

**The Financial Innovation Hypothesis:  
Schumpeter, Minsky and the *sub-prime* mortgage crisis**

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## **ABSTRACT**

The Neo-Schumpeterian literature inspired by the work of Schumpeter and the financial Keynesianism of Minsky are often regarded as unrelated, if not contrasting, strands of literature. However, both these authors agreed on the necessity to embed the economic analysis within the institutional and social settings characterizing economic systems. An in depth analysis of these two authors' key contributions and their possible combinations gives us inestimable insights to analyse the structural changes in the economic system. In particular, this would be helpful especially to understand the recent evolution of the US system, undoubtedly being the most advanced capitalist economy. Minsky (1990) suggested a way to conceive a common monetary theory stemming from Schumpeter (and Kalecki) then developed by Keynes and, we add, in a later stage by Minsky himself. This monetary view of Minsky stems from Kalecki, encompasses Schumpeter's vision and includes elements by Keynes. In our view, this includes one crucial feature shared by Schumpeter, Keynes, and Minsky, which is often overlooked by the related literatures, namely the centrality of the banking system. Banks, together with other financial institutions, have been arguably one of the most, if not the most innovative element in the US economy in the last decades, going beyond their 'traditional' role of issuer of loans. This paper describes the recent innovation in the financial system, building on a parallelism between non-financial and financial firms. We maintain that the 2007-8 crisis was not the result of an innovation in the real sector, but came from an innovation (or a series of innovations) intrinsic to the financial system itself, which fostered credit creation. We argue that this 'cluster of innovations' can be placed under the label securitization, defined as the business of packaging and reselling loans, with *repo* agreements as the main source of funds (Gorton and Metrick, 2012:425). We argue that securitization is not only at the core of our explanation of the sub-prime crisis, but it is also a practice through which an insightful connection between the works of Schumpeter and Minsky can be established.

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## 1 INTRODUCTION

The Neo-Schumpeterian literature inspired by the work of Joseph Alois Schumpeter and the financial Keynesianism of Hyman Philip Minsky are often regarded as unrelated, if not contrasting, strands of literature. However, we believe that some of the key insights from these two literatures can be combined, and provide an important contribution for the understanding of most recent structural changes in capitalist economic systems. The monetary theory and especially the theories of banking can represent a bridge among these two scholars. For both these authors, financing is a key determinant of the economic dynamic, being at the same time as the whole financial system, deeply innovative. These innovations inherent to the broad financial sector, we argue, must be taken into account to understand the unfolding of the Great Financial Crisis (henceforth GFC). In fact, both authors agreed on the necessity not to detach the economic analysis from the institutional and social settings characterizing the economy in which the events occurred. Thus, since by the time Schumpeter and Minsky conceived their theories, economic systems have tremendously changed, it is important to take into account the main aspects of novelty. Minsky was well aware of the evolutionary nature of the capitalist system and, as underlined by Knell (2015), he offered important insights to the analysis of the economy as a system in evolution. It seems therefore legitimate to try to re-interpret his theories in light of the structural changes in the economic system (of the US which is the object of our analysis), i.e. the process generally labelled as 'financialization'.

The two authors have almost antithetical primary focuses of analysis. Schumpeter focused his analysis on the real side of the economy, with innovative entrepreneurs propelling the economic dynamic, whereas Minsky's theories have their core in the financial sector and in its destabilizing effects on the economic system. This might explain why in Minsky's main publications (e.g. Minsky, 1975, 1982) - in which he put forward his financial interpretation of Keynes' General Theory (henceforth GT) - the name of Schumpeter appears only in the acknowledgement for his role in the education of the author. To find some considerations about the work of his doctoral supervisor, we need to refer to Minsky's less popular publications, notably Minsky (1983), Minsky (1988) and Minsky (1990). There one can find not only Minsky's critiques to Schumpeter, but also the possible connections among the two authors' work. The critiques are directed mostly to Schumpeter's *Business Cycle* (Schumpeter, 1939a) considered a 'retrogression' (Minsky, 1982:11) from his *Theory of Business Cycles* and a 'minor performance' (Minsky, 1982:1) with respect to Keynes' GT. The crucial fault ascribed to that book was, in Minsky's view, the embracement of the Walrasian approach and its 'axiom of reals'. This choice left no space for finance, which is not only at the core of Minsky's lifetime work, but also in his view the area where Keynes and Schumpeter connect. According to Minsky, both authors analyse a monetary production economy where money and production go hand in hand (Minsky, 1988). In fact, Minsky (1990) suggests how to conceive a common monetary theory stemming from Schumpeter (and Kalecki) then developed by Keynes, and, we would add, in a later stage by Minsky himself. The potential connection among these authors - located

in their respective monetary theories - can, according to Knell (2015), be enlarged to the time dimension in relation with their business cycle theories.

Referring to the work of Kalecki, Minsky notices how both Schumpeter and Keynes embraced the same view on the macroeconomic link between profit and investments. In a nutshell, Kalecki (1971), referring to social accounting identities, shows how in an economy in which the government runs zero deficit and the current account is balanced, and assuming workers consume all their wage income (i.e. saving propensity equals zero), the aggregate level of gross profit is determined by investment and capitalist consumption. Investment requires financing though. In Schumpeter, the financing firms' investment decisions - in particular innovative investment - by banks allows to interrupt the circular flow, which characterises the otherwise stationary general equilibrium. As it is well known, Schumpeter's maintained a (Wicksellian) credit-money view, therefore money in this scheme becomes the social artefacts which allows bankers and entrepreneur to obtain a surplus (Minsky, 1975:121). Minsky proposes an interpretation of Schumpeter's credit-money view, under a macroeconomic (Kaleckian) perspective, particularly stressing the role of investment financing. According to Schumpeter (and Kalecki) the financing of investment decisions allows for the creation of profits and drives the cycle. In Minsky's view, Keynes' monetary theory encompasses this vision of Schumpeter and makes a step forward by adding the role of liquidity preference that determines the price of assets (real and financial), and therefore guide investment decisions and as a consequence the economic dynamic.

