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An Evolutionary Perspective on the Endogenous Instability of Capitalist Dynamics

Abstract

This article is a theoretical and conceptual exploration into the study of the dynamics of financial innovations and their consequences in market economies. Drawing upon the works of Schumpeter and Minsky in an institutionalist and evolutionary tradition, the article puts forward the monetary and financial features of the 21st century economies and the recurrent systemic financial instabilities generated within the context of the financialization process. It then calls for alternative regulatory reforms capable of leading to sustainable economic development. The originality of the analysis lies in the fact that the micro-dynamics of innovations may result in both creative and destructive outcomes since there are some crucial differences between entrepreneurial innovations à la Schumpeter as the positive force in economic development, and financial innovations à la Minsky as the source of instabilities. The article then focuses on the weaknesses and inconsistencies of loosely regulated financial markets and suggests a few principles for relevant financial regulation in an endogenously unstable economy. The main contribution of the article is that financial stability must be regarded as a public good to be provided by an economy-wide regulatory framework under the supervision of a visible public hand. The study of the conditions of financial stability proves to be a matter of a specific social dilemma—opposition between private and public interests—that concerns the organisation and management of financial markets at the macroeconomic level. Such a dilemma leads to the ultimate regulatory issue of spurring the innovation dynamics of financial markets while ensuring systemic stability and sustainability through an appropriate regulatory and supervisory environment.

Keywords

financial regulation | financial crisis | innovation | institutionalist | evolutionary approaches

JEL Codes

B52, G01, H41

Introduction

This article is a theoretical and conceptual exploration into the study of the dynamics of financial innovations and their consequences in market economies. Drawing upon the works of Schumpeter and Minsky in an institutionalist and evolutionary tradition, the article puts forward the monetary and financial features of the 21st century economies and the recurrent systemic financial instabilities generated within the context of financial liberalization and subsequent financialization. It then calls for alternative regulatory reforms able to lead to a sustainable economic development.

In light of the 2007–2008 crisis, the article focuses on the weaknesses of loose financial regulation and places the emphasis on financial innovations as the major sources of systemic concerns. The analysis is framed through two core hypotheses of the seminal works of both Schumpeter and Minsky. The first hypothesis is that a capitalist economy is a monetary and non-ergodic evolutionary system that develops through continuous entrepreneurial innovations along with financial innovations. The second hypothesis is that such a system cannot be studied as a steady-state equilibrium economy but rather as a dynamic and unstable society whose working mechanics endogenously generate

recurrent financial crises and require specific system-wide regulation. These hypotheses allow us to offer an institutionalist and evolutionary approach to developing an alternative theoretical and conceptual framework in order to understand why the financial market mechanisms recurrently generate crisis-prone dynamics that prevent the economy from moving towards sustainable growth.

The main findings of the article are that systemic stability is an issue related to the provision of a specific public good, the financial stability, that has to be provided under the supervision of an extra-market public regulatory framework and that the conditions of such a framework lead to a specific social dilemma relying on the opposition between private and public interests. Such a dilemma leads to an ultimate regulatory issue that consists in spurring the financial innovation dynamics of market mechanisms while ensuring systemic stability and sustainability through an appropriate regulatory and supervisory environment. In other words, the recurrent question is 'To what extent and under what conditions the dynamics of financial innovations can enable the economy to achieve a higher level of well-being?', or 'How one can imagine a consistent financial regulation in terms of complementarity between the markets' innovation dynamics, linked to private interests, and the macroeconomic/systemic stability and viability, linked to public interest?'

Methodologically, these results are drawn from an evolutionist-institutionalist analysis, conducted in the footprints of Schumpeter and Minsky. Although not explicitly discussed within the article, the methodology and the related results are diametrically opposed to the standard statements of the neoclassical and new classical approaches regarding the functioning of financial markets that usually assert that (free) markets tend to move toward some equilibrium points and that financial markets, as an appendix of real decisions, do not require any tight extra-market regulation. This article points to the inconsistency of such a statement in a precise way beyond the usual opposition between Keynes-like (public interventionism) and Friedman-like (liberal, free markets) models. Therefore, collective action—financial regulation—comes into the picture not as an ideological choice (opposition between the state and the market) but as a rational direction in order to strengthen the working of financial markets in favour of (sustainable) economic development.

In achieving this aim, the article focuses on the monetary dynamics of capitalism and on the characteristics of individual behaviours and on market inconsistencies. It maintains that the extent to which financial markets can operate in a stable and sustainable manner has a crucial role in the viability of the economy. The regulatory framework enters the picture as an important part of the market landscape since it would determine, at the macroeconomic level, the conditions for the private accumulation process through the support role of public action in the economy.

Three sections develop these issues. The first section examines the dynamics of capitalism from an institutionalist and evolutionary perspective and puts the emphasis on the monetary and financial characteristics of the economy, as well as on the role of innovations as sources of economic dynamics. The second section develops on the micro-dynamics of innovations. It assesses their creative or destructive character in light of the features of financial markets and individual dissonant behaviours. It points to the differences between entrepreneurial innovations à la Schumpeter as the positive force in economic development, and unregulated financial innovations à la Minsky as the source of instabilities. The third section puts forward weaknesses and inconsistencies of unregulated markets and suggests a few principles for relevant financial regulation in an endogenously unstable monetary economy. It points to the core stake behind this analysis, the ultimate issue that any market economy relying on free enterprise has to deal with: how to make market innovation dynamics and systemic financial stability and viability compatible with each other through time. In other words, what kind of regulation and supervision environment should be framed to tame the tendency of financial markets to generate systemic crises and to support productive innovative activities. Fifteen years after the 2007–2008 global financial turmoil, this social dilemma still deserves attention.

