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Relationship between the financial system and the real economy from a perspective of the systems theory

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Relationship between the financial system and the real economy from a perspective of the systems theory

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Abstract: The primary reason of hypertrophy of the financial sector and recurring financial crises has been flawed methodology of the mainstream financial economics. The fundamental flaw of this methodology is rejection of the systemic approach. As a consequence, the financial economics has been giving flawed explanations of functioning of the financial sector and providing misleading or erroneous recommendations to the financial policy, of which deregulation of the sector has been the most harmful. The aim of the paper is to demonstrate that systemic approach may give new push to advancement of the methodology of financial economics and, consequently, increase effectiveness of the financial policy.

Key words: system, systems theory, structural stability, functional stability, structural adaptability, functional adaptability, dysfunctionality, internal equilibrium, external equilibrium, financial system, real economy, financial innovations, financial crisis.

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It is not an accident that our fragmentary form of thought is leading to such a widespread range of crises: social, political, economic, ecological, psychological, in the individual and in society as a whole.
David Bohm (1980)

Financial capital, once cut loose from its original role as a modest helper of a real economy of production to meet human needs, inevitably becomes speculative capital geared solely to its own self-expansion.
Paul M. Sweezy (1994)

In the wake of the financial crisis of 2008, financial sector reform has been a major policy focus. However, that focus has been almost exclusively on the issue of "stability" and preventing a repeat of the crisis, and there has been little debate about the broader role of finance in shaping economic developments over the past thirty years.
Thomas I. Palley (2013)

Introduction

The paper is an attempt to look at relations between the financial sector and the real economy from the perspective of the systems theory. The financial sector must be seen as a subsystem of the whole economy which *raison d'être* is contributing to sustainable development of the latter and not its own expansion.

Initial inspiration to tackle this topic has been the striking fact that, on the one hand, there is not generally accepted definition of financial system stability. On the contrary, review of academic literature, as well as official reports of national and international financial institutions, reveals very diverse ways of defining the financial system stability. In addition,

some definitions are mutually exclusive. On the other hand, there is a widespread recognition that the stability – defined one way or another – is the most desirable property of a financial system and the main goal of the financial policy.

This situation is even more surprising as the concept of 'system stability' has been elaborated at length and precisely defined in the framework of the systems theory. In such a situation one might have expected the mainstream financial economics to make a wide-range use of notable achievements of this theory. However, it has not, in spite of the fact that it has turned out to be helpless in the face of the problem of recurrent financial crises. Meanwhile, as Gall (1977, p. 105) aptly noted 'real world problems are resolved by radical innovation, not by new combinations of old ideas'. This finds confirmation in sporadic so far, but very important attempts to apply systemic approach (though, as a rule, with no direct reference to the systems theory) to investigation of financial systems (see e.g.: Minsky, 1982, 1986; Merton an Bodie, 1995, 2005). These researches have shown that there are reasonable grounds to believe that systemic approach may contribute to better understanding development of the financial sector and its dynamic relations with the real economy and thus to more effective financial policy.

The question, therefore, is why the mainstream financial economics has been ignoring the systems theory? The most general answer is that methodology of this economics, developed by Friedman (1953, 1962), Sharpe (1964) and Fama (1965, 1970, 1998), rejects systemic approach. As has been shown by Frankfurter (2007, ch. 1), one of the strictest implicit assumptions of this methodology is 'that the sum of the parts equals the whole', which stands in glaring contradiction to the concept of the system.

In the following parts of the paper it will be shown that the systems theory can give new push to advancement of methodology of financial economics. First of all, it will force the latter to perceive finance in the holistic way, i.e. as a subsystem of the broader economic system and not as an autonomous system governed by its own rules and pursuing only its particular goals (see: Fullerton 2011, p. 2). In particular, it will be demonstrated that application of concepts of the systems theory to financial economics allows for better understanding of dynamic relations between the financial system and the real economy, and

consequently, for better targeted and thus more effective financial policy. One should stipulate that the paper discusses the problem at rather high level of generality with no intention to provide ready-to-use analytical tools for empirical analysis.

However, before getting to the heart of the matter, some thought should be given to the concept of a system, which only seemingly is simple.

1 Three perspectives on the notion of a system

In the academic literature one can find three principally different ways of defining a system. What makes the difference is the assumed genesis of a system or – in other words – what is considered the foundation on which a system is built. The three alternative genesis of a system are the following:

- **Set of elements/units**

  Examples of definition: 'A set of coupled acting elements is called a system' [Lange 1965, p. 17]. 'A system is a complex object, formed of separate components interconnected by a number of relationships' [Ladrière, 1968, p. 685]; 'A system can be defined as a set of elements standing in interrelations' [Bertalanffy 1968, p. 55].

- **Structure**

  Examples of definition: 'System refers to an ordered form, which brings the entire elements into a structural connection (Diemer 1968, p. 151)'.

- **Functions**

  Examples of definition: 'System is a concept that refers both to a complex of interdependencies between parts, components, and processes that involves discernible regularities of relationship and to a similar type of interdependency between such a complex and its surrounding environment' (Parsons 1968, p. 458); 'System is a whole coupled by a form of regular interactions or cooperation between its parts' (Such 1986, p. 82).

The differences are not only semantic as they also indicate alternative primary bases on which a system may arise: elements, structure or functions. And this has fundamental effect on explaining how the system develops and operates. At this moment one can say that if a

system develops from a set of elements, then it is called **emergent**, whereas in two other cases systems are called **designed**.

In the real world man-made systems develop in different ways. In the case of technical systems their coming into existence is preceded by their design: functional, structural or both. On the other hand, socioeconomic systems may be created on a basis of an earlier concocted design, as well as emerge spontaneously out of the interaction of components comprising them (Parent 2010). In the following paragraphs the three perspectives on the system are discussed in more detailed way.

