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# Architecture of Flows and Financial Stocks

## Mechanism and transmission channels, flow, transmitters and receivers

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***Abstract*—Financial space is a monetary representation of all the other areas that can be identified and defined in society, particularly in the economy and can be considered a set of specific financial interconnections with defining characteristics that distinguish them. With the profound changes in the way interconnection entities socioeconomic using new communication channels, appear more frequently in discussions of specialists and not only a series of issues related to currency, under its virtual financial risks related to cyberspace the degree of "domination" of information networks. In this context, this research paper will try to bring a series of contributions on how this space is designed financial according with the complex network of adequate risk.**

***Keywords-network; financial space; financial risk; model***

***JEL cod-C45, D85, L14, L86***

## I. INTRODUCTION

Any company for aces achieve its objectives in the short, medium or long interacts with his or her social, economic, natural. From a financial standpoint, the company relationship with its environment can be formalized and appealing to the concept of financial networks.

In this way it can reflect a financial structure at micro or macro identifying interconnections between autonomous entities, recognized and identified legal, economic and social.

On the other hand, financial area is a monetary representation of all the other areas that can be identified and defined in society, particularly in the economy and can be considered a set of specific financial interconnections with defining characteristics that distinguish them. Financial capacity is dual, presenting two often contradictory stances: all entities, channels, collection of stocks and flows, on the one hand and all entities, channel, placement of stocks and flows. In this context we intend to analyze financial network components and a better delimitation of the risks that may occur in such types of networks.

## II. MATERIALS AND METHODS

Regarding the methodology of research on financial environment, complexity and diversity of the issues addressed have required the use of methods, techniques, tools, and procedures of scientific investigation and interpretation to which it's attached particular importance:

- ✓ Documentation, namely, accessing and studying general and specialized bibliography, domestic and foreign, state approach to knowledge issues investigated financial environment and scientific substantiation of the research.
- ✓ Rational method, used as an instrument of knowledge, reflection, analysis, organization, and ongoing scientific research approach.
- ✓ Integration of forms, methods, and logic operations research carried out through the use of analysis and synthesis, abstraction and concretization, comparison, generalization, and systematization.
- ✓ Statistical methods, through the use of descriptive statistics and statistical analysis.
- ✓ Observation method, carried out systematically and analytically.
- ✓ Discussions with experts from institutions and national and international institutions, but also the beneficiaries of financial products and services.
- ✓ Data analysis and interpretation, using graphs, tables, and figures to highlight various developments in financial environment.

Using the classic instruments of scientific research, based on analysis and synthesis, induction and deduction, general and particular, and adding modern methods, authors achieved substantial and pertinent analyses and studies on financial environment main ways, both internationally and especially national. Contributions of authors on investigated issue are highlighted during the research work and theoretical and applicative significance value resulting from the conclusions and proposals that they have formulated and promoted.

The research results are presented using formulas, tables, figures, and graphs. The theoretical information needed for the research was taken from literature and specialized works in the field of financial environment investigated, from home and abroad. Statistical information and concrete data on how financial environment works were taken from reports and statistics of institutes involved in financial environment in the country and abroad as well as to public bodies and private specialist.

This method of analysis provides a more rigorous substantiation of the decision-making process and also maximum reduction in uncertainty.

## III. Results and Discussions Collecting Financial Network (RFC)

Within this network are mobilized availability of money from business entities that have capacities of funding. Financial instruments which are collected availabilities monetary deposits (DP) and securities (TV).

Both deposits and securities are diversified maturities, interest, ways etc. tailored bidders currency needs to exploit their advantage as availability. However, the two types of instruments have specific hedging techniques, to protect the interests of tenderers, risks arising from the economic environment, the banking entities and the investment vehicle used for "investing" cash collected.

Within this network operates two categories of participants:

a). availability bidders (ODP), represented by households (GP), businesses (FR), State (ST) and even financial institutions (FIs). For methodological reasons we have not considered "outside", i.e. financial relations with subjects from abroad.

b). collecting financial institutions (IFC) which can be separated according to the two types of institutions collection (ISC): banks (IB) and non-banks (IN).

They are universal and specialized banking institutions (commercial banks, popular banks, savings banks, investment banks, etc.) defining characteristic being that the conversion of deposits into investment instruments (IPL), generating and money creation. At the same time, these institutions performed and cash receipts and payments in the economy.