1. Capitalist Economy Dynamics

Capitalism is a dynamic monetary economy that evolves through booms and busts that are related to the 'normal' functioning of society. The main constituents of the dynamic are decentralized individual decisions, innovative activities of agents, and the institutional framework that determines the scope of individual actions aimed at generating net gains and allowing

accumulation. A remarkable property of this economy is its tendency to generate systemic instabilities (notably financial instabilities) that regularly threaten its sustainable reproduction. To understand such a complex system, we adopt an institutional and evolutionary perspective, and put the emphasis on the dynamics of banking and financial innovations in a highly financialized world.

1.1. An institutionalist and evolutionary perspective

In economic literature, innovation is regarded as a core factor in economic change and development (Aghion, 2018; Andrews et al. 2022) in a unilateral or multilateral causality relationship with growth. More specifically, in institutionalist and evolutionary approaches, the analysis of economic dynamics through innovations is at the forefront of any research project because society is regarded as a continuous change process, in the Schumpeterian sense (Schumpeter, 1934; Fontana, Martinelli & Nuvolari, 2021), that cannot be thought of in terms of steady-state equilibrium and that is often related to the behaviour of institutions that shape the overall environment (Harper, 2018). To understand a given economic and social phenomenon, one has to understand first how the phenomenon is formed and developed, how it becomes what it is (Coriat & Dosi, 2002). However, even though some institutionalist studies develop specific analyses of the financial dynamics–real dynamics–instability nexus (Knell, 2015; Callegari, 2018), a comprehensive theoretical framework for financial innovations and instability is not yet provided within the evolutionary and institutionalist literature. In order to partly fill this gap, this article specifically focuses on the dynamics of financial innovations. When it comes to the functioning of the financial system and to the outcomes that may stem from its evolution through time, the focus can be placed on two specific aspects of the financial environment:

- the innovation dynamics of markets and, more accurately, financial innovations and their consequences on economic evolution;
- the dynamics of financial regulation, regarded as the framework that would allow (or not) the markets to behave and develop strategies in various directions that could provoke various issues.

Therefore, the regulatory environment is regarded as the permissive and incitative force that would guide market behaviour. Such a relationship can be studied under the regulatory dialectic approach of Kane (1988) or the Goodhart Law (Goodhart, 1984) as a defensive strategy of banks: The regulatory restrictions imposed by public authorities would push market players to innovate for new ways of performing their activities that could allow them to avoid the new restrictions. This regulatory arbitrage is then regarded as a paradoxical interaction between 'Gaming the rules and ruling the game' (Nouy, 2017). One can also regard such an evolution as an 'augmented regulatory dialectic', a kind of offensive strategy: The regulatory changes in favour of less supervised markets (financial liberalisation) would push market players to find (to innovate for) new ways of performing their activities in order to get further benefit from the new institutional environment. The market can then evolve toward a specific phenomenon, called financialisation.

Although very similar, these approaches belong to two different institutional environments. The regulatory dialectic is generated by tight regulation. Public restrictions create incentives for agents to innovate in order to counterbalance the effects of public policies. The augmented regulatory dialectic is due to loose regulation (the so-called financial liberalisation) and provides incentives to innovate in order to capture more profits in a short period of time. It leads to generalised speculation and to the financialisation of everyday life (van der Zwan, 2014), provoking systemic consequences.

These dynamics are micro-founded since they are also related to the decisions and strategies of private agents. These strategies are framed in a decentralised 'non-ergodic' world (North, 1999; Davidson, 2009). They are based on micro-rational decisions that rely on bounded rationality, evolving and continuously changing through a time-path-dependent process. There is no objective possibility to 'read tea leaves for knowing the future' (Davidson, 2009). Behavioural issues enter the picture, individuals make errors, their judgements are never perfect; they act without any central coordination that would seek rendering separate decisions compatible with each other at the societal level (Evstigneev, Hens, & Schenk-Hoppé, 2016; Nelson, 2016). Furthermore, economic agents are different (heterogenous). They may develop different and various experiences, skills, talents, and errors that might complete each other or be opposed to each other. The micro-decision process then calls for group coordination/cooperation in order to prevent inter-individual contradictions and

reduce uncertainty in a non-ergodic environment, uncertainty that individuals suffer from in the normal state of the world.

Coordination/cooperation among agents is therefore a compulsory rational behaviour, although the individual's rationality might be regarded as the best way of defending one's interests and advantages. Collective organisation and collective action mechanisms are framed, developed, and implemented in order to serve individual interests through common coordinated practices. An existential paradox of a market-based and private interest-reliant society acutely comes into the picture: how to make private interests and public interest compatible. Markets matter because we are in a market-based economic society. Institutions matter because they shape and enable economic coordination/cooperation (Hédoin, 2019; Petracca & Gallagher, 2020). This is a very common feature of institutionalist approaches, both new and old (Coriat & Dosi, 2002, p. 98).

1.2. Innovations and the monetary economy

Economic dynamics are rooted in the innovative behaviour of agents. They may result in positive or negative outcomes. Innovation is one of the most studied topics in economics. The neoclassical and endogenous growth theories (Meade, 1962; Romer, 1994; Solow, 1994; Jones & Manuelli, 2005; Aghion & Howitt, 2009), but also the Cambridge–UK tradition and alternative theories of growth (Setterfield, 2010), have all asked questions about the dynamics of innovations in the economy. Innovation is evolution. It is regarded as a creative destruction process in the tradition of Marx, Sombart, and Schumpeter (to quote but a few, Ülgen, 2017a), as a source of creative destruction (Metcalfe, 1998), as an evolutionary process of change (Nelson & Winter, 1982; Nelson, 1995), or as a matter of technology evolution affecting capitalist development (Dosi & Nelson, 2010). These approaches commonly draw upon the creative destruction process, studied by the '*Prophet of Innovation*', Joseph Alois Schumpeter (McCraw, 2007).

The definition and sectoral identification of innovation do matter with regard to the development of the economy. When it comes to the functioning of financial markets, at the heart of the economic machine, this question gains further interest since it is the linked to the viability of the entire capitalist economy through time. In order to grasp the specific concerns related to financial innovations, some conceptual precisions about the very characteristics of a market economy seem to be necessary.