Componential perspective

In this case a point of departure for defining system is a set of elements (components, units). Elements are perceived here as primal relative to the system, and the system is perceived as an existence secondary to its elements. System emerges as an outcome of spontaneous, bottom up initiatives of individual elements in response to opportunities and threats arising in their environment. In other words, it is the set of components and their characteristics that create a system and determine its properties, i.e. structure and functions performed by each component. Both are emerging gradually in hit-or-miss style as a result of behaviour of and action taken by individual elements according to possessed predispositions and skills. Though, as a rule, system's components determine intended functions of the system towards its environment, they have only general and tentative character. Functions that will be actually performed by the emergent system are neither predictable or deducible from, nor reducible to the components alone (Goldstein 2007, p. 57). Number of element and types of them may change in unpredictable way. Some of them may leave a system, while new ones may join it. A change in the set of elements usually impacts the system's structure and functions.

It is worth stressing that the structure of emerging systems may be not only hierarchic but also heterarchic[1], at least in the early stage of their development. The best example of heterarchy is a concept of the free market.

Structural perspective

From structural perspective a system is defined by its structural form (architecture, construction, formal organization, institutions[2], or social norms) determining composition of the system, i.e. types of its components, their positions towards each other and relationships between them. Each position defines a set of absolute features (attributes), which an element occupying the position should have to be able to maintain ascribed set of relations. Organizational design is perceived as primal in relation to both: elements and functions of the system. The elements are considered solely as 'conveyors' of structural relations and are considered potentially replaceable. Elements do not mould structure of the system; they only "reproduce" it. Any change in attributes of an element that disturbs the established structure of the system is considered a defect of the element and should result in replacing it by another one.

Functional perspective

From functional perspective an initial intuition for understanding a system is a living organism. System is defined as a whole coupled by a form of regular interactions or cooperation between its parts in order to perform specific functions towards the environment or, to put it differently, in order to produce specific outputs indispensable to maintain equilibrium between the whole and its environment, conditioning survival and development of the system [adapted from Such 1986, p. 82]. These external functions are performed through interactions between parts (elements) of the system. Interactions occur on the basis of an ex ante determined functional pattern (functional hierarchy). The pattern is a conceptual model (abstract system) composed of functional nodes (vertices) and links (edges) connecting them. Each functional node defines functional competencies (abilities), which should have an element assigned to this node to be able to contribute effectively to performance of external functions of the system. Links connecting the node with other nodes define elementary functions the element should perform as its contribution to the performance of the system. In other words, links define ascribed functional behaviours of the element placed in a given node.[3] Functional competencies refer to an element's potential ability to perform a given function, while functional behaviour refers to actual performance of the function.

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Like in structural approach, elements are considered potentially replaceable. Functional competencies decide on incorporating an element to the system, whereas actual functional behaviours determine whether the element is kept in place or eliminated and replaced with another one.[4] In case of systems which elements are people this approach considers human agency a factor disrupting desirable individual's behaviour.[5]

While functional hierarchy shows how the system operates, the structure shows its state. To understand operation and particularly development of real social systems, so financial systems as well, all three approaches should be applied, though a role played by each approach may differ depending on kind of systems investigated. Merton (1990, p. 263) suggests that 'a functional approach to analysing the financial system and its economic performance may provide a more useful organizing perspective than an institutional (i.e. structural in our terminology) approach, especially in an environment of rapid technological changes and movement toward increasingly global connections among financial markets'.

The main difference between componential perspective on the one hand, and structural and functional on the other, lies in the following: the former assumes that behaviour of elements of the system is constrained only by external factors, while according the latter the elements' behaviour is constrained first of all by the settled structure and/or functional pattern of the system. Paraphrasing John Child's (1972, p. 2) statement on determinants of organisational behaviour one can say that both, structural and functional approach fail to give due attention to the agency of choice by whoever have the power to direct the system and thus imply that behaviour of a system can be understood by reference to functional imperatives and structural constrains rather than to political action. This means that the role of componential perspective in investigating a system increases along with growing freedom of activity and behaviour of components of the system. Taking into account that each component of the socio-economic system is unique, even within a certain class of components, one must conclude that a theory assuming componential approach to the investigated socio-economic system (e.g. a market theory) and, concurrently, uniformity of each class of its components (in this case enterprises and customers) is rather not able to explain correctly functioning and development of the real system.

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2 What does "financial system stability" mean?

Though the term 'financial system stability' has recently become one of the most frequently used in academic financial literature, as well as in official reports of national and international financial institutions, no universally accepted definition of financial stability and analytical framework for assessing it exist yet. [6] There are plenty of them, more or less different, some mutually exclusive.[7] Generally, one can distinguish three main ways of defining financial stability:

- as a robustness of the financial system, i.e. its ability to withstand shocks to the economy and financial markets;
- as a state, situation or condition in which financial system efficiently performs specific functions;
- as the ability of financial system to perform specific functions towards an economy,

Only definitions from the first and small group allude to the system theory's concept of stability, though possibly not necessarily in full consciousness of logical consequences. As an example one can quote the Bundesbank definition from 2003, which says that financial stability is '**a steady state** in which key macroeconomic functions [...] are performed efficiently' (Deutsche Bundesbank 2003, p. 8; author's emphasis). The trouble with this definition is that if a system is in 'steady state' then the recently observed behaviour (facilitating as well as impeding performance of the economy) of the financial system will continue into the future. The word 'steady' is no longer present in the recent Bundesbank definition (see Deutsche Bundesbank 2015, p. 5).

Definitions from the second group differ fundamentally from the remaining two. Contrary to the common understanding of **stability as a property** of a system (see Allen & Wood, 2005, p. 3) these definitions consider financial system stability/instability as an outcome of favourable/unfavourable circumstances, in which the system has found itself.[8] Besides, these definitions do not specify what determines the state (situation, condition) and what it is being referred to. Is it the financial system itself or its environment, or both? What are the forces impacting on the state and what kind of financial system response is assumed?