This network of collection of deposits (PDP) is highly regulated and controlled mainly by the National Bank and banking institutions, balance supply and demand parameters have been established, usually by banks (both for short-term deposits -PDZS - and for long-term deposits - PDZL)

Availability collect non-bank institutions using a variety of securities purchased by bidders liquidity, availability and places them investors, to those who need short-term liquidity. Disintermediation has triggered such a diversity of financial institutions, which have adapted their tools bidder's needs. Such institutions are: insurance companies, pension funds, mutual funds, investment funds, securities companies, etc.

These institutions store their availability collected from banks, representing institutional deposits with funds managed by management companies specialized.

Financial network collection is divided into components differentiated in many respects, the main components are: subnet mutual funds (PFM), subnet insurance (PAS), subnet investment funds (PFI), subnet pension funds (PFP), subnet mortgage (PIC) and so on these components by connecting to financial institutions, network placements. Typically, this network constitutes institutional liquidity (LIT), capitalized strengthened through professional management of investments.

A subnet distinct, specific network of financial collection is the subnet collection of the state (PCT), through which the state raises its financial resources (using Treasury - TPB) subnet is divided into two parts: subnet tax collection (PCF) and subnet public borrowing (GDP).

This distinction does not mean separation, segmentation, strict collection, banking institutions operating in the subnet securities, using financial instruments for attracting cash deposits (certificates of deposit). Also in this network act and Treasury, institution using financial instruments to borrow both from the public and from financial institutions, constituting often and warehouses.

Simplified financial network collector is shown in the following figure.

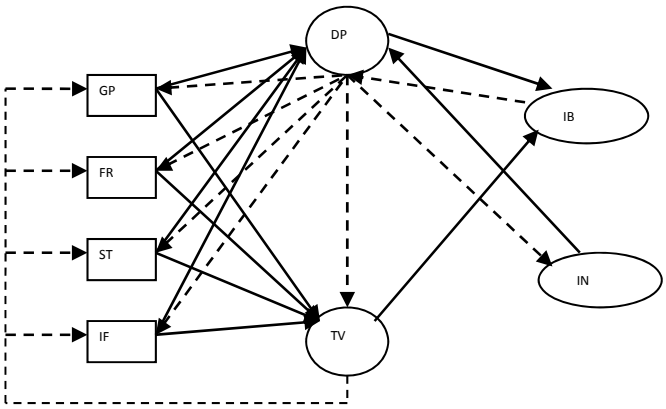


FIGURE I. COLLECTING FINANCIAL NETWORK

$$R_j = \frac{(DSB)_j}{\sum_{i=1}^{4}(DSB)_i} = \frac{(DSB)_j}{DST} = \frac{\sum_{i=1}^{4}(DSB)_{ij}}{\sum_{i=1}^{4}(DSB)_i} \quad (5)$$

$R_j$ = collection rate by the j instrument.

$$DPF = DPD + DPI - DPT = \sum_{i=1}^{4}\sum_{j=1}^{2}(DSB)_{ij} = \sum_{i=1}^{4}(DSB)_{i1} + \sum_{i=1}^{4}(DSB)_{i2} \quad (6)$$

DPF = final bank deposits.

$$R_f = \frac{(DZ)_f}{DPF} \quad (7)$$

where

$R_f$ = the rate of formation of deposits (direct or institutional).

$$DBZ = \sum_{l=1}^{5}(DBZ)_l \quad (8)$$

where $l = \begin{cases} DSB_{j=1} \text{ for } i=1, 2, 3, 4; \\ DSB_{j=2}. \end{cases}$

It defines five categories of interest such (l): four related bidders "i" and one related to the bonds (TV).

$$DPF = \sum_{f=1}^{5} (DPF)_f = \sum_{i=1}^{4} \sum_{j=1}^{2} (DSB)_{ij} \quad (9)$$

$$RIC = \sum_{k=1}^{2} (RIC)_k \quad (10)$$

when

$$k = 1 \rightarrow RIC_1 = \sum_{l=1}^{5} DBZ_l \quad (11)$$

$$k = 2 \rightarrow RIC_2 = \sum_{i=1}^{4} RTV_{it} \quad (12)$$

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$RTV_t$ = retribution of t securities.

