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Review

The algorithm for the development of global financial crises

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Currently the world economy is facing a disaster whose size, behavior and overall circuit remains a mystery. We do not know what the outcome will be, whether the state of the economy will continue to strike or how to respond to counter-measures. But we can certainly say that there is one thing we know already, which is crisis. There is therefore the need for a radical restructuring of the global financial system. The present study aims at achieving an economic and mathematical model based on which complex information can be obtained about the quality, credit and financial market efficiency. Financial and credit markets are classified by level of information to market participants, how directors highlight factors affecting finance, buyers, sellers of shares in financial and credit markets, how they propose ways to alleviate or prevent consequences, which can be financial or credit crisis and who should bear the consequences of banking activities that generate "pyramids" finance.

Key words: Financial-credit market, econometric methods, financial crisis, financial resources.

INTRODUCTION

Modern economic theories reject the idea of a general theory of the global economic-financial crisis that would incorporate such an event in a general working model. This is because they consider that every financial crisis is unique, that it represents an historic accident, which has been generated by specific factors in a certain social economic and political context. According to these theories such a crisis cannot be anticipated so that the negative effects can be reduced to a minimal level. Although the causes of the cyclic evolution of economic processes are yet to be identified, this trait is however quite obvious. Based on these theories, the following study attempts to shape a possible economic model that takes into account the ever accentuated influence of changes in the global economy on the efficiency of the financial markets. Even though a unanimous solution is difficult to obtain, the proposed model can highlight the causes of the appearance and development of economic crisis.

Unlike the models that calculate the premises for future decisions, the algorithm of the development of global financial crisis represents: the link between the para-legal actions of certain structures, economic subjects that initiate, support and multiply the crisis; the steps that can and must be taken to overcome or avoid the crisis. Our research stems from the idea of shaping an economic-mathematical model that can generate complex information, which is necessary to all the participants in the financial-credit markets.

THE INFLUENCE OF THE CHANGES IN TECHNOLOGICAL PRODUCTS AND SERVICES

The needs of a society evolve with time and in a designated space. The ranges of products and services that cover the consumer's needs greatly influence the producers thus determining the offer and the request. We denote by $A = \{1,2,...,\alpha,..., a\}$ - the range of products and services the society requires. The producers partially

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manage to ensure the existence of such products, in concordance with the technological and scientific progress (TSP). We note by $B_0 = \{1,2,..., \beta,..., b\}$ - the range of products and technological services destined for the market. Under the impact of *TSP*, some products from the B_0 range are subject, in time, to change. The product β, $\beta \in B_0$ will be made of B_β changes. In the market, the consumer will come across the initial products and services plus their subsequent changes. We note by $B = \{B_1, B_2, ..., B_\beta, ..., B_b\}$ - the range of products and technological services that are offered to the consumers and the society as a whole.

The B range is contained within the A range (Figure 1). Every product and service can be subjected to certain modifications (m) (Urbany, 1996).

Every B_b range can potentially change its configuration: some modifications can be eliminated from production while some can be introduced (Figure 2).

$k_{\beta m \alpha}$ is the volume of capital investments, including operating costs required for production and modification of m product and service β that will cover the requirements (needs) α of society. The following variable is introduced:

$$X_{\beta m \alpha} = \begin{cases} 1, \text{ if the society's needs are covered by} \\ \text{modifying } m \text{ product and service } \beta; \\ 0, \text{ if otherwise} \end{cases}$$

Besides production costs $k_{\beta m \alpha}$, producers face costs of research, development, innovation and design (Grossman and Stiglitz, 1976). $S_{\beta m}(x) = \left\{ \alpha \in A_{\beta m} \middle| {}^{A}_{\beta m \alpha} = 1 \right\}$ entails the set of products and services covering the needs α of society by modifying m, the products and service β; $A_{\beta m}$ - range needs can be met by modifying m, the base product and service β. In order to determine the rationale for designing processes for the modification of m products and services β, we introduce the following variable:

$$Y_{\beta m} = \begin{matrix} 1, \text{ if } S_{\beta m}(x) \neq \phi \\ 0, \text{ if } S_{m_\beta}(x) = \phi \end{matrix}$$

By $S_\beta(y)$ - the set of changes in the products and services β that can cover at least one of society's needs is denoted:

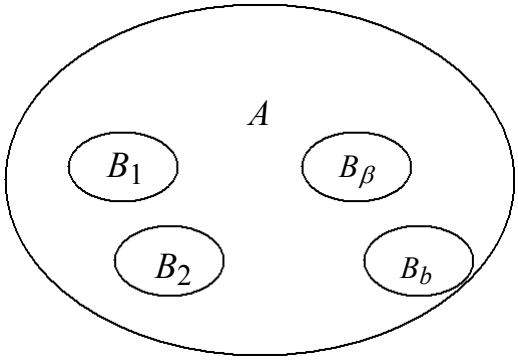

Figure 1. The B_β, $\beta = 1,2,..., b$ ranges are contained within the A range. Source: Elaborated by the author.

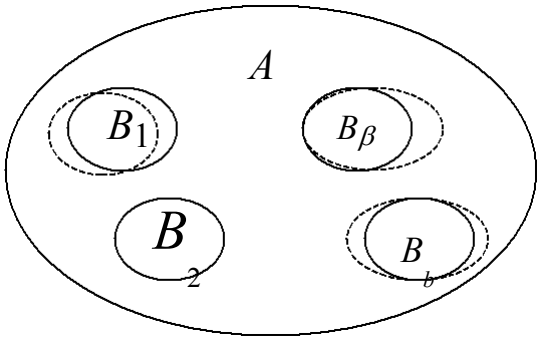

Figure 2. The B_β, $\beta = 1,2,..., b$ ranges from A can change their configuration. Source: Elaborated by the author.

$$S_\beta(y) = \left\{ m \in B_\beta \middle| y_{\beta m} = 1 \right\}$$

Costs related to research, development, scientific and technological development (Berliner and Brimson, 1988), innovation, designing changes in the products m and services β are determined by function $F_\beta(S_\beta(y))$. The total costs for goods and services β are:

$$f_\beta(x, y) = \sum_m \sum_\alpha k_{\beta m \alpha} \cdot X_{\beta m \alpha} + F_\beta(S_\beta(y));$$

and for all products and services:

$$f(x, y) = \sum_\beta f_\beta(x, y) = \sum_\beta \sum_m \sum_\alpha k_{\beta m \alpha} \cdot X_{\beta m \alpha} + \sum_\beta F_\beta(S_\beta(y))$$

(1)

Manufacturers of products and services function $f(x, y)$ determine the minimum conditions:

$$\sum_{\beta}\sum_{m} X_{\beta m\alpha} = 1,\ \alpha \in A \ldots.(2)$$

$$X_{\beta m\alpha} \le Y_{\beta m};\ \beta = 1,2,...,b;\ m \in B;\ \alpha \in A \ldots(3)$$

$$X_{\beta m\alpha} \in \{0;1\};\ \beta = 1,2,...,b;\ m \in B;\ \alpha \in A \ldots(4)$$

$$Y_{\beta m} = \begin{cases} 1, \text{ if } S_{\beta m}(x) \neq \phi \\ 0, \text{ if } S_{\beta m}(x) = \phi \end{cases} \ldots\ldots\ldots\ldots(5)$$

Optimal values X^*, Y^* can be $f(X^*, Y^*) = \min f(x, y)$, which are determined based on the algorithm (Alexeev and Vasilcovschii, 1989).

The ranges $A;\ B_0;\ B;\ A_{\beta m};\ S_{\beta m}(x^*);\ X^*_{\beta m\alpha};\ Y^*_{\beta m};\ S_{\beta}(y^*)$ are complex information (IC).

Producers of goods and services start from the needs of society. However, scientific and technological progress may suggest new needs of the consumer (example, computers, mobile phones etc.). Therefore modification of the ranges B_β, $\beta = 1,2,...,b$, can, in principle, "exit" range A (Figure 3).

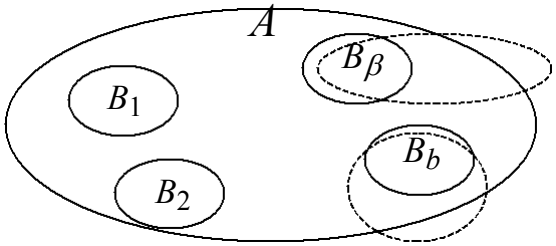

Figure 3. Ranges B_β, $\beta = 1,2,...,b$ in some cases can eliminate some needs and in others create new needs for the consumers. Source: Elaborated by the author.