Definitions of the third type hit the nail on the head with referring to the **ability** of the system to perform specific functions, but the ability to perform specific functions and stability of a system (as defined by the system theory) are quite different concepts. So the problem with this type of definitions is a terminological one and reflects a conceptual gap between the financial economics and the systems theory. However, this gap may have (and actually has had) negative consequences for effectiveness of the financial policy.

The concept *system stability* has originated from the systems theory. Its traditional definition says that a system is stable if, when perturbed, it returns to its original state (The ASC Glossary n.d.). More recently stability is defined as ability of a system to persist and to remain qualitatively unchanged in response either to a disturbance or to fluctuations of the system caused by a disturbance (Heylighen n.d.). The second definition combines the first one with Holling's concept of *resilience* defined as 'the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks' (Walker et. al. 2004, p. 5) [9].

It is generally believed that a desirable property of social systems is their stability. (Krippendorff, 1986). Actually, stability of a social system is desirable only in specific situations, namely when functions a system should perform – i.e. functional requirements of environment for the system – are constant and its present structure enables the system to perform these functions efficiently. While in the case technical or biological systems these conditions are in principle met, this is usually not true for social systems. As Ackoff (1981, p. 4) observed 'Human beings seek stability and are members of stability-seeking groups, institutions, and societies [...], but the world in which this objective is pursued is increasingly dynamic and unstable' And if the environment of a socio-economic system is changeable, so are functions the system is supposed to perform towards it. If the system were stable (in the sense of the systems theory) then it would still carry out – or at least try to perform – the same functions as before, and not those required currently by its environment. Then, what would be the point of caring about stability of the financial system which performs functions useless – and the more so detrimental – for its environment, i.e. the real economy and other financial systems? There is no doubt that there can be only one answer to this question: any.

3 Dynamics of a system: stability vs adaptability

Each open system exists as a part (subsystem) of a system of higher order (suprasystem), performing some function or functions towards other subsystems and the suprasystem as a whole. The situation when functions, which the system is actually performing towards its environment, match functions required by the environment (or to put it another way: when a system is being fully **eufunctional** towards all other components of the suprasystem) will be called **external equilibrium** of the system. And this is the only situation when stability of the system is desirable from the point of view of its environment. As shown below, there are possible other functional relations between a system and its environment.

The external equilibrium of a system should be distinguished from its **internal equilibrium** (which systems theory calls simply equilibrium), that is the situation in which each component of the system (element and subsystem) is eufunctional towards other components of this system. A system is in a state of internal equilibrium only if all its subsystems are in a state of external equilibrium. If the opposite is true, and some critical function of a subsystem is not performed effectively, then the system can survive only if it is parasitic on or symbiotic with some other system which compensate adverse effects of failed function (see: Miller 1969, p. 74-75]. For example, a bank, in which the function of risk management fails, becomes insolvent and can survive only at the expense of other financial entities or the State.

It should be emphasized that while **internal equilibrium** of the system conditions effective performance of some external functions, it does not necessarily mean its external equilibrium. In the real world one can easily observe a lot of systems performing certain functions very effectively, but the functions are not those expected by the system's environment, i.e. by other systems belonging to the same suprasystem. Such a system is **non-functional**. When functions performed by a system have negative effects on its environment it becomes **dysfunctional**. In the extreme case, a system may wins benefits at the expense of its environment. Such a system becomes parasitic. In the field of biology a cancer is the best example of such a system.

The last financial crisis proves that the global financial system has become to a high degree parasitic towards the real economy and the society.[10] Similar opinions were expressed – though less bluntly – already three decades ago by John Train and James Tobin (1984), and then by Hyman Minsky (1990), Paul Sweezy (1994) and more recently among others by Joseph Stiglitz (2009), Andrew G Haldane (2010), Dean Baker (2013), Gerald Epstein (2013), Thomas Palley (2013) and Epstein and Crotty (2013). The first of the above mentioned authors wrote about the casino aspects of commodity futures markets and pointed out that speculation in these contracts was negative-sum game for the general public due to large 'win' of brokers and berated the brokerage houses for misleading amateur clients into this particular casino (quoted after Tobin 1984, p. 15). In his *Fred Hirsch Memorial Lecture* Tobin said that "we are throwing more and more of our resources, including the cream of our youth, into financial activities remote from the production of goods and services that generate high private rewards disproportionate to their social productivity" (p.14). Epstein and Crotty presented preliminary estimates suggesting that in the decade of the 2000s the financial sector in the US extracted 2-4 times as much income relative to the value of services it provided to the from the real economy as it did during the 1960s (Epstein and Crotty,(2013, pp.299-300).. This would suggest that the financial sector was detracting from rather than contributing to the growth of the real economy.

A system's equilibrium is ceaselessly exposed to potential disruptions from the side of factors occurring in the system's external as well as internal environment. To ensure permanence of the equilibrium – or, in other words, to ensure **dynamic equilibrium** – of the system, these factors must be ceaselessly monitored and their impact anticipated and neutralized, and if not possible, activities restoring equilibrium should be undertaken. A system, which is not able to establish and maintain its equilibrium or restore it when lost, is devoid of **adaptability**: structural or functional, or both.

Summing up, while the stability of a system means its ability to protect or restore its essential properties (structure and functions) from destroying or disrupting impact of internal and external factors, adaptability of a system means its ability to change these

properties when they become incompatible with changing requirements of system's environment. Stability concerns internal equilibrium while adaptability – external one.

Both stability and adaptability concern the structure of the system as well as and its functions[11], and both may take on two, not mutually exclusive forms: reactive (reacting to problems when they occur instead of doing something to prevent them) and proactive (anticipatory and preventive).