So:

$$RIC = \sum_{l=1}^{5} (DBZ)_l + \sum_{i=1}^{4} RTV_{it} . \quad (13)$$

$$R_k = \frac{(RIC)_k}{\sum_{i=1}^{4} (DSB)_{jk}} \quad (14)$$

where

$R_k$ = remuneration rate of cash collected.

k = 1 şi 2.

For k=1:

$$R_1 = \frac{\sum_{l=1}^{5} (DBZ)_l}{\sum_{f=1}^{5} (DPF)_f} . \quad (15)$$

For k=2:

$$R_2 = \frac{\sum_{i=1}^{4} (RTV)_{it}}{\sum_{i=1}^{4} (DSB)_{i2}} . \quad (16)$$

Formalizing financial network collectors can provide ways of determining the "charges" inadequate flows across their networks (availabilities, securities and deposits) and 'resistance' remuneration determined rates circuits managed uncorrelated. This way you can intervene to fine-tuning of network operations, through regulation.

## IV. Network of Financial Placements (PPF)

Through this network is realized or mediated direct distribution of monetary resources collected by entities that need funding. Face potential supply demand, supply enabled by financial institutions. The financial instruments used are of two categories: loans (CR) and marketable securities (TPL).

The two categories of instruments are highly diversified and differentiated, tailored and demand conditions of liquidity, this diversification aimed at "prices" attached, including interest, risks that accompany differently each type of tool, risks arising from the beneficiary liquidity (investor) the nature of the instruments, the management of financial institutions, the economic environment for business etc. Diversification is generated by the agreed period, the procedures for reimbursement, the specific nature of financial institutions and clients, investors, liquidity destinations.

Loans and investment securities delimit distinct financial subnets regulated differently, sometimes two categories of tools are transformed into each other.

In this financial network operates two categories of participants:

a). financial institutions for placements (PFIs) which are usually collecting financial institutions (IFC), but manifests and other institutions only investment activities, investment financial institutions (IFIs), valuing them up or deposits funds in investment securities.

We can write the following relationship:

$$\alpha(IΦΠ) = \alpha(IΦX) + \alpha(IΦI) = \alpha(IB) + \alpha(IN) \quad (17)$$

where

*a*). Represent the flows in financial network of placements

b). Applicants for financial resources (SRF), which is real demand for financial resources to invest them, applicants are primarily companies (FR) and the State (ST), and households (GP) and financial institutions (FIs).

The relationship between banking institutions and non-banking financial institutions functional, subnet being interconnected segmented into two compartments - subnet loans (PCD) and subnet investment securities (PTL). However, it is a network unit, the two types of financial instruments are transformed into each other.

Subnet loans divides subnet interbank (PRP), the major component of the network supply (PMT), subnet credit economy (PCE), corresponding to overall loans to the economy, subnet public credits (PCB), subnet consumer loans (PCS), subnet credits mortgage (PCI) etc.

A separate subnet, subnet connected public credit (counterparty of public loans), a subnet is public investment (PIP) which the state places, in various forms, the necessary liquidity for the investments in the economy. This is part of the network subnet public investments (PDB).

Subnet investment securities (PTL) is divided in turn into actions subnet (CAP), i.e. property titles and subnet bonds (POB), both forming subnet securities (PVB), subnet short-term securities (PTT), etc.

Network financial investment is divided but not only after the nature of the instruments but also after the formation of their prices, representing initial core network (PPR), in which they sell securities by applicants liquidity, which become beneficiaries cash to liquidate Title, often with investor liquidation. Securities are purchased through financial institutions by liquidity supply, which may be financial institutions, which are investments in institutions (PLI), various so the private placements (PLP), the primary network dividing it from this point of view the primary network private placements (PPP) and the core network of institutional placements (PPI).

Securities acquired are then negotiated within the network side (PSC), supply and demand being generated by bidders to availability, which entered the subnet stock (PBS), institutionalized form of PSC, connect their differentiated financial resources, motivations being either protecting, gain, often speculative, of "propriety" etc.

Subnet investment securities generated a kind of risk, "distribution" with a speculative load special, often volatilizing securities values, values that become the object of transactions, naming the subnet sub net derivatives (PDV).

The two types of investment instruments often, as I said, is transformed into one another, especially loans becoming investment securities, recorded in this process of deleveraging, i.e. to reduce the flow of loans in favor of flows investment securities .

