

Outline of a Proposal to Reform the Institutional Architecture of Money, Savings, and Credit to Reach a Financial Sustainability

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How to cite this paper: Savona, P. (2018) Outline of a Proposal to Reform the Institutional Architecture of Money, Savings, and Credit to Reach a Financial Sustainability. *Modern Economy*, 9, 1103-1111. <https://doi.org/10.4236/me.2018.96071>

Received: April 8, 2018

Accepted: June 8, 2018

Published: June 11, 2018

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Abstract

The scope of this paper is to examine the complications raised by technical innovations in the financial field (fintech). The conclusion of this enquiry is that the current institutional architecture cannot guarantee monetary and financial sustainability as long as Governments decide to reform it using the already available instruments (cryptocurrency, blockchain, algorithms) instead of leaving them free to operate or limiting their use as they are doing. The same goes for any tentative to restate bank credibility forecasting money and financial instability starting from big data treated with traditional econometric methods.

Keywords

Financial Sustainability, Money, Savings, Credit, Cryptocurrencies, Artificial Intelligence, Algorithm, Blockchain

1. Introduction

Economic growth sustainability is a concept borrowed from the ecologists who consider having sustainable growth a biological system that preserves indefinitely its natural features. The dream of the economists is to have an economic system which supports indefinitely a sustainable level of growth; they have different views on how to reach this goal: some of them think that a free market is the natural vehicle; others see this task be performed by the State intervention. Stable conditions are a central feature of sustainability: the free marketers (mainly monetarists) consider that instability comes from money and finance markets and they suggest fixing monetary rules and giving financial freedom; the interventionists (mainly keynesians) consider the real sector be intrinsically unstable,

and this requires public controls, spending, taxation, and indebtedness [1].

The concept of sustainability has been extended to finance; most economists refer to a system of public control of market behaviors, but they are divided on a different approach to freedom; some ask for pervasive rules, others for simple surveillance. Recent history testifies that the rules can be bypassed by financial innovations, and surveillance cannot control the behavior of the operators. Regulations always follow, not prevent the crisis. There are many examples of failure of financial sustainability: Dutch tulip crisis, French John Law default, American Black Friday Crash, South America Sovereign debt insolvencies, and the most recent crisis of subprime credits; the last was a result of the “irrational exuberance” as defined by Alan Greenspan, the former Chairman of the Fed Board: mortgage credit was given without a serious creditworthiness and these assets merged with other triple A financial assets in some derivatives whose risk was valued under a mathematical hypothesis (the Black-Scholes-Merton Formula) that the market refused to substantiate [2]. If sustainability is a dream for real growth, it is an illusion for financial processes. The analysis of Charles Kindleberger gave historical support to the idea that we cannot have finance sustainability due to the psychological behaviors of market operators [3]; Hyman Minsky shared this view, but he gave more importance to the institutional framework [4].

A general view of the sustainability problem is that such a system requires three legs: environmental, economic and social. People usually refer to the conclusions of the UN World Commission on Environment and Development, known as Brundtland Report from the name of the chairman, which states the goals to be achieved for human prosperity, peace, partnership, and the protection of the Planet [5].

The scope of this paper is not to analyze either the history of the sustainability concept or the possibility of reaching such a system—already and extensively analyzed [6]—but to examine the complications raised by technical innovations in the financial field (fintech). The conclusion of this enquiry is that the current institutional architecture cannot guarantee monetary and financial sustainability as long as Governments decide to reform it using the already available instruments (cryptocurrency, blockchain, algorithms) instead of leaving them free to operate or limiting their use as they are doing. The same goes for any tentative to restate bank credibility forecasting money and financial instability starting from big data treated with traditional econometric methods [7] [8].

The first paragraph is a description of the logic of sustainability and the problem of its application to monetary and financial institutions. The second gives a short description of how money, savings, and credit markets currently work. The third shows the macroeconomic impact of reciprocal interference between these three markets. The first three paragraphs are a typical lecture for university students. The fourth paragraph states the deep changes recently occurred in the money, savings and credit markets, and the fifth puts forward a policy proposal

of an institutional reform to improve the working of monetary and financial market and their sustainability making use of modern technologies (blockchain, cryptocurrency, and algorithms).

2. The Current Working of the Monetary and Financial Markets

To understand the relevant features of the current working of the monetary and financial markets, we need to know 1) how money is created and used; 2) how financial savings is managed; and, 3) how risks to give credit and subscribe risk capital are assessed.