THE EFFICIENCY OF THE FINANCIAL-CREDIT MARKET

Producers of goods (products) and services, based on the profit they make, can expand their activities. But with the emergence of technology performance, new principles, the need to modify products and services may require costs that exceed those available to the manufacturer (Lipsey, 1999). In these cases, producers use financial-credit market. Depending on a number of factors, financial-credit market may be poor, with little success, or have moderate and greater efficiency.

The efficiency of the financial-credit market =
- Negative, if the information is missing
- Reduced, if past information is known
- Moderate, if past information is processed using econometric methods
- Increased, if the complex information is known (IC)

It is difficult to define the quality of market, but it can be described. If for example, all the participants of the financial-credit market are at loss, then we can certainly say that that market is faulty (this model has not been taken into consideration, as our study is centered on developing a model that will be conducive for the avoidance of a financial-credit market); if the same participants win all the time, then the market is faulty as well (Held et al., 2004). If the participants do not have the complex information IC, then the market is definitely faulty; if the participants can predict the shares prices based on retro-information, then the market has reduced efficiency; if they use econometric methods to balance the shares prices, then the market will have a moderate efficiency.

The financial-credit market can contribute to a more efficient economy only if the stock seller correlates with the buyer and offers the complex information in (IC) at the right moment. The selling-buying processes can bring financial resources to some and profit to others. This can be exemplified.

At the t moment the investment bank releases stocks at the P_t price. The buyer, having the complex information from the moment t (IC_t), hopes that at the $(t + 0)$ moment, the price will be $P_{t+0} > P_t$. The target profit of the buyer is:

$$\frac{E(P_{t+0} \mid IC_t) - P_t}{\text{where } P_t} \cdot 100\% = E(\alpha_{t+0} \mid IC_t),$$

E - the mathematic target.

The α_{t+0} dividends are transformed into regulators. The money (M) is transformed into stock based on IC_t that brings the buyer the money $M_1 = \frac{1}{1 - \alpha_{t+0}} \cdot M$.

The raise of the dividends α_{t+0} contributes to the raise of the money the stock holders obtain. If both the buyer and the seller have the IC_t, then the financial-credit market has an increased efficiency; it creates justifiable financial fluxes; it helps make the economy more effi-cient; the cutting edge technologies attract more financial resources, which are necessary for the production of goods

and services.

THE POSSIBLE STATES OF THE FINANCIAL-CREDIT MARKET

We have established that the financial-credit market can have four possible states (Figure 4). The efficiency and inefficiency of this market can be determined by the level of information the participants of the stock commercial-lization processes have (LeRoy and Werner, 2001); the answer to the question, “Do the participants to the financial-credit market have the complex information?” can have four possible versions: (a) they do not; (b) they have retro-information; (c) have the complex information only partially; (d) have the complex information in full. According to this level of information, we can have the following situations:

(a) The financial-credit market is faulty; the financial resources fluxes and refluxes are irrational, they do not contribute to the development of new technologies and they sustain the global economic crisis; (b) the quality and efficiency of the market is reduced; old technologies are supported and they have no perspectives; new tech-nologies are not developed and the situation contributes to the global economic crisis; (c) the efficiency of the market is moderate; we encounter partial support both for the old and new technologies and the contribution to the global economic crisis is slow; (d) the quality and efficiency of the market is increased; the financial potential is directed towards supporting the new technolo-gies and it does not contribute to the development of a financial-credit crisis; this is more of a theoretical market than a practical one .

The complex information (1) to (5) that is available to all the sellers, buyers and producers directs the financial resources owners to sustaining the economy as a whole. To solve problems (1) to (5) is not difficult from a mathematical point of view, but from the point of view of the dimensions, volume and accuracy of the exogenous – it is indeed a great problem.

THE INSURANCE SYSTEMS REGARDING THE ACTIVITY OF BANKS

The scientific structures that would bear the responsibility for the quality of the recommendations – of the endo-genous complex information – must be organized in the context of the insurance systems. Unlike social insurance (Stegăroiu and Ţau, 2008a; 2008b), the insurance of the buyers may, but most not be supported by the society. The insurance systems for banking activities are those structures that should bear the burden of an economic crisis; they should be empowered with the right of controlling the financial resources flux.