From the point of view of investigating relations between financial and real sectors **it is crucial to differentiate between adaptation of a system to the requirements of its environment** and **changing the environment by a system to suit itself.** Steg calls the former **adaptive behaviour**, while the latter **adapting behaviour** of the system (Steg and Schulman, 1974).[12] One should notice that the adapting behaviour may bring about two opposing consequences to the environment: beneficial (when the purpose of the system is to create new opportunities for its own development through stimulating changes that benefit also its environment) or detrimental (when the system is driven exclusively by its egoistic self-interests). In the field of finance making customers warm to cashless transaction is an example of the former, while persuading financial investors into buying 'toxic' derivatives (like CDS and CDO, or persuading low-creditworthiness households into taking out a mortgage for buying a house are examples of the latter.

Structural stability vs structural adaptability

Structural stability is meant here as system's ability to protect its structure from destroying impact of uncontrolled factors. However, keeping a system structurally stable makes sense only if the actual structure allows the system to perform effectively and efficiently its functions towards its environment. If the opposite is true, structural stability will make the system more or less non-functional or dysfunctional. In such a case, to restore its eufunctionality, the system has to demonstrate its structural adaptability, i.e. ability to adjust its structure to functions it is supposed to carry out. Structural adaptability is particularly important when functions required of the system are changing considerably and its current structure does not longer allow to perform them.

Functional stability vs functional adaptability

Functional stability is understood as a system's ability to perform a given set of functions in spite of disrupting impact of uncontrolled factors. From the outsider's point of view a functional stability of a system desirable only if functions the system is actually able to perform, are those it should perform to be eufunctional towards its suprasystem. If the opposite is true, functional stability is losing its *raison d'être* and should be replaced by functional adaptability, that is system's ability to adjust its functions to new functional requirements of the suprasystem. Functional adaptability should usually be accompanied by structural adaptability of the system. And both may require a new collection of elements or new composition of their attributes.

The system which is not able or willing to adapt itself to requirements of its environment, or shows adapting behavior harmful to the environment, has to be subject to external regulation. This is particularly true in the case of the financial sector.

It should be stressed that to determine whether the system remains in equilibrium, both the scope of functions, the way they are performed, and their quantitative dimension should be taken into account For example, one of the basic function of banking system is making loans to the real sector actors: enterprises and households. However, too lenient loan policy and consequently excessive credit expansion may easily lead to dangerous increase in irrecoverable debts on the one hand and to mass consumers and enterprises insolvency.

4 Causes for external disequilibrium system of a system

One can enumerate the following causes for external disequilibrium of a system:

a) Particular components of the system have adjusted their individual functions and structures to their own interests, contrary to the interests of other components and the system as a whole. The system is in internal as well external disequilibrium. As mentioned above, in such a situation the system can survive only if it is parasitic on or symbiotic with some other system, which compensate adverse effects of failed functions.

b) Initially functions of the system matched functional requirements of the system's environment, and its structure was fit to perform them but then the system has adjusted

its functions to their own interests, contradictory to the interest of its environment. System remains in internal equilibrium but has lost its external equilibrium. This makes the system dysfunctional or parasitic.

c) Functions the system should perform towards its environment have been incorrectly designed, and structure and composition of elements adjusted to them. The system retains internal equilibrium and may effectively carry out its functions but is not eufunctional towards its environment (is not in external equilibrium).

d) Functions of the system have been designed correctly but its structure is not (fully) fit to perform them (at least some). System is (at least partially) in internal and consequently in external disequilibrium.

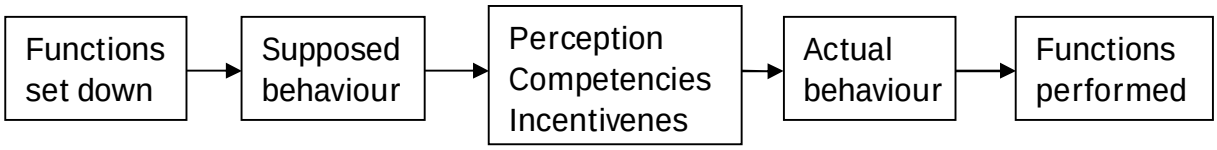
e) Functions of the system has been designed correctly and structure is fit to perform them, but attributes, functional abilities or functional behaviour of its components does not (fully) meet requirements of system's structure or functions. System is not able to perform the expected functions effectively (at least some of them).

f) Change in functional requirements of the environment to which the system – hitherto remaining in external equilibrium – is not able to adjust itself because lack of (or insufficient) structural and, consequently, functional adaptive capacity ('ossification' of the system's structure). 'If the system is "structurally stable" [...], the new mode of functioning will be unable to establish itself (Prigogine and Stengers 1984, p. 189-190). In consequence, the system deprived of functional adaptability, loses its external equilibrium. In case of organisations the ossification of their structures is a product of a bureaucracy, which being efficient in the original environment, is not able to meet the challenge of changing environment.[13].

g) Failure of one or more parts (elements, subsystems) of the system. If not repaired or replaced, the failed part may trigger a cascading failure of successive parts and, consequently, external disequilibrium of the whole system. Prigogine and Stengers (1984, p. 176) point out that in some circumstances a role played by individual behaviour may be decisive. Particularly in complex systems even small changes 'in physical interactions or

stimuli can cause large effects or very significant changes in outputs' (Paul Cilliers 1998, p. 3).

In social systems the scope and degree to which functions which have been set down for particular components of a system are actually performed depend on three main factors: perception of the functions by the components, their competencies and incentives:



Summing up, to judge how a system currently impacts other systems belonging to the same suprasystem and the suprasystem as a whole, one should first of all weigh up whether the system is in external equilibrium or disequilibrium, and not if it is stable or unstable. From the long-term perspective, in turn, one should examine whether the system displays structural and functional adaptability aimed at benefiting its environment.