At present the money mechanism is based on the supply of legal (or high powered) money by a State organization (usually a central bank), which creates bank deposits—a typical fiduciary money—through a multiplier process induced by the interaction between credit and the payments systems. The demand for money meets the transaction and speculative needs of market operators. Being a numeraire, money should have a stable value, not only from the point of view of prices (inflation), but also from that of instability of the savings and credit values (mainly, risk of reimbursement). Banks use deposits as a source for giving credit mismatching the maturities; if they made mistakes in estimating creditworthiness, deposits cannot be totally or partially reimbursed. Hyman Minsky rightly wrote that money is “servant of two masters”: stability and growth.

To protect bank deposits the States created some different forms of guarantee schemes. In the US mainly the FDIC-Federal Deposit Insurance Corporation, many other countries have similar guaranties deposits. The European Union is trying to merge the various national DGS-Deposit Guarantee Schemes. The States also intervene directly as lenders of last resort or as banking crises resolution agents. These methods do not prevent the possibility of banks crisis and deposit insolvencies. Banks charge a fee for managing payments; on principle, current account deposits should not pay interests to enforce an opportunity cost to hold money instead of financial assets. However, banks very often do so, mixing money and savings, creating risks and time lags in the transmission mechanism of monetary policy decisions. Also on this topic there are plenty of articles and books. A very clear one is the textbook readings of Frederic Mishkin, an economist with large experience at the New York Fed [9].

Holding savings meets different instances to hold money. Economists are divided in interpreting the propensity to save: some (the neo-classicist or marginalists¹) believe that savings is induced by interest rates offered by intermediaries (this is why money should not bear any interest); others deem it residual once satisfied the demand for consumptions (the keynesians²); some others think that people have a long-term plan of expenditures in accordance with their “life cycle” (the Franco Modigliani hypothesis³).

¹This approach has many explanations; the natural references are that of Alfred Marshall [10] and John Hicks [11].

²The “residual hypothesis” is one the basic feature of the Keynesian model [1].

At present the management of savings is split between various types of financial intermediaries; pension funds are the most significant part of them and an important support for economic growth and social stability. The links between managers of savings and credit bankers are legally allowed (even formally controlled), involving the two functions in conglomerate strategies with different goals. At present the choices to invest savings are based on a mix of subjective and objective assessments. Despite the presence of control (or supervisory) authorities, mismanagement and abuse are always possible, mainly if plots or manias create “bubbles”. When necessary, to protect real growth sustainability the authorities decide the “euthanasia of savings”, *i.e.* the sacrifice of their yields, as happened in the recent crisis⁴. Usually the intermediaries of savings require a management fee independent from the benefits obtained by the savers, weakening their sense of responsibility.

In the past the credit system was divided between commercial banks, universal banks and the direct market (mainly stock exchange). The first were involved in short-term or “commercial” credit; regulations give a legitimacy to the use of their deposits at risk being this credit self-liquidating. The second granted medium or long-term credit for many purposes, such as to buy a house or finance productive investments, which require the use of savings at different maturities and risks. The third directly finances public and private investments, collecting savings on the primary section of the market and guaranteeing their liquidity (not the reimbursement) on the secondary or transaction market. Currently the bank credit system is subject to an *ex-ante* internal or external (by rating agencies) risk assessment of the borrowers (*i.e.* their capacity to reimburse debt), and by public authority surveillance. Financial markets (long-term debt and risk capital) are subject to an *ex-ante* control on the legitimacy of the offer and to *ex-post* surveillance by stock exchange authorities.

The assessment of the “merit of credit” (credit worthiness or rating) is central to the activity of savings intermediaries, being judges of the skills of managers combining labor and capital and testing market behaviours⁵. They should distinguish well from bad entrepreneurs as a necessary condition for an efficient functioning of the entire market, *i.e.* to avoid those good entrepreneurs be expelled by bad ones, as the Gresham Law for money.

The situation is such that the interaction among money, savings and credit creates risks from different perspectives in the monetary and financial markets,

³Franco Modigliani advanced this hypothesis with his student Richard Brumberg in the 1950s; however, he published a paper later [12]. The hypothesis has been positively verified in many countries.

⁴The concept was introduced by Keynes’ *General Theory* as “euthanasia of rentier”, considered responsible of a too high propensity to save instead of to consume, which creates an underemployment equilibrium that ethically legitimate to sacrifice savers, mainly denying to pay an interest. This policy has been implemented with the so-called Quantitative Easing of money creation by the Fed and other central banks during the recent crisis.