For Minsky, the GT laid 'foundations of an investment theory of business cycles and a financial theory of investment' (Minsky, 1994:3).<sup>1</sup> Minsky adds a further element to this monetary theory: he enriches the picture underlying the centrality of debt. An investment decision encompasses a decision on the source of finance and therefore on the liability structure, and, as we will see in following sections, impacts the stability of the system. He puts the liability counterpart of investment decisions at the centre of the stage. It is worth noting that Minsky (1975) illustrates how the Kaleckian link between profits and investment can occasionally be broken, as it happened in the US after the Second World War when profits were generated by public deficit and new house constructions, with mortgage issuance eased by public guarantees. This monetary view of Minsky, whose corner stone is the financing of investment, stems from Kalecki, encompasses Schumpeter's vision and includes elements by Keynes.<sup>2</sup> According to Minsky (1988) indeed both **According to Kregel (2009), Minsky learned from Keynes the importance of money and expectations, while from Schumpeter the importance of banks and other financial institutions, in financing entrepreneurial innovations, and of innovations in determining the dynamics of imperfect competition.** In our view there is one crucial element shared by Schumpeter, Keynes, and Minsky, which is often overlooked by the related literature. That is the

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<sup>1</sup> It is well-known that in the GT Keynes assumes a fix stock of money. However, albeit Minsky's interpretation of Keynes largely focuses on the GT, he embraces an endogenous money view, referring to other works of Keynes for instance underlining how his 'veil of money' (Keynes, 1973a, p.117) describes the capacity of banks to issue loans in excess of deposits, so creating money *ex nihilo*. An analysis on the monetary theory of the two authors and more specifically of the reason why Keynes assumed a fixed stock of money in the GT, is far beyond the scope of this paper (see Bibow, 2010). However, it is quite interesting to notice how, in one of the passages in which he more clearly defends an 'endogenous money' view (Schumpeter, 1954, p.1080) Schumpeter refers to Keynes' 'Treatise on Money' (Keynes, 1930), and notice that this was reverted in the GT.

<sup>2</sup> See also Roncaglia (2013) on this.

centrality of banks. As cited by Minsky (1990: 122), Schumpeter dubs banks as the '*ephor*' of the economy<sup>3</sup>. By creating means of payment, they allow “the carrying out of new combinations” (Schumpeter, 1982:154) and they are therefore 'phenomenon of development' (ibid.). That is to say, banks allow for investment, including the entrepreneurial innovation process, to take place. This quintessential role of banks, seen as determinant of the level of economic activity through their financing decisions, can be found also in Keynes (1973b:222), where he argues that “the banking system holds the key position in the transition from a lower to a higher scale of activity”. This link between Schumpeter and Keynes, is analysed by Knell (2015:201), both considered money and financial aggregates not to be neutral (non-neutrality principle), highlighting the fundamental role of the credit market and of banks.

In Minsky, this position evolves. Banks, thanks to their ability to create purchasing power - and setting with it the level of indebtedness through the issuance of loans to who they deem as credit-worthy borrowers - together with the key for more economic *activity bear the responsibility for instability*. They are indeed portrayed by Minsky as very active profit seeking agents, furthermore highly innovative, given their ability to modify their balance sheets (and their business organisation with it) **for example in order to expand credit with a given amount of reserves and overcome limitations imposed by financial authorities, thanks to liability management (Kregel, 2016)**. They put the economy in motion, up to instability. Minsky (1986:279) depicts banks as “endogenous destabilizers”. This, albeit being a logical consequence of the theoretical framework developed by Minsky (see section 2 on this), is seldom at the core of Minskyian literature, which tends to focus on the decisions of firms. It is worth noting that the term 'banks' was often used by Minsky to refer generally to different kinds of financial institutions. Moreover, their importance in his 'Financial Instability Hypothesis' (henceforth FIH) does not rely exclusively on their role as credit issuer: “They actively solicit borrowing customers, undertake financing commitments, build connections with business and other bankers, and seek out funds” (Minsky, 1986:256-257). In our view, banks, together with other financial institutions have been one of the most (if not the most) innovative actors in the US economy of the last decades. As we will see, their role goes beyond the one of issuer of loans, and put them at the centre of the functioning of a financialized monetary system of production.

Accordingly, the goal of this paper is to answer Minsky's explicit call: 'further progress in understanding capitalism may very well depend upon integrating Schumpeter's insights with regard to the dynamics of a capitalist process and the role of innovative entrepreneurs into an analytical framework that is [financial] Keynesian in its essential properties (i.e. it is Minskyian) (Minsky, 1983:2). In so doing we try to enlarge “The Schumpeterian vision of the experimenting entrepreneurs who innovates [...] to the financial firms.” (Minsky, 1983:14).

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<sup>3</sup> In ancient Sparta, the *Ephors* formed a council of five members, which had to step in and take a decision whenever the two kings disagreed, hence avoiding a stalemate, something equivalent to a stationary general equilibrium state.

In the last decades, financial institutions' role appeared not to be limited to the financing of the 'real' production processes any more. The financial sector is increasingly focusing on the manufacturing of financial products - structured financial assets to nourish the appetite of rentiers - in a dynamic which is disruptive due to the lack of a clear separation between the entity that 'produces' and the one that 'finances'. We believe that this metamorphosis of the financial sector can be fruitfully analysed by updating and combining the theories of these two authors, providing an original reading of the GFC that started in the US during the summer of 2007. Section two discusses Minsky's contribution, both contextualizing the theoretical evolution of the FIH and trying to highlight the broad 'financial Keynesianism' standpoint. Section three presents a 'financial' reading of Schumpeter's work and discusses the innovation that characterized the financial industry in the US in the last decades. Section four provides our 'structural' interpretation of the GFC, based on our integration of the two literatures discussed in the previous sections. Section five concludes.

## 2 MINSKY'S CONTRIBUTION

Since the 2007-8 financial crisis, the theories of Hyman Minsky have had a huge comeback. His FIH has abundantly been referred to by authors from different traditions within academia (Wray, 2011; Eggertsson and Krugman, 2012; Bhattacharya et al., 2015; Charles, 2016, e.g.) and beyond (McCulley, 2009; Cassidy, 2008), in the attempt to provide a theoretical ground to the understanding of the recent financial crisis. The term 'Minsky Moment' has become a catchy expression to define a situation in which the indebtedness of some sector of the economy (usually a private one) becomes unsustainable, ultimately triggering an economic crisis. Nonetheless, there are still controversies about the extent to which the Financial Instability Hypothesis can provide an explanation to the so-called 'sub-prime crisis'. Some authors have directly questioned the coherence of the FIH with the event leading to the sub-prime mortgage crisis. For example, Davidson (2008) believes that the *speculative* and *Ponzi* finance of the FIH (see next section), were ruled out by the contractual forms of the housing market. Hence he negates that the burst of the GFC can be understood as a 'Minsky Moment'. Behlul (2014), observes that the lack of a leveraged non-financial corporate sector makes the sub-prime crisis differ from the dynamic described in the FIH. On the contrary, Kregel (2008) recognises the presence of a Ponzi scheme in the sub-prime mortgage market. However, in his view this was not the result of endogenous forces, as in the original analysis proposed by Minsky. The process was determined by a structural change of the financial system, which caused the detachment of the issuer of the debt and evaluator of the credit worthiness - namely banks - from the bearer of the risk, thus the lender's risks are 'contracted out' to the final holder of the securitized mortgage. According to this reading, this transformation triggered the *Ponzi* scheme that caused the sub-prime crisis. Other authors are more clearly giving credit to Minsky for providing a valid framework to understand the recent crisis. Similar to Kregel, Wray (2012) states that the crisis is the result of a structural change in the US economy, therefore dismissing the possibility of 'black swans'. However, his idea is that the

excess of optimism - motivated by the Great Moderation - led to the undertaking of riskier and riskier financial practices, ultimately heading the economy toward the crisis. In other words, Wray portrays a ‘destabilizing stability’, as in the traditional Minsky's analysis. Interestingly, other authors suggest what we could define as a ‘same scenario different location’ perspective, according to which a Minsky moment actually occurred, albeit not exactly where Minsky theorized it would have happened. For example, Dymski (2009) acknowledges the importance of the contribution of Minsky in the understanding of the features of the crisis. However, he recognises that events in the 2007-8 had specificities - i.e. new banking regulation, inclusion and consequent financial exploitation of minorities in the real estate market, and a US current account deficit - which made them differ from the dynamic depicted in the FIH. Similarly, a Minsky dynamics is identified by Bellofiore and Halevi (2009:16), but with different modalities. First, the boom did not occurred in relation to real investment. Second, aggregate demand was no more dependent on aggregate investment, because of the rise in debt-financed consumption. Third, the increase in prices associated with the boom was independent from wages, and rather determined by raw materials' price.