In this context, we must not put a sign of equality between the banking insurance system and other insurance systems (Stegăroiu and Stegăroiu, 2009). The latter can become involved with the investment banks and find themselves in a win situation if the banking activities are correct; but they will be at a loss if the banks generate financial pyramids.

THE DIRECTING SYSTEMS FOR FINANCIAL RESOURCES

The financial-credit market is a system made of a string of mutually influenceable elements. In this situation, the owners of complex information which is developed and argued in a scientific way by the insurance system, become “direction operators”. They will also assume the function of a “regulator” (Figure 5).\

The owners of financial resources are the “direction bearers”. This is how a directing system appears on the financial-credit market. Thus the financial potential is used optimally and the financial-credit crisis can be avoided. In the global economic structures such a system is missing (Figure 6) which leads to the conclusion that apparently the financial-credit market is not regulated. Actually, it is “chaos” that regulates the market (Hogg and Huberman, 1991). Therefore, the financial potential, depending on the level of information of the participants to the financial-credit market, is used rationally, and the global financial crises are probable.

The current possibilities of the information technology allows for the substitution of chaos with a regulator. The problem is theoretically complex, yet solvable. From a political and national standpoint, the problem of regula-ting the financial-credit market is far from being solvable. The situation becomes even more complex when we have other economic subjects on the market that are capable of redirecting the financial fluxes and refluxes outside the economic circuit. (Blundell-Wagnall et al., 2008). Consequently the monetary mass inside the circuit decreases, financial resources from para-legal methods are stolen and extracted from the productive sphere, money becomes scarce and we have the premises for the development of a global financial crisis (Figure 7). The irrational fluxes and refluxes of the financial resources are backed up by some multibillionaires who are interested in redistributing the capital. They will draw back the liquidities; the mass media is alerted and a commotion over the impeding global financial crisis is created.

These actions contribute to the reduction of bank de-posits, to the increase of cash and consequently amplify the monetary mass, thus sustaining the global financial crisis. Therefore, we can identify three factors that initiate and aggravate the crisis: the bank that generates financial pyramids; multibillionaires that put effort into redistributing the global capital; mass media.