In a Schumpeterian vein (Ülgen, 2014; Kitchel, 2016), it is argued that capitalist market economies are monetary economies such that their functioning as well as the outcomes markets generate in their evolution cannot be understood without an accurate analysis of the monetary and financial conditions of the path of development. Sawyer (2020, p. 38) focuses, among ten specific features of a theory of evolutionary macroeconomics, on the monetary nature of capitalism: 'The analysis necessarily concerns a monetary production economy. Money is created by banks (commercial and central) and destroyed, and an "endogenous money" approach has been closely associated with heterodox macroeconomics. In a monetary production economy, there is no possibility of the separation between the "real" and the "monetary" as envisaged in the "classical dichotomy". Related to this, endogenous instability in capitalism is also put forward as a distinctive feature, since capitalist economies are prone to fluctuations and crisis, and then to unemployment against which governments try to design policies to support the level of activity' (Sawyer, 2020).

The financial conditions are regarded at the macroeconomic level with a special attention to private and public institutions as market organizers but also as regulatory bodies that determine the patterns of the regulatory framework in force. At the society level, all economic transactions do require credit–debt–repayment relations that may develop mainly through two modes of operation:

- the monetary creation within the banking credit–financing system and
- the reallocation of available funds (savings, loanable funds, previously accumulated by surplus economic units) through the financial markets and financial intermediaries.

The former is usually known as the endogenous money creation process, mainly initiated by bank credit to finance enterprises' projects linked to future profit expectations. In a monetary economy, the production–investment activities have to be financed by bank credits before requiring the reallocation of loanable funds, the monetary balances on individuals bank accounts. Historically, this point of view can be linked to the Banking School tradition, opposed

to the Currency School and quantity approach, usually regarded as the main theoretical reference of monetarist approaches (Goodhart & Jensen, 2015; Bolton, 2021) that rely on the second vision of money and finance. This second approach, the loanable funds theory, argues that the funding process of economic activities rests on financial intermediaries and markets. These intermediaries are non-monetary or non-bank financial institutions. They can fund spending units and then provoke monetary creation, but they cannot directly generate new money like the banking system.

Two further remarks are worth noting: The first is that financial institutions are usually seen as intermediaries between surplus/saving units and deficit/spending units. The former is identified as households and the like and the latter as enterprises. Such a distinction, relevant in a bank-based financial system where the direct bank credit is the main source of financing of the economy, is not enough to understand the working of a financially developed market economy. Indeed, in such an economy, the financial markets, mainly through financial innovations, continuously generate new products, processes, and other ways of allowing agents to invest, borrow, and speculate without any tight regulation. Thus, the operations in financial markets are not merely 'real' entrepreneurial activities (production of tomatoes, investment in Hi-Tech ICT, etc.) but are also (most of time) intended to permit economic agents to enter into financial hedging and/or speculative operations. It would be more suitable, therefore, to define financial markets as all the activities that allow gambling[1] whatever the stated final purpose at the origin of the initiative. This precision seems necessary to desacralize the story-telling often used to give financial markets an obviously positive social utility in the standard textbooks.

Given the monetary nature of market economies, financial market stability is the primary condition for smooth economic development. One of the major issues, then, is the extent to which financial markets can operate in a stable and sustainable manner. Such an issue obviously calls for determining the conditions contributing to the viability of markets and the accumulation process. These features could be globally related to private wealth accumulation, primacy of private interest over public interest, decentralisation of economic decisions through profit-seeking market activities, and the supporting role of public action in the economy. Therefore, systemic stability is a social dilemma that lies in the opposition or complementarity between private interest and public interest, between the market's innovation/change dynamics and macroeconomic/systemic stability. This opposition is directly related to the organisation and management of financial markets.

2. Microdynamics of Innovations: Creative or Destructive?

Whereas the literature usually argues that innovations have a positive impact on economic development, the effects of financial innovations and so-called financial development on the economy are somewhat ambiguous (Beck and al. 2012; Cecchetti & Kharroubi, 2015; Bara, Mugano & Roux, 2016, Karwowski, Shabani & Stockhammer, 2017; Loayza, Ouazad & Rancière, 2018; Storm, 2018; Hardy & Sever, 2020), depending on several factors related to the level of development of an economy, the regulatory framework, etc.

Lacker (2011, p. 1) remarks that '…financial innovation – that I think is of great importance as we learn more about what caused the financial crisis and shape the future of financial regulation. Currently, many people are hostile to the very thought of financial innovation. After all, wasn't it new financial products and instruments – subprime mortgages and complex derivatives, for example – that got us into trouble in the first place? The answer here, as with many things in economics, is *yes* and *no*'.

2.1. Real and financial evolutionary dynamics

In evolutionary theories, apart from price competition, the key role is played by innovative competition, based on technological progress and creating feedback mechanisms (Dąbrowski, 2016). The prophet of

1 In a similar way, Veblen (1919, p. 89) remarked, one century ago, that a businessman entrusted his administration, not to the industrial engineers, but to 'the captains of finance', who had to do with the haggling of the market: 'By historical necessity the discretionary control in all that concerns this highly technological system of industry has come to vest in those persons who are highly skilled in the haggling of the market, the masters of financial intrigue'.

innovation, Schumpeter (1947, p. 82), argues: 'in dealing with capitalism we are dealing with an evolutionary process.' The evolutionary process of dynamic and positive change in capitalism relies on entrepreneurial innovations that push society forward through the exploitation of new opportunities, new combinations, methods, markets, etc. (Schumpeter, 1934, p. 63). The essence of innovation is the 'economic' use of scientific and technological inventions. The innovator is not an inventor, not a man of technology; the innovator is an entrepreneur, a man of business. Schumpeter maintains that new technical knowledge (inventions), when it is not carried into industrial use, is not relevant from an economic point of view. The potential use of invention must be transformed into effective use, into innovation that is economically valuable in society's evolution (Iwai, 1984). Schumpeter then states that economic activities (in the broad sense) imply four roles: entrepreneur, manager, capitalist (owner of capital), and inventor (Shumpeter, 1934). The entrepreneur is the innovator. The field of innovation is all-encompassing: it includes time in products, processes, marketing, organisation. It is worth noting that Schumpeter was primarily interested in the process of management, dynamized by innovation, understood as giving a new function to an already known product, which produces more profit than the previous product. Technical, organisational, and managerial changes are of interest only as far as they can affect the innovation process. Therefore, the introduction of innovation does not primarily mean an increase in existing factors of production, but rather a transfer of existing factors from the old to the new applications. Innovation is a positive systemic impetus for economic development.