We believe that this controversy, that is the debate about whether the last crisis could be indeed explained as a ‘Minsky moment’ or not, is deeply linked to an interpretative. If the FIH is slavishly taken as originally presented by Minsky - with its core in the financing decision of investment by firms - and overlapped with a summary of the main events that characterized the sub-prime crisis, a certain amount of circumstances and features over which the evolution of the crisis deviates from the dynamic depicted in the FIH will undoubtedly emerge. In case this is the route taken, the conclusion would be that it was not - at least not exactly - a ‘Minsky moment’. Our perspective differs substantially. We believe that Minsky's analysis goes far beyond his theory of investment. By using Minsky's representation as an adaptable framework, we are able to understand how the financial system can overcome its limits, and how this can affect the real economy (as Bellofiore and Halevi, 2009 and Wray, 2012, appear to have done). In our view, the FIH (Minsky, 1986) is the outcome of a complex theoretical framework developed by Minsky. Minsky's ‘financial Keynesianism’<sup>4</sup> is a personal interpretation of Keynes’ GT, which highlights the financial aspects hidden in the original version: “the missing step in the standard Keynesian theory was the explicit consideration of capitalist finance within a cyclical and speculative context.” (Minsky, 1975:129). Our hypothesis is that this same theoretical framework can be applied to analyse contemporary financial markets, hence obtaining a new reading of the FIH, and consequently a structural explanation of the recent financial crisis.

## **2.1 The Financial Instability Hypothesis as a Component of Minsky's Financial Keynesianism**

The FIH can be defined as an endogenous theory of business cycle, centred on the analysis of the financial structure of the economy. According to Minsky, the economic system is characterized by endemic forces that during a period of tranquillity - meant as a situation of more or less stable growth - lead the system towards

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<sup>4</sup> According to Papadimitriou and Wray (1998), this was the definition preferred by Minsky for his own work, rather than 'Post-Keynesian'.

instability: “stability... is destabilizing” (Minsky, 1975). The interpretations of this view of Minsky usually focus on the analysis of firms' investment and financing decisions. In this analysis, firms, under uncertainty, choose the level of investment by comparing two elements in Minsky's two price theory.<sup>5</sup> On the one hand, the expected stream of returns diminished by a discretionary margin, which represents a 'cushion of safety' (see Kregel, 2008) to protect firms against the possibility of wrong forecasting and of not being able to repay the debt (*borrower's risk*). On the other hand, the cost of the capital asset - whenever firms have to resort to external finance - increases together with the amount of the loans, since banks claim a premium against the possibility that the borrower defaults on its debt (*lender's risk*). Broadly speaking, the bigger the loan, the higher the possibility to default, the subsequent losses, and therefore the required risk premium.<sup>6</sup> This process highlights how any investment decision implies a stream of financial commitments, and how it is expected to lead to the establishment of a stream of revenues. As long as revenues exceed commitments, the economy is stable. Vice-versa, a crisis can occur. This considerations led Minsky to formulate his famous taxonomy of financial positions, in which he distinguishes among *hedge*, *speculative*, and *Ponzi* units.<sup>7</sup> In the first case, firms' expect that money inflows always exceed their financial commitments. In the second case, their revenues are enough to repay interests, but not the 'principal' portion of the loan. Hence, it becomes necessary to roll over the debt. Finally, *Ponzi* units are those who need to borrow further money, or to sell assets, since expected revenues are even lower than interest payments. The overall stability of the economy depends on the relative materialization of each of this theoretical types of units: the higher the number of *hedge* units present in the economic landscape, the more stable the economy will be. According to Minsky, after a prolonged period of tranquillity units' expectations - both firms' and banks' ones - tend to become more and more optimistic. The margins of safety narrow, and *speculative* and *Ponzi* finance become consuetudinary. In terms of a business cycle, this is the upward phase. The economic system endogenously moves towards a more unstable financial position and then 'something' happens. This could be for example an increase in interest rate - due to tighter monetary policy or endogenous forces - or a change in expectations.<sup>8</sup> At this point, *speculative* and *Ponzi* units are no longer able to meet their financial commitments. The upward phase of the cycle comes to an end, an economic crisis is ultimately triggered, and the downward phase of the cycle starts. Firms try to meet their financial obligations either by defaulting, or by selling their assets; this can lead to a Fisherian debt-deflation, hence worsening the crisis, which spreads because of the obvious interrelationships among the various units' balance sheets.

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<sup>5</sup> This double focus is expressed by Minsky, through a two price theory which recall the *Tobin's q*, from which it differs for two main reasons. First, Minsky takes into account the source of finance, since he dismisses the Modigliani-Miller theorem. Second, he takes into account uncertainty.

<sup>6</sup> This view immediately recalls Kalecki's *principle of increasing risk*, (Kalecki, 1937, see).

<sup>7</sup> Here we refer to the exposition of Minsky (1992a). Elsewhere, the author presents the taxonomy in slightly different terms.

<sup>8</sup> It is important to bear in mind that that 'something' is not an exogenous shock whereas the results “of (i) the internal dynamics of capitalist economies, and (ii) the system of interventions and regulations that are designed to keep the economy operating within reasonable bounds.” (Minsky, 1992a, p.8).

In our opinion, limiting the analysis of the work of Minsky to the definition of the FIH does not give full justice to his work. We believe that the FIH should be understood as a corollary of a broader theoretical framework, ultimately aimed at describing the macro-dynamic features of financially complex market economies.