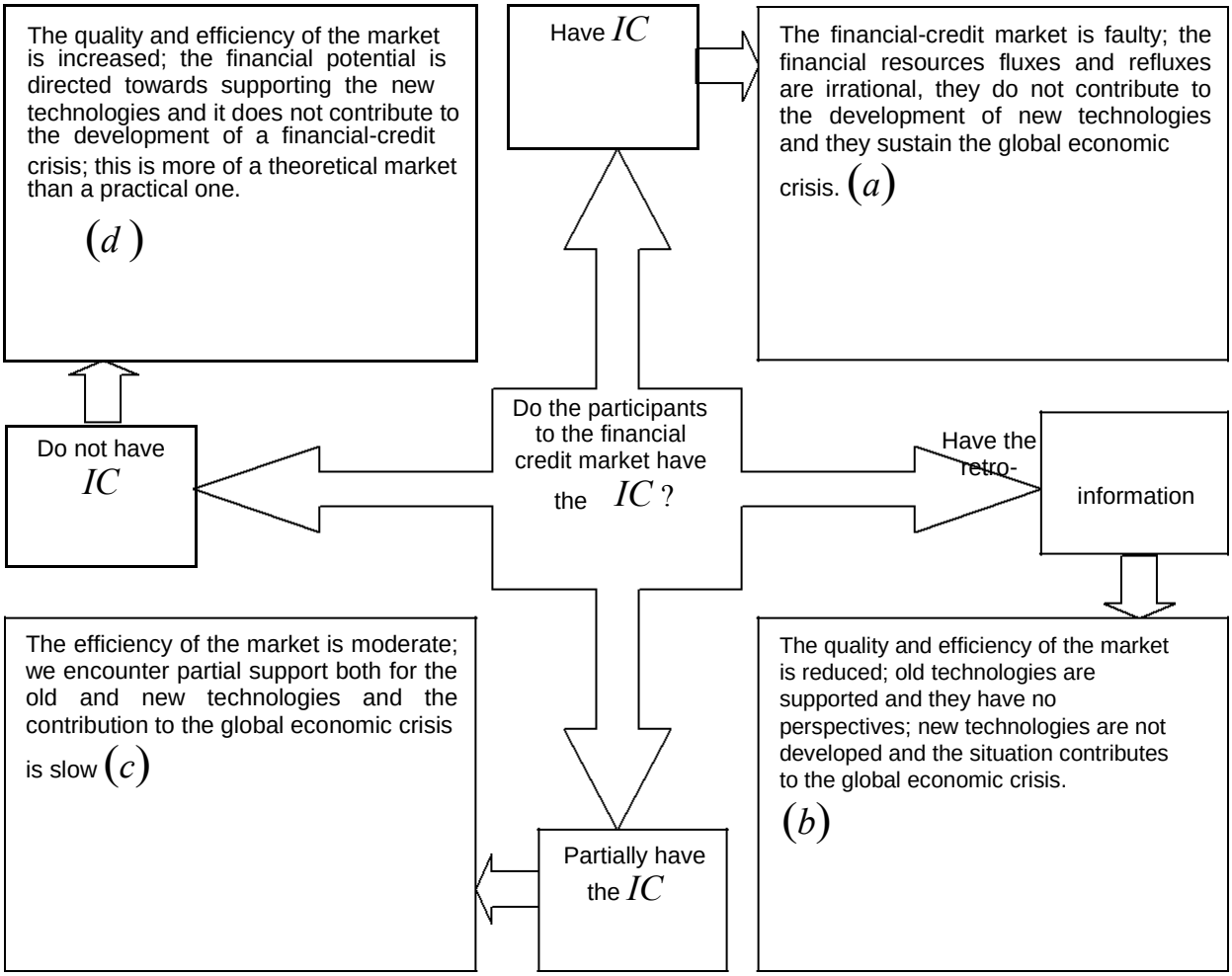

Figure 4. The block-scheme of "The quality of the financial-credit market". Source: Elaborated by the author.

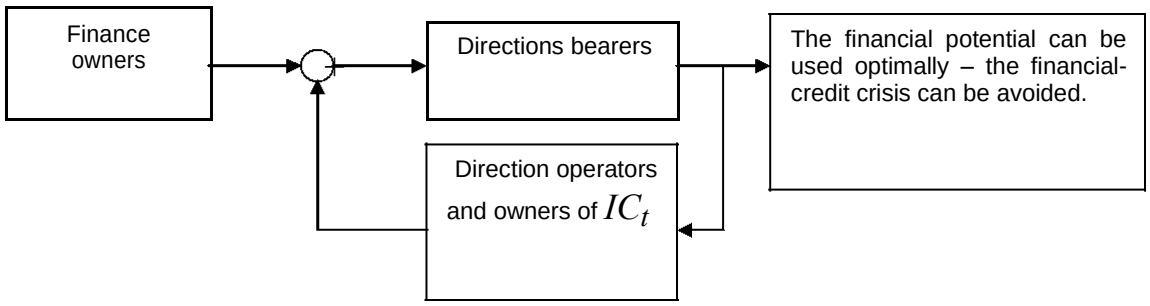

Figure 5. Block diagram of "The optimal targeting of financial resources". Source: Elaborated by the authors.

The impossibility of influencing these actors leads to the conclusion that global financial crises are imminent. However, the financial-credit crises can be softened. In order to do so, scientific research must be conducted at a global level with branches in the national economies.

THE AVOIDANCE OF GLOBAL FINANCIAL-CREDIT CRISES

Studies about the global technological evolutions, based on calculated, tested and accurate economic data can offer

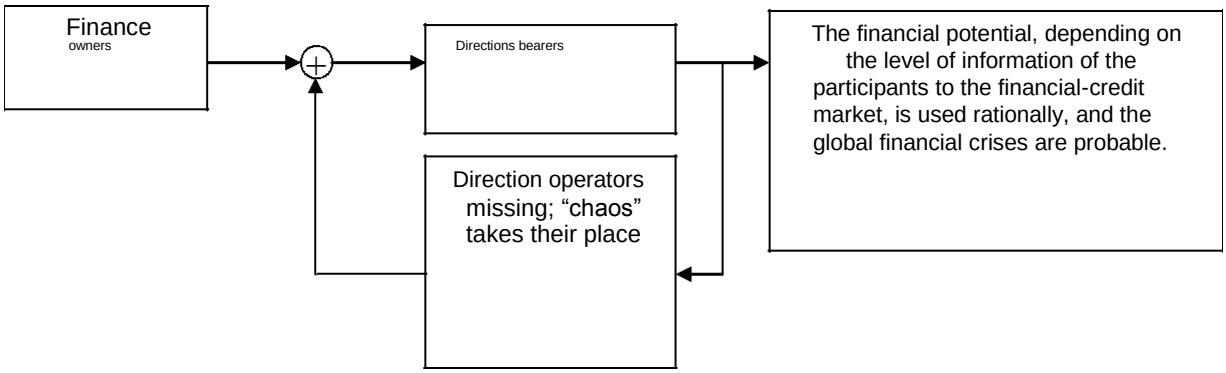

Figure 6. Block-scheme „The random directing system for financial resources". Source: Elaborated by the author.

