of some event. The risk of an event does not depend on economic agents' awareness of it. Profitability is estimated by profit or loss from a transaction. Further in this article we will consider the role of trust for measuring the flows of information and show its importance in the current financial system. Thus, the system boundaries, defining the space of the financial system functioning are risk, return and information which is measured by the level of trust towards it.

Having established the general space we should move to defining the domain. Risk can take values from 0 (zero) to 1 (one) which is from 0 to 100% respectively. Return can be both negative (loss-making) and positive. The range of return values varies from plus infinity ($+\infty$) to minus infinity ($-\infty$). Information measured by trust ranges from 0 (when there is no confidence at all) to 1 when information is highly trusted.

In the system functioning space proposed above the study of financial instruments liquidity undergoes a qualitative change. Liquidity of each of the multitude of financial instruments will be an aggregate of points that will define a curved surface to be calculated by the equation. To develop new financial products it is essential to predict their liquidity. By combining risk, return and information measured by trust we can consider liquidity from a new perspective. The ability to quickly transform financial assets into cash without significant financial losses is largely determined by the information which potential buyers dispose. In the financial system the relationships of trust are transformed and affect the liquidity of both the financial market as a whole and each financial instrument circulating there.

4. The role of trust in the financial system functioning space. Trust is the concept related to various social and humanitarian sciences: sociology, psychology and many others. Credibility is based on confidence, predictability of various economic agents.

The problem of measuring information is an important theoretical and methodological issue to be solved when information is included into the space of the financial system functioning. Information volume meter is a bit. Reliability of information is determined by its truth or falsity. According to the author, the criterion for information gradation should not be a quantitative but the social one. Information is a product of society functioning where new information is constantly generated, verification of the existing one and refutation of the false one take place. With the increased amount of information exponentially growing according to the Moore's law, constant procession and validation of information is impossible for each individual member of the society.

Mechanism allowing information management without personal checking by economic agents is trust. Trust as an economic category was considered by a number of scientists who presented their point of view on the issue and among them we should note (Bradach and Eccles, 1989; Gambetta, 1988; Ostrom, 1998; Seligman, 1997). Trust allows economic agents make financial decisions in the conditions of incom-

plete, asymmetric information. Implementation of trust mechanisms compensates for the lack of information under uncertainty. Trust to information can be interpreted as a certain amount of it, which is enough for economic agents to make a decision. Trust acts as a supplement of missing information, which makes it possible to correct the asymmetry of information distribution.

Consequently, the higher is the level of trust, the less information is required for decision-making and the shorter it's the verification procedure and at the absolute level of trust the assessment of verification may be unnecessary. In the opposite case, to make a decision under low level of trust there will be required a substantial amount of information and time-consuming procedure to analyze its authenticity. Trust is the institutionalized type of accepting or rejecting information.

Under instability and uncertainty trust may acquire both positive values "trust", "trust completely" and zero values like "do not trust", "do not trust completely". Economic agents make decisions based on the information which they consider truthful and trustworthy. Real truth or falsity of information does not matter, decision is based on the economic agent's relation to information, on what he believes is true or false. Trust as a social category has two levels: individual and public. At the individual level the relationships of interpersonal trust, the relationships within households are formed.

At the social level trust acts as a form of institutionalized delegation of rights and powers, that is, as confidence in institutions. When we deal with practical application, formulated at the theoretical level of the financial system space the problem of verified public trust measurement arises. There are several organizations involved in the measurement of trust such as ESS, World Values Survey Association (WVSA), Eurobarometer. By trust measurement we mean the trust itself to information, supposing that any process and institution operating within the financial system, is assessed by the society on the basis of information about it.

There are the following trust evaluation models for quantitative risk assessment: typological, functional, structural and factor. In the proposed space of the financial system two parameters – risk and information – do not have clear estimation methods so only empirical testing of initial hypotheses and calculations can choose the most appropriate option. Analysis and modelling of the financial system will require improving the methods of quantitative risk assessment and information credibility evaluation.

Conclusions. When working out new approaches to the financial system understanding we should combine the best groundwork carried out by national scientists and the representatives of other CIS countries and traditional views of researchers from developed market economy countries.

In the article we have compared the definitions of financial system provided by the representatives of the "post-Soviet" economic school and foreign scientists. Advantages and disadvantages of the given points of view have been outlined. The conclusion has been made that the role of financial market and government causes most of scientists' argument.

The formation of common scientific space where the positions of scientists with different points of view would become a step forward towards wider scientific dialogue on the essence of contemporary financial system. Unification of various perspectives

on the issue under consideration can compensate for weaknesses and highlight the strong points of current views which, in the end, will lead to a new paradigm of financial system where the issue of protection from financial crises will be developed at high level.

Theoretical value and practical importance of this research include the following:

1. By identifying new links between the elements of financial system it is possible to forecast the responses of the whole system. Behavioural responses of households within the financial system are the consequences of financial interaction with other elements of the system. The identified links can be applied in econophysics and behavioural finance when modelling economic agents' behavior.

2. Determining the system-forming factor and system boundaries will provide an opportunity to apply categorical apparatus of the systems theory to the financial system to model the development of the financial system and forecast changes in its elements.

3. The introduced category of "financial architectonics" enables studying the composition of the financial system so that we could study any changes in the financial system structure, consider the formation of new elements and also follow the changes of the set links between its elements.

Scientific mapping of the coherent system of the financial flows movement requires new understanding of the complex interaction between the elements of the financial system and an updated categorical apparatus of the research. Processes inside the financial system can be described via the proposed three-dimensional functioning space.

Gnoseological status of the financial system is greatly increased by the spatial relationship of risk, return and information within the following dimensions: risk – information, information – return – where we can project the parameters of financial institutions as well as identify the trajectory of financial flows. In this space it is possible to analyze the sector of public finance, financial intermediaries, firms and households. The defined space, with its specified boundaries can help solving several important methodological problems:

- how to determine the position of all the elements of the financial system in the space of its operation. It also makes it possible to determine the composition of institutions of the financial system and describe its architectonics;
- how to formalize the financial flows between the elements of the financial system, namely, between the public finance sector and financial intermediation;
- how to formulate the equation of the curved surface liquidity in the space of the financial system.

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