## 2.2 Minsky Beyond the Financial Instability Hypothesis: the evolutive character of its financial Keynesianism.

Paul Krugman (Krugman, 2011) divides Keynesians scholars into two broad groups. Authors in the first group (i.e. the 'Chapter 12ers') focus on radical uncertainty, while the ones in the second group (the 'Book 1ers') underlines the refutation of 'Say's law' and the importance of aggregate demand. According to Krugman, while the first group cannot do much more than stress that 'capitalism is unstable', the second has managed to offer, by means of equilibrium analysis, 'intuition pumps' that do help to deal with economic problems. Hyman Minsky (as many other so-called 'Post-Keynesian economists') completely overcomes this dichotomy. Following Krugman taxonomy, should we pick just one of the twenty-four chapters of the GT, he might rather be classified as a 'Chapter 17er'. Minsky's *financial Keynesianism* springs indeed from a personal interpretation of the GT, whose main focus is indeed Chapter 17 - in which Keynes displays his theory of portfolio choice underlying the key role of liquidity preferences. He reads the GT through a financial perspective, undoubtedly enclosing in his analysis Chapter 12 (*fundamental uncertainty*) and Book 1 (*effective demand*).

It is possible to identify some of the core elements, or paraphrasing Minsky (1981:1) a 'list of ingredients', of its financial Keynesianism. Jointly they form the theoretical lens through which he observed the economic reality and which allowed him to outline his theories.<sup>9</sup>

We already presented one of these elements in the introduction, namely is the centrality of investment in his analysis. The level of investment is not only the main driver of the business cycle, but it is also the determinant, at the aggregate level, of the profits, which are required for the economy to be able to honour debt positions. Moreover investment decisions entail decisions on financing sources, which can lead to unstable financial positions.

The second element is that Minsky identified the core of a capitalist economy in the financial system: "a capitalist, or if you wish, a market economy is a financial system" (Minsky, 1992a:16). Finance is ubiquitous in Minsky's work. Capitalism is represented as a system with complex financial markets. Portfolio choices, financing decisions, and stock-flow relations are the determinants of the economic dynamics and of the overall stability of the system. Units in this system are interlinked through a network of balance sheets (Minsky, 1975:6)<sup>10</sup>. What Minsky has done was to bring back from the *Treatise on Money* (Keynes, 1930)

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<sup>9</sup> The elements listed here should by no means be considered as an exhaustive review of Minsky's contribution. For a thorough theoretical analysis of the work of Minsky see Bellofiore and Ferri (2001) and Papadimitriou and Wray (1998) among many others.

<sup>10</sup> The FIH is indeed based on a micro characterisation, where financial distress propagates through balance sheets and becoming relevant at the macroeconomic level. This might be considered as the cause for the fallacy of composition – or the missing

crucial 'monetary [and financial] detail' that, in the GT, Keynes let fall (see Macedo e Silva and Dos Santos, 2011) 'into the background' (Keynes, 1930: vii).

The third element of our list is the characterization of units as profit seekers. This might appear standard referred to a capitalist economy, but it assumes a specific connotation in Minsky's financial Keynesianism. In fact it refers to both the real and the financial side of the economy. The pursuit of profit motivates units, both borrowers and lenders, to undertake increasingly riskier financial positions, inevitably heading the economy toward crises; "profit opportunities within a robust financial structure make the shift from robustness to fragility an endogenous phenomenon." (Minsky, 1986:234). Profits, in this setting, might arise either from entrepreneurial, or financial activity. The shift toward financial investment by non-financial firms - which has been investigated in Post-Keynesian literature on financialization since Orhangazi (2008) to the more recent Tori and Onaran (2017) and Tori and Onaran (2018) - jeopardises economic growth and stability due to a sort of 'crowding-out effect' on real investment (Minsky, 1986:18).

Fourth, inter-temporality is unequivocally a defining feature of the FIH and according to Knell (2015), when combined with a credit-money view, it is a point of contact between Schumpeter's and Minsky's business cycle theories. Investment decisions are based on a time horizon linking past, present, and future. In fact, "in a capitalist economy the past, the present, and the future are linked not only by capital assets and labour force characteristics but also by financial relations." (Minsky, 1992a:4). Decisions taken in the past determine current financial positions. Current decisions in turn will impact on both future positions and the current ability to fulfil commitments (due to the above-mentioned role of investment). Finally, expectations on the future streams of profit (usually formed on the basis the more recent past experiences) guide current investment decision.

This leads us to the fifth element of our list. Fundamental uncertainty is at the core of Minsky's interpretation of Keynes' GT, "Keynes without uncertainty is something like Hamlet without the Prince" (Minsky, 1975:55). The mechanism through which euphoric expectations lead the economy towards increasingly speculative positions would not make sense in a world characterised by (shared) deterministic expectations and well-known probability distributions. This is rather the result of a decision process based on (Keynesian) convention to overcome radical uncertainty. The same holds true in periods of recession, when general negative expectations slow-down economic activity, making evident the need for government intervention.

Sixth, Minsky analyses a monetary economy. Money is a mean of financing and makes production possible, but it is also required to validate debt positions, and it determines new liability structure. The financing of economic (and financial) activities, as well as indebtedness, are always two sides of the same coin. This is true for Minsky, as it is *de facto* in any balance sheet.<sup>11</sup> Two are, in our view, the characterising aspects

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macroeconomic link - identified by Lavoie and Seccareccia (2001): financial fragility does not need to appear in social accounting (of the firms sector, in the traditional version of the FIH) in order to represent a problem at macroeconomic level.

<sup>11</sup> We can say that enlarging the analysis of portfolio decisions in Chapter 17 of the GT to liability structures is arguably the key original contribution of Minsky to the work of Keynes.

of Minsky's views on money (Minsky, 2008). On the one hand, money enters the economy through credit to finance either real or financial activity and can be used 'as a means of payment for goods and services and as an instrument by which debts are discharged.' (*ibidem*:3). On the other hand, the money supply is considered endogenous and pro-cyclical.<sup>12</sup> In the upward phase of the cycle, the supply of money overcome the limits imposed by monetary authorities and fosters the issuance of credit, feeding 'booms' and 'bubbles'. This may be the result of an active and conscious effort of the financial system through balance sheet management, as well as of an endogenous increase (restrictions) in the types and amounts of liability accepted, due to euphoric (pessimistic) expectations. Within this framework, it becomes natural to identify banks as 'endogenous destabilizers'. Whereas not directly determining them, they fuel the business cycles, supplying the credit during booms and cutting it during recession (see for example the episodes of 'credit crunch'). In the FIH, banks are indeed the units that allow firms - and the economic system in general - to undertake increasingly fragile positions. It is important to bear in mind that this behaviour of banks is not irrational, simply they live in the same economic environment of firms, with which they share the "expectations climate" (Minsky, 1986:255). Due to radical uncertainty, the euphoric expectations pushing firms to expand their business during booms is the same optimism motivating banks to expand credit.