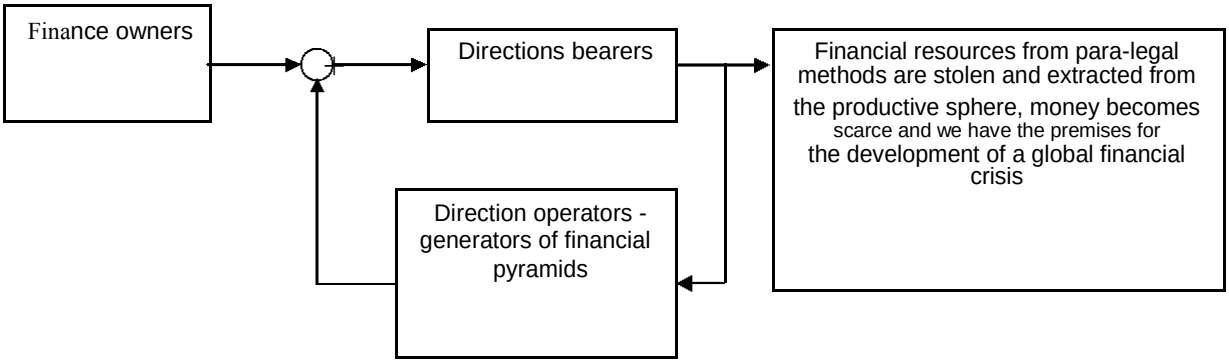

Figure 7. Block scheme „The destructive directing system forfinancial resources". Source: Elaborated by the author.

offer complex information that can oppose the damage caused by the three disturbing actors.

This scientific research is conducted based on exogenous information; endogenous indicators are calculated and the complex information is available to: insurance structures, producing companies, active sellers; active buyers (Figure 8). Consequently, the complex information helps make the financial-credit market more efficient. Correctly informing the population about methods of calculation and the success of TPS acts like direction operator and regulators for the financial fluxes. These regulators also have a certain impact on correcting the operations of banks.

In crisis situations, banks have three regulators: the monetary basis (B); the mandatory reserves (22); the cash interest in the quantum of deposits $(C\,2)$ (Figure 9).

To overcome crises we can have various alternatives:
(1) the three disturbing actors initiate and develop global financial crises; the national governments strive to support the banks with the financial resources of the future generations; (2) the three disturbing actors initiate and develop global financial crises but the insurance structures, the national governments, the global structures give sanctions to the dishonest banks and the burden of the loss is borne by the banks and their shareholders.

CONCLUSIONS

The financial-economic crises are generated by the imperfect functioning of the financial-credit markets; these markets cannot and must not be regulated; all participants to the commercialization process must be offered the complex information in order to make the financial-credit markets more efficient; according to statistic, financial crises have proven a source of profit for some, but a burden to the society as a whole; financial-economic crises can be localized, if the investment banks that generate financial pyramids are monitored and san-ctioned in due time, while the burden of these sanctions is borne by the shareholders and not the society; the
national governments use unsatisfactory economic policies