All the above listed situations may be responsible for external disequilibrium of financial systems. However, special attention should be paid to the situation when a financial system gains high adapting capacity ('mastery over the world' in Max Weber's phrasing) and uses it to change its environment (i.e. the real economy) to pursue its egoistic self-interests. In this way financial system expands through destabilisation of the real economy. An extreme example of detrimental adapting behaviour of the financial system has been an extensive political lobbying and influence peddling or bribery) for far-reaching deregulation of financial sector, which has brought about disastrous effects on the real economy (see e.g.: *The Long Demise …*, 2003) followed by the equally vigorous campaign against re-regulation of the sector after the outbreak of the global financial crisis. Total US financial sector spending on lobbying more than doubled in 1998-2007 (from $207.8 million to $426.5 million) and in the seven subsequent years increased by another 16.7% (up to $497.6 million in 2014). Besides, the US financial sector is far and away the largest source of campaign contributions to federal candidates and parties, with insurance companies, securities and investment firms, real estate interests and commercial banks providing the bulk of that money (Center … 2015). In 1997 and 1998 the US financial sector lobbyist spent over $300 million on Congress. The chairman of the Senate Banking Committee, Phil Gramm, himself collected more than $1.5

million during five years preceding the enactment of the Financial Modernisation Act in 1999 (McLaughin, 1999). A year later the Commodity Futures Modernisation Act passed without debate. The two acts nearly completely deregulated the US financial market opening the doors to fast, pathological development of the financial sector. After the outbreak of the global crisis lobbing and influence pending continued, this time against re-regulation of the financial sector. During the 2008 election cycle, the financial industry has donated $24.9 million to members of the New Democrats, a neoliberal fraction of the Democratic Party strongly tied to Wall Street. Representative Melissa Bean of Illinois, who has led the Coalition's efforts on regulatory reform, was the top beneficiary, with donations of $1.4 million (Veksin and Kopecki, 2009). Members of the House of Representatives Financial Services Committee received $69.7 million in campaign contributions over their career, of which $4.6 million fell to the new committee chairman Spencer Bachus. (Papagiannis, 2011).

Concluding remarks

Application of systemic approach to analysis of relationships between the financial sector and the real one, has brought about to the conclusion that stability of the former (defined as its ability to persist and to remain qualitatively unchanged in response either to a disturbance or to fluctuations of the system caused by a disturbance) not necessarily contributes to sustainable development of the whole economy. As nowadays the real sector is experiencing fast changes, the most important feature of the financial sector becomes its structural and/or functional adaptability, i.e. its ability to adjust its structure to functions it is expected to carry out or to adjust its functions to new functional requirements of the real economy. In the last decades, adaptability of the financial sector manifested itself rather in adapting behaviour than in adaptive one. In other words, development of the financial sector occurred more through adapting the real economy to its own goals than through adapting itself to changing needs of the non-financial sectors. Such an attitude by itself needn't pose a threat to the economy. As mentioned above, the problem appears only when the adapting behaviour of the financial sector is driven exclusively by its egoistic self-interests and leads only to its own short-term benefits at the expense of the long-term development of non-

financial sectors. Epstein and Crotty (2013) analyzing financial innovations other than such as CDOs come to the conclusion that about one-third of them has been functionally inefficient as they were "motivated by tax, accounting, and regulatory, 'arbitrage' or 'evasion'" rather than simple efficiency improvements'' (pp. 303-305). Large-scale diffusion of innovations in the field of debt securitization (CDS and CDO), not captured by their estimate, was not only socially useless but have had particularly detrimental effect on the economy.

However, in all fairness, it should be added that, on the other hand, some innovations in the real economy have had an ambiguous impact on the financial sector. This can be said first of all about the internet which enormously shortened the time needed to carry out financial transactions. The innovation has reduced the duration of even long-distance payments for of all kinds of goods and services from hours or days to seconds or minutes, but at the same time brought about multiplication of purely speculative transactions in financial markets. Development of high frequency trading (HFT) algorithms has enabled to automate trading strategy and execute about one thousand or more orders per second to "manufacture money from money"(Harrington, 2011, p. 99). This allows 'to split enormous orders into blocks of 100 to 300 shares so that other traders can't recognize the true demand and take advantage of that knowledge for their own profit'(Urstadt 2009, Duhigg 2009). The HFT contributed to enormous increase in number of securities traded in stocks between 2005 and 2009. For example, the average daily number of total shares traded in all U.S. stocks increased from above 4 billion in 2005 to almost 10 billion in 2012. At the same time by HFT percentage of shares traded by HFT increased from 21% in 2005 to 61%[14] (*Declining U.S.* ..., 2012), which means that the number of remaining shares increased by just one fifth. Among the consequences of expansion of HFT is increased volatility of security prices. For instance, in early March 2010 shares of the biotech company Dendreon plunged more than 69% in 70 seconds as a result of combination of short-sellers and HFT (Harrington, 2011, p. 100). The HFT was also behind the so called 'flash crash' on 6 May 2010, when 'in just 20 minutes the New York Stock Exchange had witnessed it's biggest stock plunge in decades, all traced to one gargantuan sell order'. The Dow Jones Industrial Average fell by nearly 1000 points. In just 20 minutes 2 billion shares worth $56 billion had changed owners.(Treanor 2015)

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Another consequence of HFT was dramatic reduction in average time of keeping shares of particular companies: from four years few decades ago to 22 seconds at present (see: Bauder 2013). Volatility of companies' shareholders increased enormously with a considerable part of them regarding shares as cards for casino games and not as the company's title deed. This, in turn, has had negative impact on corporate behaviour.