Finally, as abovementioned, Minsky put considered capitalism to be a system in continuous evolution, whose different forms or stages, at times coexisting, succeed one another. The stages differ with respect to the characteristics of trades and industries, production costs, and balance of powers. Minsky (1988, 1996) characterizes them mostly according to the role and features of financial institutions. We may say that it is a 'financial-based taxonomy' of the stages in the evolution of capitalism. First, he describes *Commercial Capitalism* as a stage where only trade is financed by the banking system, which allows to bridge both time, financing goods to be sold, and distance, pledging for legitimacy of distant trade partners. In this first stage, the financial system has no role in the financing of expensive long-term assets, since this is delegated to governments or partnerships. The second stage is named *Finance Capitalism* (from French and American revolutions to the World Wars), and sees the rise of large financial organizations (i.e. financial market, or banks), with the aim of financing vast projects, like railroads or utilities. This stage was characterized by economic expansion, followed by recurrent crises and recessions, and business cycles becoming as a characterizing feature of capitalism. After WWII, the third stage, *Managerial Capitalism*, emerged. Public expenditure was a large share of GDP, the financial structure was stable, with low private debts and a large share of banks' balance sheets represented by public debt. Corporate management is at the core of the system. The managers of large corporations, also thank to restricted competition, had access to large cash flows to

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<sup>12</sup> Albeit money being central, the distinction between banks and other financial institutions in Minsky's works is often unclear or absent, so it is also the distinction between money and 'quasi money'. This may be the cause of some controversies regarding Minsky's monetary theory. For instance, Rochon (1999) questions the existence of a theory of money endogeneity in Minsky. On the contrary, Wray (1992, 2015) - also referring to unpublished material - believe that Minsky had a clear understanding of the functioning of the monetary system and of the endogenous nature of the money supply. This debate can be interpreted in light of the contraposition between 'structuralists' and 'accommodationists' (or 'horizontatlists') Post-Keynesian monetary theories, with Minsky belonging to the first group.

finance their objectives. The last stage, *Managed Money Capitalism or Money Manager Capitalism* (Minsky 1996) (henceforth MMC) sees the rise of institutional investors. A large portion of corporate shares is owned by funds, whose short-termed vision, due to the need to remunerate investors, influences corporate management<sup>13</sup> and makes takeovers and merges easier. As the aim of this paper is to try to build a bridge between the Schumpeterian and Minskyian analysis, it is interesting to recall how according to Minsky, this stage of capitalism required the intervention of the State for the economy to be ‘technologically dynamic’. The short-term needs for funds could hardly be functional to the development of technological innovations. A characterizing feature of MMC is the rise of securitization, which deeply changed the face of the financial system. However, when Minsky identified this new stage of capitalism, major crucial financial regulations were still in place and numerous effects of this innovation had yet to emerge.

This idea motivates our attempt to provide a new reading of the FIH, by stressing its complementarity with an evolutionary perspective. Minsky (1993:106) further maintained that, “to understand the short-term dynamics of the business cycle and the longer term evolution of economies it is necessary to understand the financing relations that rule, and how the profit-seeking activities of businessmen, bankers, and portfolio managers lead to the evolution of financial structures.” For this reason, it can be argued that the FIH is just as much about evolutionary economics as it is about effective demand in a monetary economy (Knell, 2015:294).

### **3 INNOVATION, CREDIT, AND FINANCIAL BUBBLES**

This section firstly offers a rapid overview of Schumpeter's contribution. Due to reasons of space this will necessarily be partial, nonetheless needed for the scope of our analysis. We then analyse the role of finance in both Schumpeter's framework and in neo-Schumpeterian contributions in general, in order to build a bridge between the Minskyian and the Schumpeterian literatures. The second part of this section presents our discussion of the key innovative features of the financial sector, contextualized into the (neo-) Schumpeterian theory of innovation.

#### **3.1 Schumpeter's Financial Theory of Credit and the Dualism of Financial Firms**

Schumpeter (1964/1939) characterized his dynamic description of economic development as a combination of endogenous determinants (i.e. innovations) and response mechanisms (i.e. business cycles) (see among others Alcoufie and Kuhn, 2004). His key argument is that the endogenous feature of this process is ultimately due to conditions inherent to the functioning of capitalist economic systems. Schumpeter's starting point in his theory of economic development is the description of a stationary state in which the economic system is merely reproducing a ‘circular flow’, which is characterized by competitive equilibrium. The essence of this equilibrium is the fact that firms have full control and understanding of the specific techniques in use at this

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<sup>13</sup> This is largely in line with the literature on shareholder-value orientation (Stockhammer 2004, Skott and Ryoo 2008, Hein 2010).

specific point in time, simply because they have been actually employing them for a considerable period. This flow can be 'creatively destructed' only by economic development. In Schumpeter's view, only the entrepreneurial activity is the mean through which new 'combinations' of means of production (i.e. innovations) are introduced, thus breaking the otherwise static 'routine' (Schumpeter, 1982). As summarized by Winter (2006), Schumpeter identifies five groups of new combinations: new products, new means of production, new markets, new sources of supply, and new organization of industry. The appetite for future profits (or surplus over costs) by entrepreneurs is the key driver of innovative processes. The introduction of an innovation makes the appropriation of profits over the 'normal rate of return'<sup>14</sup> possible, thus enhancing a new phase of accumulation.<sup>15</sup> The dynamic feature of this process comes from the fact that "technical change is partly driven [...] by repeated attempts to cope with technological imbalances that it itself creates." (Dosi and Grazzi, 2009:180).

Along with the quite usual evaluation of Schumpeter's contribution discussed above, for the purpose of our analysis it is important to stress the connection between credit and innovation highlighted by the Austrian author, and specifically between the provision of credit and the dynamism of the economic system (Schumpeter, 1964/1939; 2014/1970). In his *Treatise*, Schumpeter (2014/1970) understands money as the clearing tool through which credit and debt positions, or claims and counter-claims, can cancel each other out. By modelling the economy as a system of accounts (household, firms, commercial banks, and the central bank), Schumpeter is able to highlight the role of the banking system as the sector of the economy in which the account settlement takes place. This essential role within the capitalist system give to banks their unique ability to create new purchasing power, since "every bank credit and every bank investment creates a deposit" (Schumpeter, 2014/1970: 188, italic in the original). In particular, for Schumpeter (1951:153), banks are pivotal players in the innovation process, the providers of the means through which innovations are carried out by the entrepreneurial activity. The process of introduction of new combinations cannot be financed through past returns (since in the equilibrium of the 'circular flow' profits and savings are assumed to be zero, and resources fully utilized), thus requiring fresh credit. In short, in the Schumpeterian scheme, innovations would simply be "impossible without new general purchasing power." (Bellofiore, 1985:26). The provision of credit to specific (i.e. selected) firms or sectors, is the condition to provide a dynamic component to the two otherwise static elements of the system, i.e. the private property of means of production and competition in the market. Schumpeter characterizes the operation of the money market as basically "financing of production, trade, and speculation, the transactions of which ultimately require a special financing operation, since new combinations are being established with the help of "means", of which newly created *ad hoc* means have the logical priority" (Schumpeter 2014/1970:316). Notably, Schumpeter introduced the concept of 'functional

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<sup>14</sup> This being the prevailing rate of profit within the 'circular flow'.