Some distinctive features of financial innovations, however, render the evolution of financial markets somewhat problematic for the stability of the economy. Indeed, financial innovations are not of the same nature as real-sector innovations. Finance (and financial markets) allows (or not) economic agents to undertake real activities and to produce goods and services. Monetary and financial operations are not the same activities and do not have the same purposes as the production of airplanes, tomatoes, computers or software. Finance is the prerequisite for all economic activities, it is the 'ticket' to enter the economic game (Schumpeter, 1934; Ülgen, 2014).

Minsky (1988; 1993) adapts Schumpeter's idea of 'entrepreneurial innovativeness' to the financial sphere and examines institutional changes through the behaviour of bankers and financiers as innovators 'In Schumpeter's vision it is the banking structure of a capitalist economy which controls and delineates what can be financed, and only that which is financed enters the realm of the possible. But nowhere is evolution, change and Schumpeterian entrepreneurship more evident than in banking and finance and nowhere is the drive for profits more clearly the factor making for change' (Minsky, 1993, p. 106).

Minsky introduces innovativeness directly into the financial sphere, which allows him to analyse the impact of innovation on finance as well as on the whole economy and to draw some important conclusions about the cyclical development of the economy and the continuous fluctuation of finance between stability and instability. Under some conditions, financial innovations tend to increase economic instability. Minsky thus overcomes Schumpeter's one-sided and indirect approach to the involvement of credit relations in innovation and proposes the concept of a direct relationship between finance and innovation. Indeed, Schumpeter's innovation process rests on real sector/entrepreneurial innovations; banks play a secondary, accompanying role in such a process. However, Schumpeter adopts a more normative approach than Minsky regarding the innovative activities of the financial sector. Schumpeter (1939) is aware of possible financial innovations and their positive or negative consequences and gives different examples for the role of financial innovations in the capitalist development process in the 19th and 20th centuries. But he also states that the essential role of banks is not to innovate but to finance entrepreneurial innovations. Economic activities/entrepreneurial innovations cannot become effective without the financing process. However, financial innovations often turn into speculation-led activities provoking reckless finance and subsequent bubbles (Schumpeter, 1939).

Minsky (1986) focuses on 'uncertainty' and 'expectations' and points to overconfidence and overestimation of a given situation by financiers and entrepreneurs that result in euphoria and panics. This is the financial instability hypothesis (Minsky, 1982) that maintains that economic fragilities often have endogenous causes. This is a convergent statement in Schumpeterian and Minskyian institutionalist analyses (Knell, 2015). Finance can trigger instability through innovations that lead to more complex and volatile financial markets, which in turn generate challenges for the industry and lead to permanent structural modifications (Schwarcz, 2009, p. 213). The

innovation process presents a sort of spiral dynamic. For instance, Merton (1992) calls these dynamics an 'innovation spiral' such that the first innovation would beget the next innovation.

Although a number of works maintain that financial innovations are neither all bad nor all good, but contain mixture of elements (Lerner & Tufano, 2011), other studies show a direct correlation between innovation and financial market volatility (Beck et al. 2012; Karwowski, Shabani & Stockhammer, 2017; Storm, 2018). Sotiropoulou, Giakoumatos and Petropoulos (2020) maintain that in the case of the European Union financial system, the development of a banking system had a negative impact on economic growth since the allocation of private credit proved to be inefficient and thus did not improve economic growth. Even if the size of the stock markets had a positive effect on economic growth, the market liquidity negatively influenced economic growth. In addition, subsequent financial instabilities had a negative impact on economic growth over the years 2004 to 2014.

In the process of the financial development of the 2000s, a dramatic increase in the financial sector's innovations led to various hedge fund management activities and took over from real productive activities and crowding out resources from economies in favour of speculative operations. Focusing on advanced economies, Cecchetti and Kharroubi (2015) show that the level of financial development is good only up to a point, after which it becomes a drag on growth and a fast-growing financial sector is detrimental to aggregate productivity growth. Analysing industry-level data on patenting from 32 countries and 52 financial crises over 1976 to 2006, Hardy and Sever (2020) show that financial crises disrupt firms' access to finances, since they constrain the borrowing of firms that rely on external finance and lead them to reduce their investment in innovative activities in terms of both total quantity and quality, for 10 years or longer after a banking crisis.

In such an environment, increased investor demand for new financial products and the pursuit of return on investment are direct drivers of financial instability. Llewellyn (2009, p. 7) argues that:

A key dimension of financial innovation is the extent to which it contributes to *efficiency* and *stability* in the financial system. When a *functional approach* to financial innovation is applied, many new instruments and techniques have the potential to enhance the efficiency of the financial system (….) However, the stability implications of these instruments are ambiguous in that, while innovation may enhance the stability characteristics of financial systems in the face of small and uncorrelated shocks, it also has the effect of reducing stability in the face of large and correlated shocks.