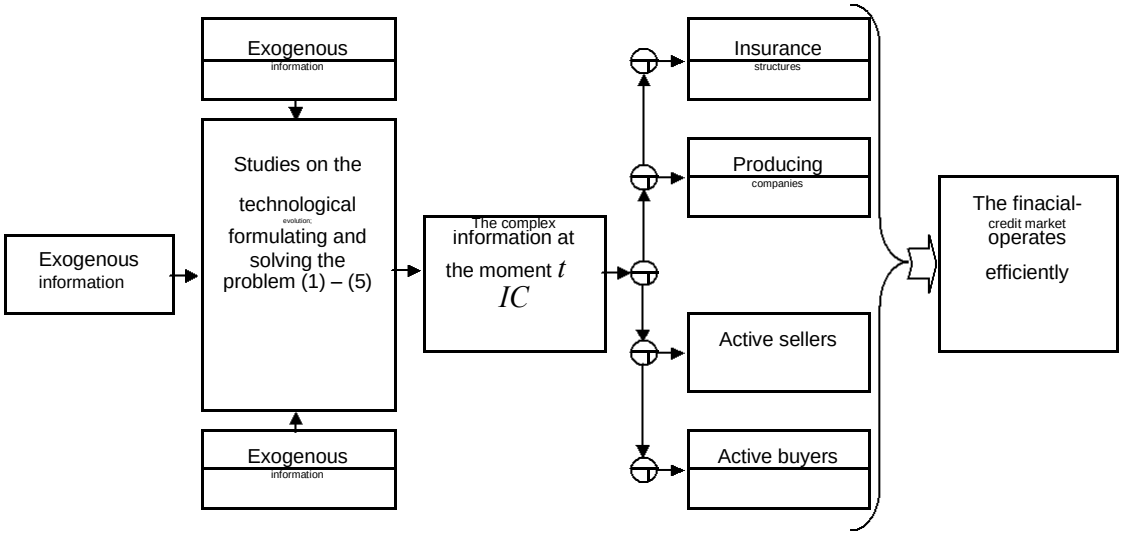

Figure 8. Block scheme for avoiding global financial-credit crises. Source: Elaborated by the author.

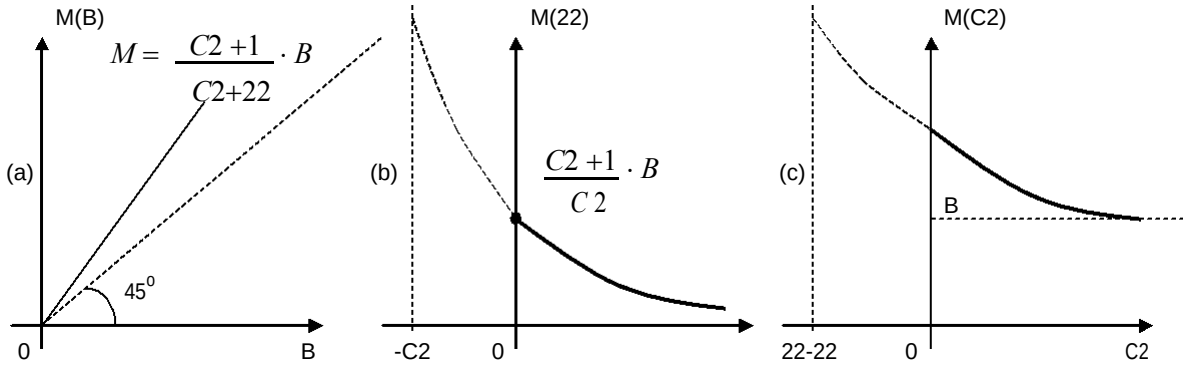

Figure 9. Graphs for the evolution of the monetary mass. Source: Elaborated by the author.

economic policies to create social and economic problems that are justified through the development of global financial crises; the ensuing psychosis undermines the trust of the population in investment banks and reduces the amount of bank deposits; the monitoring system for banking activities must not be incorporated into IMF, which is an advantage-taker and not a savior of the afflicted national economies; the world economy needs a scientific-practical structure, where problems, successes and complex information for the national and/or global economies are determined; the research conducted within the IMF and the security services by Rogoff and Reinhart (2008) has a consulting character: when the IMF is required to sell its financial resources and not when the banks that generate financial pyramids are sanctioned; this scientific-practical structure must also operate inside the UNO, after a certain constitution, accepted by all the member states; in the list of advantage-takers we must number alongside the IMF and BERD the countries that import energy resources and raw materials; the global financial crisis has also transformed into an economic mechanism of influencing the political and economic direction of certain countries that export natural gases, oil and metals. Taking these economic, military and strategic interests into consideration in the context of the global financial we can conclude that the financial-credit market can become efficient only in theory, while in practice, global financial crises are imminent. Thus, the negative consequences affect mostly under-developed countries, in two ways: during a period of crises (the pessimist way); during periods of normal global economic operation. Crises have different development periods. There is no such period when crisis is absent in any country. They have become a governmental excuse for corruption, unprofessionalism and lack of economic successes.

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