<sup>15</sup> This view is criticized by Sweezy (1943), who argues that in an economic system characterized by a capitalistic class-structure, profits exists even without innovations. The accumulation process is thus not a mere consequence of innovation, rather a necessary condition imposed by the profit-making mechanism, which ultimately generates innovations that are functional to the preservation of both the mechanism itself, and the underlying class-structure.

differentiation of credit' (Bezemer, 2014), distinguishing a 'primary wave' characterized by bank provision of credit for entrepreneurial productivity enhancements, from a 'secondary wave' of easy credit fuelling speculative activities. The financial side of the innovation processes is seldom central in the new-Schumpeterian literature, which instead largely focuses on the 'real-side' of the phenomenon (see for example Block et al., 2017). The work of Carlota Perez on the relationship between credit provision and innovation is a praiseworthy exception. In several contributions, Perez (2002; 2009; 2010; 2011) underlines how the common trait in all the five technological revolutions<sup>16</sup> has been that, after the initial 'irruption' stage during which new technologies appear, the support provided by financial institutions has been a necessary condition for the establishment of a new techno-economic paradigm (Perez, 2009). The 'risk-reduction mechanism' inherent to the diffusion of the new paradigm attracts financiers, willing to take advantage of the increasing profit opportunities in an environment of low perceived risk (Perez, 2011:14). Entrepreneurs and financiers enters an upward spiral, or a bubble, in which more and more "entrepreneurs will offer their projects to the also growing number of financiers. If they seem to follow the new paradigm, all projects, good and bad, honest and crooked, are likely to have access to the required funds" (*ibidem.*). In order to accommodate this huge injection of funds, financial institutions introduce new instruments to support the absorption of the new paradigm by the specific economic sector(s), causing inflationary pressure on assets price. The latter and the speculative wave work as a counter-tendency to the primary one, eventually leading to the end of the cycle: when the bubble bursts, a recessionary phase kicks in. Perez (2002, 2011) identifies derivatives instruments as the main driver of 'reckless finance' in the 'secondary wave', a phase that she dubs a 'frenzy phase'. In short, the argument is that the major financial bubbles were driven by massive processes of credit creation to install the various technological revolutions (see Perez, 2002, Chapters 10 and 13).

After this discussion, it becomes clear how Perez' work, by disclosing the financial aspects of new-Schumpeterian innovation-based business cycle theory, recalls Minsky's Financial Instability Hypothesis<sup>17</sup> and the above mentioned financial theory of business cycle. Indeed, the shift from the first (productive) wave of finance to the second (speculative) wave evokes the passage from *hedge* to *speculative* finance in Minsky's taxonomy. Jan Kregel suggests a possible combination of the two theories: 'Financial regulation that is introduced in response to the crisis in the installation period provides the financing for the deployment period, and at the same time lays the seeds of financial innovation in the form of regulatory arbitrage that provides the financing for the installation period of the emerging paradigm' (Kregel, 2009:204). There are nonetheless non-trivial differences among the two theories. First, innovations in the real sector are not the driving force in the FIH. Second, unlike Perez, Minsky warned about the crucial role of the government in contrasting the recession following the boom in order to prevent 'it' (the Great Depression) to happen again. (Minsky, 1982).

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<sup>16</sup> These are the 'The Industrial Revolution', the 'Age of Steam and Railways', the 'Age of Steel, Electricity and Heavy Engineering', the 'Age of Oil, the Automobile and Mass Production', and the 'Age of Information and Telecommunications'. See Table 1 in Perez (2011, p.190) but also Freeman (1995).

<sup>17</sup> Somehow as Minsky did with the financial aspects of the GT (Macedo and Silva, 2008).

Third, and most important, Minsky focused on the liability side of firms' balance sheet and on their indebtedness, hence the inflow of money from the banking sector is central in his analysis. Perez refers instead to capital gains (bubbles), and therefore to a specific kind of financial instrument, namely shares, and to 'idle money'. In her view, financial markets, rather than commercial banks, are the core financial actors. However, her characterization does not devote much space to the complexity or to the evolving nature of the financial system (Kregel, 2009). Schumpeter himself did not devote many considerations to the innovative nature of the financial system. In fact, as we have seen, for Schumpeter the source of the rupture of the equilibrium has to be located in the innovation process taking place within traditional entrepreneurial activities. In his framework, finance is confined to a complementary role, i.e. to make the innovation in the entrepreneurial real sector possible. The banking and the innovative sectors are functionally intertwined, since credit creation is seen as the "monetary complement of innovation" (Schumpeter, 1964/1939:111). Furthermore, the rupture of the equilibria determined by the innovative processes is not seen as negative, as these are rather instrumental to the renewal, hence strengthening, of the economy in what he famously deemed as a process of 'creative destruction'. However, we think that a Schumpeterian theoretical perspective can give interesting insights to understand the functioning of financial systems and, once combined with Minsky's contribution, its inherent destabilising effects.

Contrary to Schumpeter, Minsky focused on the innovations of the financial system considered to be highly innovative (Minsky, 1990) and saw this kind of innovation bound to determine instability: "Nowhere is evolution, change and Schumpeterian entrepreneurship more evident than in banking and finance and nowhere is the drive for profits more clearly a factor in making for change." (Minsky, 1993:106). In this sense, as underlined by Knell (2015), Minsky offered important insights to the analysis of the economy as a system in evolution. It has to be noticed that, for him 'evolution' was not necessary a synonym for progress. Quite on the contrary, for instance he feared that the transformations of the financial sector in the 1980s could represent a 'retrogression' (Minsky, 1990). Within Minsky's financial Keynesianism, financial institutions' innovative character is mostly reflected in their ability to circumvent regulation through liability management, and more generally to increase the supply of credit finding "new ways to finance activities." (Minsky, 1986:220). This was bound to feed speculative positions and lead the system towards instability. Despite the undeniable crucial importance of finance even in the analysis of Minsky, as we have seen in section 2.1, in his analysis the need for finance comes primarily from the production and investment decisions arising from the real sector. We believe that the evolution experienced by the financial institutions led them to transcend their traditional role of credit providers, making them become 'producers' of financial commodities, through securitization. Minsky recognized the emergence of a new stage of capitalism (MMC) however he did not have the time to observe fully its unfolding (hence he never interpreted his FIH accordingly). Building on the classification proposed by Perez (2011), Table 1 provides an updated taxonomy of technological innovation, which includes securitization.

[Table 1 about here]

In our view, it was exactly the coincidence of this double role within the same entity that made the dynamic in the credit provisioning system so explosive. We believe that this interpretation of financial institutions as innovative entrepreneurial activities, highlights the link that can be established between the work of Schumpeter and Minsky. In this sense, we believe it is quite interesting to notice that this double role of financial institutions (being on the one hand credit provider and on the other hand financial enterprises) had been somehow already noted by Schumpeter himself: “Financial institutions and practices enter our circle of problems in three ways: they are ‘auxiliary and conditioning’; banking may be the object of entrepreneurial activity, that is to say, the introduction of new banking practices may constitute enterprise and bankers (or other ‘financiers’) may use the means at their command in order to embark upon commercial and industrial enterprise themselves.” (Schumpeter, 1951:153, footnote 8). Taking into account this double role makes the combination between Schumpeter and Minsky possible, and allows us to present a valid framework for a novel understanding of the GFC.