Part of financial innovation works as a regulatory bypass, as emphasized in the Goodhart-Kane regulatory dialectic approach. Such a strategy is obvious in the case of shadow banking and might provide some arguments in favour of public supervision over financial innovations '…such activities were often structured so as to avoid regulations and capital requirements imposed on banks. Any firm that performs maturity transformation, however, exposes itself to the risk of financial distress if their creditors lose confidence in their ability to repay and withdraw their funds, or refuse to roll over their investments. Creditor runs are exactly the kind of events that typically elicit official support, because if no government support is forthcoming, the creditors of other similar firms are likely to run as well. (…) The precedents set by intervening outside the formal banking system thus provide a further stimulus to the growth of fragility-prone maturity transformation in the shadow banking system, beyond the incentive to avoid the burden of prudential regulation' (Lacker, 2011, p. 4).

These remarks point to some specific features of the organisation of financial markets today. These features are numerous, relating to both the regulatory framework and the behaviour and strategies of economic agents. They often reveal the weaknesses and fragilities of the financial system and are at the origin of instabilities that may become systemic under certain conditions.

2.2. Beyond the innovations: behavioural and cognitive sources of financial instability

The very reasons for instabilities in financial markets are related to human behaviour and decisions, whether they are public or private. Instabilities are rooted in the political choices that decision-makers make and are fed by the interpretation that economic agents make according to their personal interests in a given regulatory environment. Therefore, the positive or negative role of financial innovations partly depends on the decision-making persons and processes. This

poses real challenges for policy-makers looking for relevant economic reforms (Borio, 2021).

The 'Homo economicus' approach has recognised a person who makes a financial decision as a rational individual. According to the theory of rational choice (Von Neuman & Morgenstern, 1944), a person makes rational decisions with the most favourable *expected* consequences. Behavioural economics has introduced changes in explaining the behaviour of an individual under conditions of uncertainty, which is a natural feature of the market economy. The 'Allais Paradox' (Allais, 1990) shows that, influenced by their own judgement and analysis, people do not always choose the most beneficial solutions. Therefore, guided by their own convictions and biases under the influence of their own beliefs and judgement, people do not always achieve the most rational solutions. Thus, decisions will not meet the criterion of rationality even at the individual level.

One should then consider specific hypotheses about the characteristics of economic agents and the definition of their expected rationality. Simon (1985, p. 303) remarks 'It makes a difference, a very large difference, to our research strategy whether we are studying the nearly omniscient Homo economicus of rational choice theory or the boundedly rational Homo psychologicus of cognitive psychology. It makes a difference to research, but it also makes a difference for the proper design of political institutions'.

That is why it is important to take into consideration, among other behavioural issues, opportunistic attitude when it is necessary to deal with financial innovation and stability. Any transaction in financial markets is accompanied by a contract, which is a channel for the fair exchange of financial assets. The contract fixes the particular rights and terms of the transaction. In this connection, it is the contractual regulation, which is of great importance, that pushes the formation of a universal mechanism of contractual regulation in financial markets, but at the same time, this should take into account the essential features of financial transactions. Financial innovations can be described as a product of a financial market that is an object of the contract between financial intermediaries and spending/deficit units. In theory, it is well known that, during the realization of the contract, the opportunistic behaviour of financial intermediaries may appear. At the moment of contract agreement, it is an opportunism of adverse selection and during the realization period an opportunism of moral hazard (Williamson, 1993).

The banking system is particularly susceptible to a bandwagon effect type of behaviour, which leads to the problems known in the literature as financial pyramid schemes, speculative bubbles, or sudden withdrawal of deposits (Dąbrowski, 2015, p. 173). The financial crisis of 2007–2008 can be regarded through the lens of this feature, as an example of economic opportunism. Each of the top ten U.S. banks (by market share) involved in origination and securitization of residential mortgages have been involved in opportunistic behaviour in litigation brought by regulators, prosecutors, and private parties (Fligstein & Roehrkasse, 2016). For years, the leading financial institutions of the USA and the European Union have been falsifying their accounts in order to hide the significant negative effects of large-scale derivative transactions (with securitisation). National statistical offices (e.g., the Greek case) knowingly misrepresented macroeconomic information in order to raise debt capital in favourable terms for governments. Banks have manipulated one of the most important benchmarks in financial markets, the London Interbank Offer Rate. It is possible to state that systemic opportunism heavily feeds the roots of systemic instability.

As a result of behavioural economics, participants have unequal access to relevant market information about financial innovations. The supply side of innovations has better knowledge about the mechanisms and weaknesses of the financial products. As global financial crises showed, the owner of such information has a natural advantage on the market. The asymmetry of information is a source of moral hazard or adverse selection. It creates conditions under which the market is not able to function in an efficient way for all participants (Janowicz-Lomott, 2018). The asymmetry of information puts the other, less knowledgeable participants in a position of risk or even uncertainty. In the case of a lack of clear rules (third-part regulation) of such unequal relations, instability increases. Psychology states that reducing energy input at the cost of other participants in the interaction (in our case during the realization of a financial contact) and a tendency to usurp resources to the detriment of others leads to the strengthening of the pattern of violation of the rights of individuals. The choice of action comes down to an assessment of the benefits (or costs) of engaging in a conflict of interest. There is an assessment of the comparative benefits of good behaviour and the personal gains of violating agreements (Williamson, 1993). The choice to refuse to act opportunistically is seen by the individual as acting to the detriment of her/his

own interest in favour of the public interest. Failure to comply with the public interest reduces efficiency and interactions and increases costs. However, in some cases, there is a conscious willingness on the part of individuals to bear the losses caused by not seeking a better outcome. The choice of behaviour is often not based on knowledge of the rules, but on the repetition of the most successful behaviours used previously. In the case of a financial crisis, once crossed, unethical and illegal practices often became standard operating procedures for all of the banks (Fligstein & Roehrkasse, 2013). The institutional and regulatory environment thus becomes the breeding ground for societally unhealthy behaviours that are considered individually to be rational micro-economically. Such behaviours become regular and common in financial markets and undermine their stability. Prevention of this requires protective mechanisms that would block opportunistic aspirations. The costs of such mechanisms form a specific type of transaction costs. In addition to this, the costs of protecting against opportunistic behaviour also include the losses incurred by economic agents from such behaviour in the absence of protective mechanisms or through their inefficiency. Stigler (1974, p. 55) maintains that: 'All prescriptions of behaviour for individuals require enforcement', since one of the axioms of human behaviour is that all agreements whose violation would be profitable to the violator must be enforced following the rule that: 'The goal of enforcement, let us assume, is to achieve that degree of compliance with the rule of prescribed (or proscribed) behaviour that the society believes it can afford' (Stigler, 1974, p. 56).