The last financial crisis has revealed that when effectively performed functions confer a benefit on financial sector at the expense of the real one, the former becomes not only dysfunctional, but parasitic on the latter. And that is not all: the more efficient in this situation the financial sector is, the more detrimental is its impact on the real economy. This is why the financial sector must be subject to regulations on the national, international and global level. These regulations should be aimed first of all at the sector's functionality, and their scope and intensity be similar to those applicable to the pharmaceutical sector.

Notes

[1] *Heterarchy* denotes a structure without different levels, within which "processes are governed by a pluralistic and egalitarian interplay of all components" of the system. Cf. Skyttner 2005, p. 65.

[2] The term *institution* is understood here as a set of rules that govern the structure.

[3] A function set down for a system or its component is an image of supposed behaviour abstracted by human and, in general, it is represented in the form of *to do something*, while

function actually performed corresponds to actual behaviour of a system or its component (see: Umeda et al. 1990, p. 183, 184).

[4] Distinction between *functional abilities* and *functional behaviours* appeared for the first time in 1909 on the ground of biology, with reference to cells. See: Gorbon and Chlebopros 1988, p. 152.

[5] *Agency* refers here to the capacity of individuals to act independently and make free choices.

[6] Not much has changed since 2004 when the Governor of the Swedish Riksbank said that, 'the concept of stability is slightly vague and difficult to define' (Heikensten 2004).

[7] For review and analysis of various definitions of financial stability see e.g. Alawode et. al (2008) and Schinasi (2004).

[8] Such an understanding of the 'stability' is also obviously contrary the etymology of the word: Latin *stabilis* from *stāre* ("to stand") + *-abilis* ("-able"). See: *The New Oxford Dictionary of English,* 1998.

[9] The concept was first time presented in Hollings (1973, p. 17).

[10] Black (2010) says that a function the contemporary financial system performs towards real economy has transformed from "a servant" to "a predator".

[11] The term *system adaptability* used here has a wider meaning than *adaptive capacity* used in Systems Theory. The latter, defined as 'resilience to perturbation, giving a system the ability to reconfigure itself with minimum loss of function', concerns structural adaptability only. The term 'functional adaptability' is well known in medicine. The Author of this paper used this term with reference to the human resource systems in Dymarski (1987).

[12] Steg and Schulman (1974) p. 2. Originally a distinction of this kind was made a century ago by Max Weber, who used terms *adaptation to the world* and *mastery over the world* (see: Parsons et al. 1961, p. 1055). Similar distinction with reference to structural adaptation of organism has been done by Krippendorff (1986, headword *Adaptation*). He calls adaptive behaviour *Darwinian* and adapting behaviour *Singerian* ('after Singer who described how

organisms, particularly man, can change the nature of their environment so as to eliminate threats to or prevent the destruction of their internal organization').

[13] An excellent presentation of a mechanism through which bureaucracy degenerates from an organizational optimization to an organizational pathology and next exports pathological behaviour beyond strict organizational boundaries is presented in Acar & Aupperle (1984, pp. 157-166).

[14] Since 2013 has trend reversed.

References

Acar, W., K. E. Aupperle (1984), *Bureaucracy as Organizational Pathology*, Systems Research. The official Journal of the International Federation for Systems Research, Vol. 1, Number 3, , Pergamon Press, pp. 157-166.

Ackoff, R. L. (1981), *Creating the Corporate Future. Plan or be planned for*, John Willey & Sons.

Alawode, A. A., M. Al Sadek (2008) *What is Financial Stability?* Financial Stability Paper Series, Central Bank of Bahrain, No. 1, March 2008 http://www.cbb.gov.bh/assets/FSP/What%20is%20Financial%20Stability.pdf

Allen, W. A. and Wood, G. (2005) *Defining And Achieving Financial Stability*, LSE Financial Markets Group Special Paper Series, Special Paper No 160, Cass Business School, City University. April 2005; http://www.lse.ac.uk/fmg/workingPapers/specialPapers/2000s.aspx.

Baker, D. (2013), *The Need to Rein in the Financial Sector*, in: 'Restoring Shared Prosperity: A Policy Agenda from Leading Keynesian Economists', edited by T. I. Palley and G. A. Horn, pp. 81-86.

Bauder, M. (2013), Der Banker: Master of the Universe, bauderfilm.

Bertalanffy, L. von (1969}, *General System Theory. Foundation, Development, Applications*, Revised Edition, George Braziller, New York.

Black, W. K. (2010), *How the Servant Became a Predator: Finance's Five Fatal Fla*ws, The Huffingtonpost, 18.03.2010; http://www.huffingtonpost.com/william-k-black/how-the-servant-became-a_b_318010.html

Bohm, D., (1980), *Wholeness and the Implicate Order*; Routledge & Kegan Paul.

Center for Responsive Politics (2015), *Lobbying Database*, Open Secret. Org, , https://www.opensecrets.org/industries/lobbying.php?cycle=2016&ind=F

Child, J. (1972), *Organizational structure, environment and performance: the role of strategic choice*, Sociology, January 1972 vol. 6 no.1, pp. 1-22.

Cilliers, P. (1998) *Complexity and Postmodernism: Understanding Complex Systems*, London, Routledge.

Declining U.S. High-Frequency Trading, The New York Times, October 15, 2012. http://www.nytimes.com/interactive/2012/10/15/business/Declining-US-High-Frequency-Trading.html

Deutsche Bundesbank (2003), *Report on the Stability of the German Financial System*, Monthly Report, Frankfurt, December; http://www.bundesbank.de/Redaktion/EN/Downloads/Publications/Monthly_Report/2003/2003_12_monthly_report.html?searchArchive

Deutsche Bundesbank (2015), *Financial Stability Review* . http://www.bundesbank.de/Redaktion/EN/Downloads/Publications/Financial_Stability_Review/2015_financial_stability_review.pdf?__blob=publicationFile

Diemer, A., (ed.) (1968), *Systematik und Klassifikation in Wissenschaft und Dokumentation. Meisenheim an der Glan*: Hain.