### **3.2 Production and Innovation in the Financial Industry**

This section describes the relatively recent innovation within financial firms (also stressing their peculiarity with respects to banks), building on a parallelism with the non-financial firms. We do this by firstly exposing the basic features of the ‘traditional’ firm, and then trying to understand the functioning of what we will identify as ‘financial enterprises’.

In one of his seminal papers, Dosi (1982) provided a very powerful understanding technological advancement: “a technological paradigm is as an ‘outlook’, a set of procedures, a definition of the ‘relevant’ problems and of the specific knowledge related to their solution. We shall argue also that each ‘technological paradigm’ defines its own concept of ‘progress’ based on its specific technological and economic trade-offs.”(Dosi, 1982:148).<sup>18</sup> Moreover, within a specific paradigm, “the way in which the direction of advance is programmed defines what the author named as technological trajectory” (Dosi, 1982, *ibidem.*). The selection and establishment of a particular technological trajectory, Dosi argues, happens according to two selection layers, i.e. an *ex ante* institutional one (the role of public or political forces) and an *ex post* one in which the market forces are predominant.

Reading the evolution of the financial sector using these building blocks provides valuable insights. It is important to note how today's financial system “bears little resemblance to that of our parents' generation. The changes in the past three decades alone have been remarkable. The financial markets have become increasingly globalized. Technology has transformed the efficiency, speed, and complexity of financial instruments and transactions” (The Financial Crisis Inquiry Commission, 2011, xvii). In our reading, financial

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<sup>18</sup> “The capitalist economic system is thus seen as characterized by a complex structure of feed-backs between the economic environment and the directions of technological changes.” (Dosi, 1982, p.151).

institutions embodied the novel 'entrepreneur', with the traditional banking sector (on their same side) as the provider of credit. Even though most of the financing through *repo* agreements<sup>19</sup> (more on this below) took place within the investment banks sector, at the aggregate level the banking sector represented the main external source of funds (see Caverzasi et al., 2018). The weakening and then the demise of the Glass-Steagall Act made the distinction between 'financial entrepreneurs' and 'credit providers' purely conceptual, resulting in the presence of almost fictitious counterparts. This institutional feature made the process of 'installing' the new paradigm even faster. In fact, the usual bargaining process between the entrepreneur and the banker (both in terms of interest rate setting, and *ex ante* evaluation of the project) hardly applies to this new environment.<sup>20</sup> In this new setting, the importance the evaluation of projects and the expectation on profits had in the traditional relationship between banks and corporations is downplayed. On top of this, financial firms were able to implement all the different steps of the securitization process within the same institution. These features made the credit provision mechanism explosive. Looking again at Table 1, this peculiarities can be brought as a partial explanation for the relatively short period elapsed between what we identified as the most recent innovation (mid-1980s) and the explosion of the bubble (i.e. the 2007-8 crisis), if compared with the periods between the previous technological revolutions and the subsequent specific crisis (e.g. the introduction of Intel microprocessor in 1971 and the *dot.com* bubble in 2001).

We believe that the 2007-8 crisis was not the result of an innovation on the real sector that fostered credit creation (as argued by Perez for the previous crises), but came from an (or better, a series of) innovation intrinsic to the financial system itself. We argue that this 'cluster of innovations' can be placed under the label 'securitization', defined as the business of packaging and reselling loans, with *repo* agreements as the main source of funds (Gorton and Metrick, 2012:425). The process is rather complex and encompasses several steps, which involve different kinds of financial entities. Banks issue loans, which are moved into the balance sheets of Special Purpose Vehicles (SPVs) in exchange for deposits. Loans were then merged into mortgage pools, and distinguished according to their level of riskiness. These were then sold to financial firms, such as investment banks, often financing their purchases through *repos*, and then used to produce Asset-backed Securities (ABSs), commonly mortgage backed securities (MBS, i.e. with the underlying being a mortgage), but also increasingly complex financial products (e.g. collateralised debt obligations (CDOs), and even more complex products such as the so-called 'squared-CDOs'). Securities were so complex and often obscure, and made of numerous pieces from various loans with uncorrelated assets underlying the instruments that were easily being considered safe, hence obtaining the notorious 'AAA' class by rating agencies.<sup>21</sup> *Repos* had a crucial role in this scheme as they represented on the one hand a safe source of finance and a very liquid safe

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<sup>19</sup> "A *repo* is the sale of a security, or a portfolio of securities, combined with an agreement to repurchase the security or portfolio on a specific future date at a prearranged price. Aside from some legal distinctions concerning bankruptcy treatment, a *repo* is similar to a collateralized loan" (Copeland et al., 2012, p.18).

<sup>20</sup> See Bertocco (2001) for a discussion and Caiani et al. (2014) for a model of this issue.

<sup>21</sup> As for example in the infamous fraud case of 'Abacus' by Goldman Sachs. See for example this article available at: <https://www.theguardian.com/business/2010/jul/16/goldman-sachs-record-abacus-fine> (last accessed June 27, 2018) for a summary of this case.

form of short term investment for financial institutions, and on the other hand a source of demand since MBS were used as collaterals in this kind of collateralised loans. In brief, this financial production process entails four steps, among which two transformation procedures: a) the issuance of the loans, b) its transformation into a financial commodity through standardisation and partition, c) the transformation of financial commodity into complex financial products, and d) the sale of the structured asset to wealth owners.

The basic economic role of a ‘traditional’ firm within a capitalist system of production can be summarized as the coordinated transformation of inputs in goods and/or services to be sold to the market in order to obtain a profit. Again simplifying, the two key building blocks of the functioning of a firm are the technological possibilities (what the firm can do) and the behavioural objectives (what the firm wants to do). The first component is usually described through a production function in which inputs (usually labour and capital) are combined, whilst the second component is usually summarized with the ‘profit maximization’ goal.<sup>22</sup>

Following Winter (2006), a theory of firm's behaviour that aim at being consistent with the contribution by Schumpeter (Schumpeter, 1982, Chapters 1 and 2) would be a “historical theory in the sense that significant differences among firms would be regarded as historically determined; it would be as dynamic theory because only in the context of such a theory can the traditional problems of price theory be confronted anew, and, ideally, it would be probabilistic - the existence of a multiplicity of unobservable factors that shape firm behaviour would be explicitly recognized.” (Winter, 2006:140). In more recent contributions, the evolutionary theory of the firm also stresses the importance of dynamic resource-based, and process-oriented functioning to explain the introduction of new resources and capabilities (see among others Rahmeyer, 2007).