The core idea is that opportunistic behaviour is a natural feature of the participants in the financial market. The issue is to find a balance between private interests that can lead to opportunistic behaviour with its negative consequences, and the public interest that limits the possibilities of profit maximization but seeks to ensure systemic coherence. Indeed, human psychology and dynamics of dissonant behaviour affect the evolution of markets and macroeconomic performance. Even advocates of liberal financial markets point to the negative consequences of such dynamics. Greenspan (1996) remarks that although one can assert that market mechanisms are rather rational, financial markets (and the economy as a whole) are basically driven by human psychology, which results in behaviour that provokes recurrent periods of crises.

Behavioural economics places the emphasis on these different patterns of decision and action that may involve individuals in perverse strategies and generate social disasters, whereas at the time of decision, choices can be seen as perfectly rational for each individual. Storytelling (and ideological propaganda) that shapes group beliefs (Akerlof & Schiller, 2009) and intuitive psychology, which leads to intuitive judgment permitting ill-conceptions of the world and perverse expectations (Kirkpatrick, 2005), are some examples pointing to the phenomenon of cognitive dissonance. Leathers and Raines (2012) note the importance of the judgment and decision models that shape political actions and also the results of the functioning of markets in a given institutional–regulatory environment.

While a behavioural approach helps us to understand deviations from rational individual behaviour patterns that could explain some of the reasons of bad macroeconomic outcomes our economies recurrently generate, it does not provide financial regulation frameworks with an overall view of the macroeconomic situation and potential fragilities. Behavioural perspective mainly leads to individual-based organisation and management of society, in line with the liberal self-regulation frameworks that proved not to be able to ensure systemic financial stability. Kregel (2014, p. 218) notes 'It was thus extremely difficult to formulate prudential regulations to respond to a financial crisis if one could only occur as the result of random, external shocks, or what Alan Greenspan would consider idiosyncratic, nonrational (fraudulent) behaviour. The only basis for regulation would be to concentrate on the eradication of the disruptive behaviour of bad actors or mismanaged financial institutions. From this initial presumption, the formulation of regulations and supervisory procedures required the assessment of the activities of individual banks—without any reference to their relations with other institutions or the overall environment in which they functioned. It was this sort of supervision that, in the early 1980s, led to the failure to identify the building risks at Penn Square Bank, Continental Illinois and Seattle First, among others, and drew attention to the problem of banks that are 'too big to fail.'

3. Endogenous Instability and Financial Regulation

The functioning of a (monetary) market-based economy relies mainly on decentralized decisions and

strategies linked to private interests. These decisions and strategies, in the absence of any social purpose-seeking collective plan, produce various results whose effects can only be observed ex post. The systemic coherence of these behaviours is not spontaneously guaranteed by any natural mechanism, contrary to the ad hoc hypotheses that economic theory is accustomed to assuming in terms of an invisible hand or the gravitational convergence of market prices toward equilibrium prices. At both the logical and observational levels, the functioning of our economies in general and of our financial systems in particular, is subject to crises and requires collective action mechanisms in order to maintain the economic society within viable limits.

3.1. Micro versus macro: weaknesses and inconsistencies of market mechanisms

In the absence of any bridge between micro-rationality (taking advantage of a loosely regulated environment to increase speculative rents, leveraging, etc.) and macro-coherence (societally viable situations, financial stability), it is not relevant to asserting that the stable functioning of financial markets might be provided by the market mechanisms themselves.

Iwai (2011) points to the opposition between market efficiency and systemic stability. Financial innovations might improve the efficiency of market mechanisms for individual profit-seeking activities, but they worsen the conditions for systemic stability. The characteristics of market mechanisms do not fit the assumptions of the invisible hand and spontaneous societal optimality of micro-rational behaviour. Micro-rationality and market efficiency are at odds with macroeconomic stability: 'This crisis [2007–2008] was a spectacular testament to the failure of the basic neoclassical principle: that making capitalism purer would bring the economy closer to an ideal state. It is true that globalization did indeed improve the efficiency of the capitalist economy and bring about a high level of average growth for the world as a whole. At the same time, however, it produced massive instability, demonstrating impressively the "inconvenient truth" about capitalism—that its efficiency inevitably comes with a trade-off in terms of instability. Why does this trade-off between efficiency and stability exist? Because *capitalism is a system built essentially on "speculation"'* (Iwai, 2011, p. 5).

Ülgen (2017b, p. 336) puts forward three arguments to argue that market-dependent self-regulation, the so-called micro-prudential regulation, is not a relevant way of organizing sound financial systems. First, since self-regulation aims to improve the safety of individual operations under the rule of rent-seeking rationality that relies on private information, it cannot allow the markets to achieve macro-stability. Information and actions needed to ensure society-wide stability are beyond the reach of individuals and decentralized market mechanisms. The aim and scope of the former is not the same as the prerequisites of the latter. Second, in self-regulatory systems, the necessary separation between the regulator and the regulatee does not hold. For instance, the rating agencies are assessors and advisers to banks and financial institutions, and they have their hands in the same profit basket. This inevitably leads to conflicts of interest since the external objectivity of the regulator loses ground based on the interests of the regulatee. The possible confusion between the judge and the judged is not consistent with financial stability as a macro-economic concern. Third, such confusion does suffer the *fallacy of composition,* since micro-rational behaviour does not readily generate macro-rational outcomes. Although one could assert that markets are efficient because private individuals do behave in a rational way when trying to improve their own situation, such behaviour does not result in a macroeconomically optimal outcome for society and may harm the sustainability of financial markets.