Duhigg, Ch. (2009), Stock Traders Find Speed Pays, in Milliseconds, The New York Times, July 23, 2009; http://www.nytimes.com/2009/07/24/business/24trading.html

Dymarski, W. (1987), Cele polityki kadrowej (Goals of personnel policy], in: J. Orczyk (ed.), Podstawy polityki kadrowej w przedsiębiorstwie (pol.) [The Fundamentals of Personnel Policy in a Company], PWN, Warsaw-Poznań, Chapter 3.

Epstein, .G. (2013), *Developmental central banking: winning the future by updating a page from the past*, Review of Keynesian Economics, vol.1 (3); pp. 273-287.

Epstein and James Crotty (2013), *How big is too big? On the social efficiency of the financial sector in the United States,* in: Wicks-Lim J. and Pollin R. (eds) *Capitalism on trial. Exploration in the tradition of Thomas E. Weisskopf*, Elgar 2013, Ch. 20, pp. 293-310.

Fama, E. (1965). *The Behavior of Stock Market Prices*, Journal of Business, Vol. 38, Issue 1, pp. 34–105.

Fama, E. (1970). Efficient *Capital Markets: A Review of Theory and Empirical Work*, Journal of Finance, vol. 25, Issue 2, pp. 383–417.

Fama, E. F., (1998), *Market efficiency, long-term returns, and behavioral finance*, Journal of Financial Economics, Vol. 49, Issue 3, pp. 283–306.

Fullerton, J. (2011), *Holistic Finance – CAPITAL INSTITUTE*, http://capitalinstitute.org/blog/2011/01/

Frankfurter , G. M., (2007), *Theory and Reality in Financial Economics. Essays Toward a New Political Finance*, World Scientific 2007.

Friedman, M., (1953) *The methodology of positive economics*, in: *Essays in Positive Economics*, University of Chicago Press, pp. 3-43.

Friedman, M., (1962), *Capitalism and Freedom*, University of Chicago Press.

Gall, J. (1977), *SYSTEMANTICS. How System Work and Especially How They Fail*, Quadrangle/The New York Times Book Co., 1977. http://www.bussigel.com/systemsforplay/wp-content/uploads/2013/12/Systemantics.pdf

Goldstein, J. (2007), *Emergence as a Construct: History and Issues*; Emergence: Complexity and Organization 1 (1), ISCE Publishing, pp. 49-72; http://www.anecdote.com/pdfs/papers/EmergenceAsAConsutructIssue1_1_3.pdf .

Gorbon, A. N., R. G. Chlebopros (1988), *Demon Darwina. Idea optimalnosti I yestestvennyj otbor* [*Darwin's demon. Idea of an optimality and natural selection*], Moscow, Nauka.

Haldane, A. G. (2010), *The $100 billion question* Comments by Mr Andrew G Haldane, Executive Director, Financial Stability, Bank of England, at the Institute of Regulation & Risk, Hong Kong, 30 March 2010; http://www.bis.org/review/r100406d.pdf

Harrington, J.C. (2011), *Ethical Investing in the Age of Excessive Materialistic Self-Interest*, [in:] N. Dobos, Ch. Barry, T. Pogge, *Global Financial Crisis: The Ethical Issues*, Palgrave Macmillan, New York 2011, pp. 82-119.

Heikensten, L., (2004): *The Riksbank and risks in the financial system*; http://www.riksbank.se/en/Press-and-published/Speeches/2004/Heikensten-The-Riksbank-and-risks-in-the-financial-system/

Heylighen, F. (n.d.) Web Dictionary of Cybernetics and Systems, Principia Cibernetica Web. http://pespmc1.vub.ac.be/ASC/INDEXASC.html#S

Holling, C. S. (1973) Resilience and stability of ecological systems. Annual Review of Ecology and Systematics Vol. 4 (1), November 1973, , pp. 1-23 ; http://webarchive.iiasa.ac.at/Admin/PUB/Documents/RP-73-003.pdf

Krippendorff, K. (1986), *A Dictionary of Cybernetics*, Norfolk VA: The American Society for Cybernetics; http://repository.upenn.edu/asc_papers/224.

Ladrière, J. (1968), *Système (Épistémiologie),* in: Encyclopaedia Universalis, Vol. 15, , 685-687, http://www.universalis.fr/encyclopedie/systeme-epistemologie/

Lange, O. (1965), *Wholes and parts: a general theory of system behaviour*, Pergamon Press - PWN, Oxford-London-Warsaw

McLaughlin, M. (1999), *Clinton, Republicans agree to deregulation of US financial system*, World Socialist Web Site, https://www.wsws.org/en/articles/1999/11/bank-n01.html

Merton, R. C. (1990), *The Financial System and Economic Performance*, Journal of Financial Services Research, vol. 4, No 4, pp. 263-300

Miller, J. G., *Living Systems: Basic Concepts*, in: Wiliam Gray, Frederick J. Duhl, Nicolas D. Rizzo (eds), (1969), *General Systems Theory and Psychiatry*, Little, Brown and Company, Boston.

Palley, T. I. (2013), Making Finance Serve the Real Economy, in: 'Restoring Shared Prosperity: A Policy Agenda from Leading Keynesian Economists', edited by T. I. Palley and G. A. Horn, pp. 73-80.

Papagiannis, J. (2011), *New research: house financial services committee members received nearly $70 million from wall street interests*, Public Campaign Action Fund (currently Every Voice.org), 02/16/2011. http://www.campaignmoney.org/PCAF_Report_Financial_Services_Committee

Parent, E. (2010), *The Living Systems Theory of James Grier Miller*, International Society for the Systems Sciences, http://projects.isss.org/the_living_systems_theory_of_james_grier_miller

Parsons, T (1961),, *Value and Belief Patterns. Editorial foreword*, in: T. Parsons, E. Shils, K. D. Naegele, J. R. Pitts (Eds.), *Theories of Society. Foundations of Modern Sociological Theory*, Vol. II, The Free Press of Glencoe, 1961, pp. 1053-56.