It identifies such a different subnet within the PPF, subnet transformation investments (PTP), under its securitization (PTR) is an essential component, these transformations carried out both types of loans between and among types of securities. This subnet is structural (PST) in PPF, changing the structure of investments.

Differences between the two components of the network are obvious financial investments beyond their interconnections.

Subnet loans, creating currency can be called a subnet extensional (PEX) is controlled and regulated by the National Bank and banks, the latter setting unilateral characteristics of loans, especially their price, interest rate, which reflects the "equilibrium" between supply and demand financial resources. This network is a network of intermediation, banks making deposits in credit conversion, thus breaking the intermediation of savings cash flow (offer) for investment (request), constituting a bridge transit, sometimes dangerous and often onerous. Risks are controlled by banks, usually to their advantage and not of bidders or applicants, banks often by transferring the risks to the economic environment or the proper management, the bidder's availability.

Subnet investment securities is more open than the banking network, especially through component stock, supply and demand of funds more transparent price setting, usually interest, but a subnet is more risky, speculative, volatile. Specific network's institutional financial investment shown in the following figure simplified.

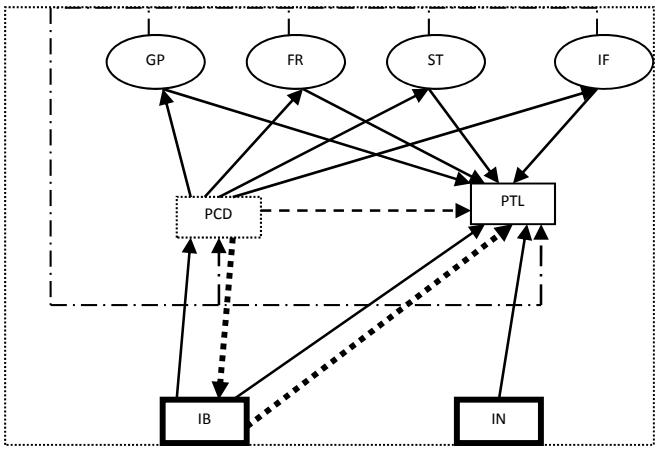


FIGURE II. NETWORK OF FINANCIAL PLACEMENTS

Simplified scheme highlight the existence of two-way money flows oriented networks:

- from financial institutions for applicants for financial resources, especially companies and state through loans and investment securities purchased in the name of bidders, the financial institution has collected;

- since applicants of placements to financial institutions is realized cash flows that financial resources are returned only in terms of chargeability and also paid the prices of investment instruments.

Within the financial placements network, the central place it occupies banking institutions, because all money flows transited both on loans and investment securities (if their financial resources placed are in bank deposits) and prices of investment opportunities and returns financial resources.

We will make the following notations:

$(PLT)_i$ = total placements from the perspective of each applicant.

$$\sum_{i=1}^{4} (PLT)_i = PLT \tag{18}$$

where

PLT = total placements, ie total financial resources procured by applicants.

From the perspective of placements instruments PLT is calculated as:

$$PLT = \sum_{r=1}^{2} (PLT)_r \quad , \tag{19}$$

where

r represents the two categories of placements instruments, loans and securities.

At the same time, total placements can be determined and the amount of placements of the two categories of financial institutions

$$PLT = \sum_{m=1}^{2} (PLT)_m \tag{20}$$

where

m = category of financial institution.

Total financial resources (RFT) obtained by each of the four types of applicants could be estimated as:

$$(RFT)_i = \sum_{m=1}^{2} (PLT)_{mi} = \sum_{r=1}^{2} (PLT)_{ri} \quad . \tag{21}$$

Obviously, it checks the relationship:

$$\sum_{i=1}^{4} (PLT)_i = \sum_{i=1}^{4} (RFT)_i \quad . \tag{22}$$

Based on these indicators can determine some significant rates for characterizing network voltages and resistances from institutional placements network (RIP).

$$R(PLT)_i = \frac{(PLT)_i}{PLT} \tag{23}$$

This rate expresses the load flows of financial resources of each applicant.

$$R(PLT)_{ir} = \frac{(PLT)_{ir}}{(PLT)_i} \tag{24}$$

where

r = placement tool used.