Indeed, there are three common ways to shape and implement strategic behaviour (Van Lange et al., 2014, p. 55): cooperation (doing well together), competition (doing better than others), and individualism (doing well for oneself). The differences between these strategies for 'doing well' lie in their respective meanings, especially between the first and the others. The last two are directly and often exclusively related to individuals and have no clear links with the first. Thus, they are not mechanically able to consider the collective and macro concerns. The first seeks to organise and rule society according to some common objectives and expectations, including individuals' own perspectives. It calls for collective action patterns according to an ultimate goal: ensuring societal/macroeconomic coherence and systemic viability. The financial system's stability is one of the major prerequisites to achieving such a goal.

Game-theoretic models show that collective rationality that relies on cooperative behaviour by

the players might yield greater outcomes for everyone individually and for society than noncooperative choices could (Lozano, 2012). Furthermore, in a noncooperative (liberal) game, there is no obvious solution that could lead to a Nash equilibrium. This poses a sort of social dilemma: how to make individual profit-seeking rationality compatible with macro-systemic efficiency? The latter is defined as macro performance through time: stability, viability, sustainable growth, etc., according to the society's values and constraints of the period (such as environment, poverty, etc.). Cooperation and coordination often require collective action and the evolution of regulatory norms to provide common and public goods. Financial stability, in an interdependent and globalized world, might be seen as a global public good to be provided by a specific collective framework (Shirakawa, 2012).

Financial stability is a common interest (common good) and can be achieved in two different ways: public regulation and supervision and/or private self-regulation. The latter means self-executing contracts where the counterparties themselves act as guarantors. The former consists in the creation of a set of regulations governing contractual relations in financial markets, as well as in the judicial regulation of contracts by the state (represented by special bodies). It is worth noting that the full monopoly of the state to act as guarantor of contracts leads to high transaction and information costs and may also suffer from a lack of relevant information even when the public enforcement is strong. So, the public authorities have to create the form of the contract by defining the boundaries of the contractual relationship and protect private and public interests. The core rule suggested here is that financial stability is a public good that cannot be produced and enforced by markets and individuals through decentralized strategies (Ülgen, 2021). Therefore, financial regulation and supervision mechanisms prove to be public facilities aimed at producing such a public good in order to allow private operations to develop in a sustainable way.

3.2. Principles of relevant financial regulation

Once it is admitted that in an endogenously unstable economy, the crises are regular features of economic dynamics, the major concern is related to the intensity of the instability that could or could not threaten systemic viability. If the instability becomes explosive, the viability is broken, if the instability is not explosive, the viability might be expected. The question, then, is: What are the conditions to maintain the instabilities below the explosion level within the evolution of the economy? In other words, are there any specific conditions and mechanisms that could allow the economy to prevent systemically explosive instabilities in order to contain the economy within some viability limits?

Usually, financial stability is regarded as a matter of individual institutions' responsibility (the so-called micro-prudential approach), the market mechanisms being supposed to ensure the overall systemic stability. The market dynamics, especially thanks to innovations, are expected to provide the economy with relevant tools for growth, and any tight regulation is expected to generate more obstacles to growth than to contribute means of strengthening systemic stability: 'We believe regulation that focuses on outcomes rather than prescription is more likely to support this development and innovation. Any set of prescriptive rules is unable to address changing market circumstances and practices at all times, and it inevitably delays, and in some instances prevents, innovation.' (FSA, 2007, p. 6). Unfortunately, the global financial crisis of 2007–2008 has shown that this was not the case, and the organization and management of financial markets, including their innovation dynamics, should be shaped according to some systemic macroeconomic stability concerns. Not only the financial regulatory policies but also the monetary policies had to be rethought and reframed to prevent systemic financial turmoil. The only way to go beyond the 'old devils' of market economies able to feed systemic instabilities is to consider the social dilemma in the nature of financial market organization. Market behaviour relying mainly on actors' individual strategies cannot provide the economy with a sustainable and stable development process and thus requires collective action-based macro-regulation. Therefore, the answer suggested in this article is that the conditions for viability have to be backed by an appropriate institutional environment that should be framed by a visible public hand as a collective action mechanism aimed at organizing the monetary and financial system as a public infrastructure and managing financial stability as a public good. Lacker (2011, p. 1) maintains: 'The question is not whether financial innovation is *inherently* good or bad. Instead, we should think about whether or not particular financial innovations are improving people's wellbeing. And that, I think, is

largely dependent upon the structure of the regulations and policies under which financial firms operate'.

So, the difficulty of such a regulation, although necessary for markets' smooth functioning, lies in the opposition between public interest and private interest. This opposition, well-developed in the traditional 'Industrial organization' studies with regard to the regulation of industrial sectors, is not specifically studied with respect to the characteristics (and the central role) of financial markets and activities. This article seeks to contribute to the development of such reflections in the area of financial regulation within the context of the evolutionary dynamics of financial markets. The major implications are related to the design of a tightened extra-market regulation that should aim at directing the market dynamics toward more productive and fewer crisis-generating activities.

Regulation seeks viability of financial markets in order to ensure viability of economic operations. Schumpeter and Minsky advocated for 'big government', a strong public hand to organise and manage market activities in the aim of ensuring systemic stability and permitting economic development (Ülgen, 2014). Big government does not mean centralisation of the decision-making process but designing regulations that would be consistent with the internal dynamics and weaknesses of financial markets. Financial regulation should seek to make the working conditions of financial markets consistent with the features of the monetary economy.