Parsons, T. (1968), *Systems Analysis: Social Systems,* in: L. Sills (ed.) *International Encyclopedia of the Social Sciences*, Vol.15, Macmillan Free Press, p. 458. Quoted after Ida R. Hoos (1972) *Systems Analysis in Public Policy: A Critique*, University of California Press, Revised Edition, 1983.

Prigogine, I. and Stengers, I. (1984), *Order out of chaos: Man's new dialog with nature*, Bantam Books.

Psychology Glossary, headword: *Homeostasis*, (n.d.), http://www.alleydog.com/glossary/definition-cit.php?term=Homeostasis

Sharpe, W. F., (1964), *Capital Asset Prices: A Theory of Market Equilibrium Under Conditions of Risk*; Journal of Finance, Vol. 19, Issue 3, pp. 425-442.

Schinasi, G. J. (2004), *Defining Financial Stability, IMF Working Paper WP/04/187, International Capital Markets Department, October 2004;* http://www.imf.org/external/pubs/ft/wp/2004/wp04187.pdf

Skyttner, L. (2005), *General Systems Theory: Problems, Perspectives, Practice*, 2nd Edition, World Scientific Publishing Co., Singapore.

Steg, D., B., R. Schulman (1974),, *Towards a Modest Empiricism in Human Transaction* (Derived from '*A general Theory of Adapting Behaviour*'), paper presented at the American Cybernetics Society Conference on Communication and Control in Social Systems, Philadelphia, Pennsylvania, October 1974; http://files.eric.ed.gov/fulltext/ED105330.pdf.

Stiglitz, J. E. ((2009), *The Current Economic Crisis and Lessons for Economic Theory*, Eastern Economic Journal Vol. 35, pp. 281–296.

Such, J (1986), *Szkice o dialektyce* [*Essays on dialectics*], KiW, Warsaw,.

Sweezy, P. M. (1994), *The Triumph of Financial Capital*, Monthly Review. An Independent Socialist Magazine, Vol. 46, Issue 02 (June) http://monthlyreview.org/1994/06/01/the-triumph-of-financial-capital/

The ASC Glossary (n.d.) American Society For Cybernetics; http://www.asc-cybernetics.org/foundations/ASCGlossary.htm

The Long Demise of Glass-Steagall. A chronology tracing the life of the Glass-Steagall Act, from its passage in 1933 to its death throes in the 1990s, and how Citigroup's Sandy Weill dealt the coup de grâce; FRONTLINE, 8 May 2003. http://www.pbs.org/wgbh/pages/frontline/shows/wallstreet/weill/demise.html

Tobin, J. (1984). *On the efficiency of the financial sector*, Fred Hirsch Memorial Lecture, Lloyds Bank Review, New York, Lloyds Bank Review, No. 153, July, pp. 115, https://economicsociologydotorg.files.wordpress.com/2014/12/tobin-on-the-efficiency-of-the-financial-system.pdf ; reprinted in J. Tobin, *Policies for Prosperity; Essays in a Keynesian Mode*, edited by Peter M. Jackson, Cambridge: MIT Press. pp. 282-296,.

Treanor, J. (2015), *The 2010 'flash crash': how it unfolded*, The Guardian, 22 April 2015; http://www.theguardian.com/business/2015/apr/22/2010-flash-crash-new-york-stock-exchange-unfolded

Umeda, Y., Takeda, H., Tomiyama, T., Yoshikawa, H. (1990), *Function, Behaviour, and Structure*, in: J. S. Gero (ed.), *Applications of Artificial Intelligence in Egineering V*, Vol. 1; *Design, Computational Mechanics Publications*, Springer-Verlag, pp. 177-193. http://diyhpl.us/~bryan/papers2/Function,%20behaviour,%20and%20structure%20-%20Umeda%20-%201984.pdf

Urstadt, B. (2009), *Trading Shares in Milliseconds*, MIT Technology Review, December 21, 2009; https://www.technologyreview.com/s/416805/trading-shares-in-milliseconds/

Vekshin, A and D. Kopecki. 2009, *Not So Radical Reform*, Business Week, Blomberg Business, December 30, 2009, http://www.bloomberg.com/bw/magazine/content/10_02/b4162024080832.htm

Walker, B., C. S. Holling, S. R. Carpenter, and A. Kinzig. (2004). Resilience, adaptability and transformability in social–ecological systems. Ecology and Society **9**(2): 5. [online] URL: http://www.ecologyandsociety.org/vol9/iss2/art5/

Web Dictionary of Cybernetics and Systems, headword: *Stability*, Principia Cybernetica Web; http://pespmc1.vub.ac.be/Default.html

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THE ABSTRACT OF THE PROJECT IS:

The research programme will integrate diverse levels, methods and disciplinary traditions with the aim of developing a comprehensive policy agenda for changing the role of the financial system to help achieve a future which is sustainable in environmental, social and economic terms. The programme involves an integrated and balanced consortium involving partners from 14 countries that has unsurpassed experience of deploying diverse perspectives both within economics and across disciplines inclusive of economics. The programme is distinctively pluralistic, and aims to forge alliances across the social sciences, so as to understand how finance can better serve economic, social and environmental needs. The central issues addressed are the ways in which the growth and performance of economies in the last 30 years have been dependent on the characteristics of the processes of financialisation; how has financialisation impacted on the achievement of specific economic, social, and environmental objectives?; the nature of the relationship between financialisation and the sustainability of the financial system, economic development and the environment?; the lessons to be drawn from the crisis about the nature and impacts of financialisation? ; what are the requisites of a financial system able to support a process of sustainable development, broadly conceived?'

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