This rate reflects the distribution of financial resources the applicant on the two placements instruments.

$$\sum_{i=1}^{4} \sum_{r=1}^{2} R(PLT)_{ir} = 1 \tag{25}$$

Do the following notation:

RTP = The total remuneration of placement instruments.

$$RTP = \sum_{r=1}^{2} (RTP)_n = \sum_{i=1}^{4} \sum_{r=1}^{2} (RIP)_{ir} \tag{26}$$

$$RIP = \sum_{r=1}^{2} \sum_{m=1}^{2} (RIP)_{rm} \quad . \tag{27}$$

The two relationships highlight the contribution of each applicant, and financial institution to total remuneration of placements.

Further note:

CRT = the total remuneration coefficient of placement instruments.

$$CRT = \frac{RTP}{PLT} = \frac{RTP}{LCT} = \frac{\sum_{i=1}^{n} (RTP)_i}{\sum_{i=1}^{n} (PLT)_i} \quad . \tag{28}$$

Depending on the analytical requirements of the network can be so detailed rates and coefficients and indicators.

Formalizing financial placements network provide ways of determining the "charges" flows across their networks (availabilities, securities, deposits) and 'resistance' remuneration determined rates circuits managed uncorrelated. As with financial market collectors using monitoring using indicators proposed, can intervene to fine-tune the operation of the market through regulation.

## V. Conclusion of the Financial Network and Its Risks

Accepting the standard definition of risk as the probability of an event with adverse effects for economic issue, the risk of network financial area can be defined as the probability of occurrence, outbreak and after one incident network that may affect the achievement of favorable network features financial and its interactive flow. The risk is a risk of network flow, which disrupts, damages interconnectivity and interactivity of network elements, constituents, or transients distribuend having adverse effects fulfillment financial network characteristics.

Network risk exposure represents the potential value or actual losses arising from damage to these characteristics, measurable value directly or indirectly through reductions in expected revenues or increases in expenditure considered properly carried out under normal network features. Achieving adequate functional characteristics is that state network which ensures its aims fulfilling its conditions, conduct interactive streams to capitalize functions and potentialities forms of monetary financial assets by transferring financial and monetary instruments.

Approached in terms of the flows and network, explained above, also one of the possible perspectives, risk Network monetary manifests feature size institutive network, led by malfunctions occurred in the way it conducted the institutionalization of the network, its characteristics, network interactive fulfilled by financial market flows. If the market performs interactive content network financial market institutions, is shaped to achieve this content, dysfunctional form affecting content, the risk of network representing just within disturbances form, for example in regulating markets, network, regulatory understood as establishing rules functional on the reliability, network complexity or velocity, so its interactive flows.

Financial network realizes its goal defining, generic, dynamic balance between demand and supply of currency in market conditions institutionalized in which network elements are regulated, organized, coordinated, supervised, even controlled through a system of relations, attributes and differentiated responsibilities entities network system has rules and procedures for instruments and operations, leading market institutionalize quality network operation, network risk as a consequence of inadequate network.

According to the definition and delimitation of the above risk in financial area network has some distinctive features, the most relevant being:

- ✓ is a risk that disrupts interaction network flows, affecting force interactivity, asset transfers, distributive and transitive element of the network, especially of its constituents, interactive network that gives individuality potentiality, finality;
- ✓ is a risk affecting the interconnectivity network connections, connections between elements, allowing and encouraging implementation of interactivity risk of decoupling, distortion, distortion, debilitating dephasing of these links, interconnectivity giving network coherence, consistency and validity; this feature is reflected, for example, by affecting interfaces and nodes, the financial center coupling and connection, monetary conversion operators etc.
- ✓ is a risk that manifests itself by altering the characteristics of flow and network at risk of authenticity network in anticipation of this research feature is bearing risk, risk, regardless of the characteristic altered induce damage interconnectivity and disruption of interactivity, reducing active capacity network to transfer and convert currency, monetary forms by distributing tools and transient operations;
- ✓ is a risk of tripping, accompanying and strengthening of risks specific to the monetary and financial, for example, reduced labor clotting network can trigger risks such as liquidity, shortage of funds, or, in another context, risk not recovered correlated with the course, can also strengthen financial risks caused by internal or external environment of an entity or inadequacy of the financial instrument;
- ✓ is a risk of the spread, the contagion of perpetuating all risks specific to the financial, for example, network disengaged increasing the likelihood and extent of the risk of interest rate or insolvency, contagion assuming, however, generation by disrupting interactivity specific risks favoring inclination and preference for risk of network entities;
- ✓ is a risk arising from the embodiment of interactivity the way of establishing interconnectivity financial space, ie a specific hazard of institutions, rules, manifest markets, network interactivity.
- ✓ This feature highlights network risk that as a human creation, even if it is determinative social financial network constitute the institutional forms, and in this respect, the risk of network failures is caused by the embodiments of the financial network.
- ✓ Obviously, in light of this research, that this is the defining characteristic, but not essential for risk in the financial network.
- ✓ Action risk network of space Financial is mediated by specific risks of this space, the risk of network generated, as I said, malfunctions institution is perceived by the impact of one or more specific risks induced by the emergence and manifestation risk network its concrete shape, as determined by the affected network feature. In this respect, the risk action network reveals that act to enhance the propagation of specific risks.
- ✓ This bias is achieved through three channels:
- ✓ Channel incompleteness configurational, and insufficient organizational incompleteness of the network, its entities, the network is unable to achieve monetary transfer forms, financial instruments in accordance with the aims and its potentialities. Incapacity can be constitutive entities, driven by its attributes organizational or topology Configuration, which was endowed regulatory, institutional, or be a incapacity inductive induced environment, the monetary system, for connections to other economic systems and social. For example, one segment of the financial market, the bond market can boost the risk of interest rate due incapacity banks to conduct money creation sufficient to incapacity business entities to achieve savings needed, or firms to cover part significant financing needs from its own resources, organizational character of incapacities on the format constituent entities: bank deposit insufficient population occupational unstructured, non-oriented companies to the market. In addition, the network might not have the distribution nodes and links of sufficient or adequate interfaces with the environment, with customers.
- ✓ Channel inadequate network of inconsistency compositional and misrepresentatives streams interactive, network Not having the instruments and forms of currency appropriate, and also flows transfer their interactivity not reflecting enough or reflecting

deformed inauthentic actual demand for money transfers through instruments available. In this respect, for example, lack or shortage of trade credit instruments, weak institutional and expansion of non-banking financial flows, such as mutual funds can help the emergence risk of blockage and bankruptcy.

- ✓ Channel of inactivity of network, of dephasing operational and disconnection of circuits, network operating often incorrect, invalid transfers of currency, i.e. without justification or sufficient coverage of risk, and failing to ensure the achievement compatible to all streams of the complete circuit of the forms of monetary or financial instruments manifestation specific risks this channel is obviously facilitated by the action of the other two channels of interactivity, Configuration, and the interactions, compositionally.
- ✓ Favoring through three channels, spread risks specific monetary system, network risk, its concrete forms, adverse effects, generating net losses and claiming cost recovery, rehabilitation financial network.
- ✓ The risk of network effects can be separated into the following categories complementary:
- ✓ Direct effects that affect the network, generally speaking, network capacity to carry out appropriate forms of money transfer, fulfillment interactions, interactive streams, which constitute the essence of the network. These effects mentioned above, can be distortion, distortion, debilitating decoupling staggering, but other forms acquiring all the functionality affecting institutional financial network. The combination of these effects, creating a functional bundle of adversity may cause the network itself to become a generator of adversity, even if it is trying to solve its own failures, network entering the phase dyspepsia, training of nodes, such as hedge funds or lumps of blockage, which can often lead to serious damage to the network, in terms of spreading contagion and perpetuating risk due to concrete forms of network effects that trigger other category;
- ✓ Indirect effects induced by dysfunctionality institutional, through specific risks network financial flows interactive, influencing their performance, affecting the value forms monetary validity of financial instruments, their potential to maintain and multiply the value, in other words, yes to achieve the transfer currency buyers bidders from savers to those who invest. These effects triggered by network risk, by its concrete forms, takes the form of network-intermediated financial risks, risks that directly generates losses and committed costs, thus affecting performance, the goals, network functionalities and potentialities.

These types of effects cover a variety of distinct effects, generating losses and costs, such as depreciation forms currency, the bankruptcy of some financial entities, volatilization of financial instruments, eg shares, participation certificates, diversion of liquidity, etc.

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