Since stability is a systemic issue, it requires a system-wide macro-prudential framework (Baker, 2013; Schoenmaker, 2013; Belkhir et al., 2020). Such a framework might be based on the rule of prevention–precaution. In this aim, Ülgen (2018) suggests a 'three-rule regulatory model':

- The rule of prevention and forward regulation such that financial activities with potential systemic risks must be prevented and institutions that would undertake such activities must provide proof of their harmlessness;
- The rule of a public supervision process: regular reporting by public regulators under the supervision of a nonmarket public authority in order to prevent confusion between systemic stability-seeking public supervision and profit-seeking self-regulation (internal-ratings-based models and private rating agencies' evaluation);
- The rule of separation between regulator and regulatee to prevent any conflict of interests. Rating and advising activities must be insulated from each other.

The 2007–2008 crisis has highlighted the importance of macroprudential policies for the viability of economies, especially in a globalised and liberalised environment. It also drew attention to the need to consider financial stability as a public good to be provided by relevant macro-prudential regulation and supervision. Such an analysis is in line with the Schumpeter and Minsky approaches to a capitalist economy's internal dynamics that often result in systemic crises that are only recovered by public intervention, such as big government's economic policies and central banks' lender-of-last-resort interventions (Ülgen, 2014). Schumpeter, in his analysis of the great crisis of the 1920s to 1930s, and Minsky. in his study on the post-WWII crises, have put the focus on these features of capitalism. Thus, a specific treatment can only be possible through public/collective action, the public hand intervention. The appropriate institutional environment can then be regarded as a regulatory system that could allow the economy to function without generating systemic threats (the explosive instabilities). In Minskyian terms, such an institutional framework is called a 'thwarting mechanism' (Ferri & Minsky, 1992). At that point, some issues have to be considered, such as the conditions for an appropriate scope of regulation: 'It should be fairly obvious that financial firms whose creditors benefit from the prospect of official support should be subject to prudential regulation in order to contain the moral hazard that arises in the presence of such third-party guarantees. The critical weakness of an ambiguous safety net is the mismatch between regulation and the safety net's scope' (Lacker, 2011, p. 4).

The precautionary approach developed in this paper is in line with the conclusions of Borio, Farag, and Tarashev (2020) that argue: 'given the political economy pressures and technical obstacles that the reforms have faced, as well as the inherent uncertainty about the reforms' effects, it is important to maintain a conservative regulatory approach.' However, Agénor et al. (2018) remarked that 'The results show that growth may be promoted by prudential policies whose goal is to mitigate financial risks to the economy. At the same time, financial openness tends to reduce the growth benefits of these policies, possibly because of either greater opportunities to borrow abroad or increased scope for cross-border leakages in regulation.'

The social dilemma is related to the paradoxical role of finance in market economies. In the age of finance and financialization (the supremacy of

financial actors, institutions, markets, and motives in the global capitalist economy), Storm (2018, p. 322) states: 'Finance is a terrible ephor, but, if and when domesticated, can be turned into a useful servant. Everything else is commentary'.

Although beyond the scope of this article, it is worth noting that in order to find a balance between the costs of tight public regulation and constraints and the macroeconomically harmful consequences of financial risks, the supervision authorities developed a new regulatory tool called 'sandboxes'. Initiated by the United Kingdom's Financial Conduct Authority (FCA) in November 2015, sandboxes seek to spur financial innovations while keeping an alert watch on emerging risks. This new approach is intended to offer fintechs a controlled testing environment allowing the financial institutions to try out their products on a limited set of customers under restricted authorization and close regulatory supervision (Cornelli et al. 2021). This might be seen as a middle way to regulate systemically important activities of markets between the state and the market, a direction that has been studied also by the research on polycentric governance mechanisms à la Ostrom (Ülgen, 2021).

4. Conclusion

The added value of this article is twofold. First, it shows why financial regulation is a social dilemma issue through the analysis of the nature of financial market dynamics that do not obviously result in equilibrium outcomes and expected growth. This statement is a conclusion drawn from the study on the characteristics of a market (monetary) economy, especially when the economy develops through the financialization process, losing any societal and macroeconomic reference and goal. Second, the article suggests some original ways of reframing a relevant alternative regulation of financial markets that should rely on a publicly organized and managed collective action framework.

Drawing liberally on the works of Shumpeter and Minsky on capitalist financial dynamics, this article develops an institutionalist and evolutionary analysis of financial innovations and argues that the dynamics of capitalism are contingent on monetary and financial features. It maintains that the inherent instability of capitalism is a general issue that has to be studied with due consideration beyond the market efficiency ideology. In a monetary economy, systemic instabilities are exacerbated when financial regulation is loosened and self-regulation schemas are relied on. The characteristics of financial innovations and behavioural patterns of individual strategies may be the source of systemic fragilities. The micro-dynamics of innovations may result both in creative and destructive outcomes due to crisis-prone financial markets and dissonant individual behaviour. This article shows that there are some crucial differences between entrepreneurial innovations à la Schumpeter and financial innovations à la Minsky. The article then brings to the fore a few arguments that distinguish between micro-efficient decisions and behaviour and subsequent macro-consequences that may threaten the systemic stability whatever the relevance may be of market strategies implemented by the private actors in the economy. The systemic weaknesses and inconsistencies of unregulated markets call for relevant financial regulation in order to allow financial markets to support innovative productive activities in a viable way. This leads us to consider financial stability as a public good to be provided by public hand-guided macroprudential regulation and supervision mechanisms. The latter must be aimed at ensuring stability at a societal level without preventing the innovative dynamics of markets to remain in play. The article then suggests some precautionary/preventive principles for relevant financial regulation in an endogenously unstable monetary economy.

The study of the conditions of systemic financial stability proves to be a matter of a specific social dilemma that concerns the organisation and management of financial markets according to a given regulatory framework. The ultimate issue is to allow market innovation dynamics and systemic financial stability and viability to be compatible through relevant regulation and supervision. The latter should be framed to tame the tendency of financial markets to generate systemic crises instead of supporting productive innovative activities. The motto is then 'preventing instability-generating behaviours and supporting sustainable innovation dynamics of markets'.

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