⁵Credit rating is a traditional internal activity of banks, but in the last century this function has been decentralized to rating agencies (Fitch, Moody’s, Standard & Poor’s) hoping to get a better credit-worthiness. Their role has been recognized by official authorities. Their performance is criticized after the wrong evaluations that brought to 2008 financial crisis.

far from guaranteeing the possibility of financial sustainability. From one side or another of these markets—mainly from a “run of deposits”—a crisis periodically starts, determining real instability and forcing policy decisions that influence market behaviors. Despite the knowledge of better policy instruments learning from experiences and theories, sometimes policy choices are not effective and contribute also to instability (as in the case of the decision to declare the insolvency of the Lehman Bros in 2008).

The situation has been complicated by monetary and financial innovations. After World War II the international money and credit markets developed the Eurodollars (*i.e.* Dollars created in Europe) and later the Xenodollars (*i.e.* foreign created Dollars) [13]; this aimed first at meeting the shortage of American Dollars that was implicit in the 1944 Bretton Woods Agreement (the so called “Triffin Paradox”⁶) [14]; then, as an autonomous international bank business, in 1971 brought to an end of the western monetary system⁷. The Dollar becomes a fiat money, *i.e.* accepted spontaneously on a fiduciary base. The Eurodollars have been one of the relevant monetary and financial innovations based on the use of the above described traditional multiplier mechanism.

During the last two decades of the Twentieth Century the market developed derivatives contracts to better manage market risks; however, their transformation in autonomous speculative business, besides the purpose of giving a better distribution of risks to the real sector, led at the beginning of the Twenty-first Century to the burst of a crisis similar to the 1929 Great Depression [15]. The result was a deep change of monetary policy in term of quantities and rates. Derivatives have been a significant innovation in money and financial traditional markets behavior, creating the first big business that was collateral to the real sector, usually considered as its “financialization”.

In 2008 an unknown author developed a mathematical protocol applied to computers, called Blockchain, and launched the Bitcoins, a telematic currency or cryptocurrency (currency encrypted) [16]. This new financial instrument has behaved like money since 2016; it could benefit from security, transparency and independence from the authorities, then it changed from becoming a speculative asset. The real revolution is not in its telematic nature, which has been known in different form for many decades (credit cards, bank remittances etc.), but in the mathematical protocol, which is from the time being protected by hackers’ attacks and public inspections.

A similar revolution started in the savings and credit markets using the tools developed by artificial intelligence. The calculations, called algorithms (algos, for

⁶Triffin Dilemma or Paradox is defined as the impossibility to guarantee the gold convertibility of the US Dollars at a constant price (35 dollars per ounce) as stated in the Bretton Woods Agreement, due to their growing needs for international uses. The inconsistency was known since when the decision was taken, but Robert Triffin was one of the most insistent critics of this weakness of the international monetary system.

⁷The U.S. authorities denied that these Dollars were part of the money creation mechanism at a global level; this was the cause of the end of the Bretton Woods Agreement, which was one of the institutional basis of the success of the western countries block over the Soviet block.

short), benefit from the computer capacity to manage a huge amount of data (the big data) collected and sold by service firm; data are treated through techniques that are mainly elaborated following a logical approach based on Swarm Intelligence (or logic of the chaos), Neural Network (how the human brain works) and Biological Evolution (or logic of the nature). Pedro Domingos counted more different approaches to calculate algos which have generated five “intellectual tribes”: evolutionaries (who considers the rules of genetic evolution), connectionists (who learns from parameters’ link), symbolists (who assembles knowledge in real time), Bayesians (who weighs evidence using subjective probability), analogizers (who maps and compares the new situations) [17]⁸. It is a deep change in the logic of scientific research, from the deductive method back to the inductive method, but with a new scientific basis different from the individual judgements and intuitions. The inductive approach does not explain, as conversely the deductive approach does or only tries, the reasons why behaviors determine a result; algos’ induction only says what the result will be, out of the assumptions of deductive approach (if ..., then ...), but linked to one or more of the above mentioned logical approaches of the five tribes.

3. The Impact of the Institutional Interferences among Money, Savings and Finance Markets

The risk created by using money to give credit raises serious problems to financial stability that neither supervisory authorities nor deposit guarantee schemes are in condition to prevent and cover. The blockchain can instead do that if it is used to serve the payments system. Anyhow the private creation of cryptocurrency expropriates the monetary sovereignty of the States, ripping off the seignorage; but this is only a minor effect, since the real problem is that private operators do not have the capacity to control quantity of money, interest rates and inflation becoming a source of potential crisis, which goes against financial sustainability. Furthermore, cryptocurrencies are in the hands of a few large market operators and this adds constraints to global competition, determining a significant impact on the efficient use of real resources, their expropriation by owners of finance and a reduction of the ability of democracy to influence the distribution of wealth and income, neutralizing this effect of economic policies.

The main source of financial instability derives from the rating of the merit of credit followed by banks either for the methodology that is used based on “mechanical indicators” and the collusions between borrowers and lenders. The use of financial indicators determines weak and insufficient results if they are not accompanied by estimates of market developments. The information on the borrowers’ balance sheets is usually not up to date and the parameters reflect the dynamics of the past. The ability of a lender—which justifies the request of a fee—is to combine the information to forecast what would happen with the credit given. Such a behavior legitimates moral hazard in bearing risks, generating

⁸See particularly pages 51-55 of Domingos’ book, and a very clear representation in the graph on page 240.

wrong or even criminal choices in giving credit.

The application of artificial intelligence methods to obtain algos cannot avoid mistakes in giving credit, but it provides an objective basis to evaluate the credit worthiness in making choices. The same method is applied to manage savings, guaranteeing similar results and preventing collusions between managers of savings and bankers, that is another source of social unfairness and financial instability.

The tentative of authorities to guarantee financial protection and sustainability is entrusted by fixing rules to operators and controlling their compliance. This approach creates heaviness and sometime inefficiency in managing money, savings, and credit without reaching the purpose.

4. Recent Deep Changes of the Money, Savings, and Credit Markets

In the last decade money, savings and credit markets suffered from deep changes both *de facto* and legally:

- **Money**—once lost its physical nature (gold or paper endowed of legal tender)—is mainly a bank deposit, guaranteed by law although exposed to risks of reimbursement of credit that it finances; now it is a computer bit (cryptocurrencies such as Bitcoins) no more charged by the risk of credit, but by other types of risks;
- **Savings** is collected by banks and many other financial intermediaries; its current management is based on a mix of subjective (the judgments of managers) and objective (mathematical indicators) decisions. They have not sufficient protection either at legal or market levels for objective and ideological reasons;
- **Credit** and other forms of financing are given on the basis of rating indicators that are calculated on the same mix of objective and subjective criteria as the management of savings. They are exposed to a growing pro-cyclical behavior for market and political reasons. Derivative contracts developed without the possibility of a solid assessment of their market values [15].

The result is that finance transformed itself from “handmaids of development” to “sources of risks”.

Financial sustainability became a chimera.

Money and financial authorities believe that it is possible to go back to past conditions, considered as “normal”. Financial innovations changed the economic and political scenarios, creating the need of a different institutional architecture.

5. The Proposed Reforms of the Money, Savings and Credit Institutional Framework

With the private diffusion of cryptocurrencies the creation of money would be provided by market operators, which do not guarantee the control of prices and

the security of its use, that are two of the fundamental functions performed by the authorities. Private operators are creating cryptocurrencies using blockchain techniques. The States should defend their monetary sovereignty, becoming responsible only to prevent the hacking of the system and to cover the costs resulting from possible damages to money holders. If this reform would be implemented, the deposit guarantee schemes at national or European level would be not necessary any more. Extended to world level this mechanism can help to solve the international monetary conundrum of the double use of a national currency, finalizing the working of the IMF Special Drawing Rights.

Not only money, but also savings management should be secluded by credit activity, to follow autonomous and objective criteria permitted by algorithms based on artificial intelligence methods, and recorded on blockchain to guarantee safety and transparency. Such a system can guarantee also equity if granted on the basis of success fees instead of fixed commissions as it is today.

The same should be applied for granting credit and subscribing risk capital not only by assessing a better merit of credit, but also avoiding moral hazard behaviors. This activity gets resources from savings and not anymore from money, undertaking a full responsibility of the risks through its own capital, giving information to savers or managers of savings about the risks taken.

Management of savings and credit should be controlled only by one public agency so as to assure that the risks taken are based on the above mentioned objective criteria (algorithms plus own capital), without the need of a public reimbursement guarantees scheme.

6. Conclusion

The conclusion is that in the Twenty-first century, financial sustainability comes from an institutional framework where the payment system, the savings management and the assessment of banks and market credit risks behave autonomously; public and private responsibilities are exactly domiciled; decisions would be based on modern methods developed by artificial intelligence; and, the costs of financial crises on savers and tax payers would be reduced.

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