As briefly discussed above, innovation can take multiple forms (see Winter, 2006). In the last three decades, the banking sector experienced technological change more in the form of new services and products, rather than in terms of organizational structure (Fram and White, 2014). Thus, without neglecting the organizational side of financial innovation, we will focus on the ‘new combinations’ in form of new products and services.<sup>23</sup> According to the technical definition, the financial system can be divided into two main groups, i.e. ‘depository’ and ‘non-depository’ institutions. The first group identifies financial institutions that provide loans, and collect deposits on which interests are paid (i.e. banks, and credit unions). The second group consists of all those institutions that produce and sell financial products (i.e. brokerage firms, mutual funds, and insurance companies).<sup>24</sup>

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<sup>22</sup> Among the various ways of challenging this conventional assumption, it can be argued that firms' behaviours are actually multidimensional, and ultimately respond to a vector of different objectives. In addition, as argued by Lavoie (2014, p.128-129), these objectives can be seen as means to the ultimate goal of the firm, which is the increase in its power over the different features of the environment in which it is actively operating (e.g. investment financing, pricing, legislation, etc.)

<sup>23</sup> It is also helpful to keep in mind that, in terms of structure, a model of either firms' process or product innovation should integrate multiple perspectives, i.e. “economics (firm size and market structure, product costs and price elasticity, trade flows) management and engineering (type of innovation, cost impact on production process, degree of technical change required) and organization theory and behaviour (organization structure, formality, planning process, communication).” (Utterback and Abernathy, 1975, p.634).

<sup>24</sup> As explained by Gorton and Metrick (2010), these disaggregation, and further disaggregation within the non-depository institutions is evident from a legal point of view. However, after different waves of financial deregulation this distinction became blurred. In

We argue that, among a variety of businesses, the key output produced by financial firms are structured financial products, which production is ultimately made possible by a generalised process of *commodification of financial relationships* (Botta et al., 2015).<sup>25</sup> Essentially, as for 'traditional' firms, this production is carried out through the use of acquired inputs (the raw materials), or what we can call 'primary' financial assets or liabilities such as mortgages, for the production of structured financial instruments. As noted by Sealey and Lindley (1977) for depository institutions, this type of production “is essentially analogous to the manufacturing firm where one production department produces and supplies an output which is used directly as an input in another process. Eventually, the intermediate outputs culminate in the final economic output of the firm, i.e., earning assets. The output of the financial firm is, therefore, produced with capital, labour, material, and loanable fund inputs where loanable funds are 'produced' through other production operations of the financial firm.” (Sealey and Lindley, 1977:1254).

In the case of financial firms, as we saw securitized mortgages (MBSs) are used as inputs for the production of collateralized debt obligation (CDOs), a structured financial product that pools and repackage cash-flow generating assets (the collateral). In a similar way to what explains the appetite of entrepreneurs to innovate, the key driver for a financial innovation like securitization has been the opportunity for an increase in profitability for the whole financial sector (Botta et al., 2018). In brief, the “business of banking is a trade-off between the appeal of profits and fear of losses. Profits are made by lending more, and by innovating in providing new financial products.” (Lavoie, 2014:255). The various financial innovations<sup>26</sup> can have multiple, complementary, impacts on the functioning of the economic system. In fact, they are likely to a) reduce costs, b) reduce risks, and c) improve the supply financial services both qualitatively and quantitatively (Fram and White, 2014). Accordingly, asset securitization provides less expensive (or lower-cost financing) and more broadly available credit. In addition, if past innovations generated within the real side of the economy were fuelled by increasing credit availability, with securitization we are in a situation of 'credit for credit'. The innovative aspect of securitization is therefore twofold. On the one hand it represents an evolution in the 'form of balance sheet management', as banks - moving from an 'originate and hold' to an 'originate and distribute' scheme - were indeed able to overcome any limitation based on the composition of their balance sheets. Kregel (2009) explains how US banks in the 60s had moved from *asset management* (that is to say the seek for profit through the allocation of resources) to *liability management* (the seek for new kinds of funding) in order to circumvent regulation and maintain competitiveness with other financial institutions. Securitization can be conceived as an innovative form of '*asset management*', with long term risky assets removed from the balance sheet. On the other hand, securitised asset represented a new product, and a hence new source of profit.

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addition, it has been shown how financial firms pursued strategical vertical integration in order to appropriate profits in all the layers of the mortgage industry (Goldstein and Fligstein, 2017).

<sup>25</sup> See also Lysandrou (2005) on this specific point.

<sup>26</sup> An exhaustive discussion of the many financial innovations introduced since the 1960s is beyond the scope of this work. The interested reader can find a comprehensive description in Fram and White (2014).

If following Dosi and Grazzi (2009:180), we broadly define technology as “a set of pieces of knowledge ultimately comprising selected physical and chemical principles, know-how, methods, experiences of successes and failures, and also, of course, physical devices and equipment”, it is glaring how this new business is technologically advanced, as testified also by its voracious absorption of high skilled labour (Cecchetti and Kharroubi, 2012; Kneer, 2013). In our view, the similarities between traditional and financial firms are very significant, and looking at these two through the same lens allows us to grasp a better understanding of financialized economies. Nonetheless, the differences are non-trivial, and determine major impacts on the functioning of the economy. The key difference is that the former experiences constraints on potential utilisation from “the physical limits of the process technology, but with intangible financial products, process technology does not constrain output in the same way.” (Nightingale and Spears, 2010:18).<sup>27</sup>

Theoretically, financial firms have no constraints in their production, apart from the inherent ‘scarcity’ of creditworthiness in the system. Indeed, banks, while endogenously creating money through loans, at the very same time they create the (raw) commodity that is essential to the financial production process. This determines a condition of *endogenous creation of commodity*, a unique privilege of the financial industry, for which a counterpart in the realm of traditional industries cannot be found. Moreover, even the constraint to commodity creation posed by the presence of creditworthy borrowers has been relaxed due to securitization. Banks are now able to clean their balance sheet from risky assets, whenever these are moved to the balance sheets of Special Purpose Vehicles, transformed into structured financial assets and then sold. This erases what in Minsky's view represented the real limit to credit supply, given the aforementioned ability of financial institutions to circumvent regulation, namely borrower's risk: “The ruling borrower's and lender's risk sets limits upon the rapidity with which the opportunities for profits through liability management are exploited.” (Minsky, 1986:235). The rupture of the legal boundaries between credit provider (commercial banks) and financial producer (investment banks), together with the weakening of the limits posed by lenders' risk, set the stage for the explosive dynamic we witnessed. Through the words of one of the experts interviewed, the Inquiry Commission perfectly captures the (Schumpeterian) innovative character of securitization, and the related Minskyian dynamic in which the economy endogenously transit from sustainable growth to financial instability, and ultimately *Ponzi* behaviours: “Securitization was one of the most brilliant financial innovations of the 20<sup>th</sup> century.” Mr. Rokakis told the Commission. **Minsky acknowledged the centrality of securitization in the new phase of capitalism: ‘There is a symbiotic relation between the growth of securitization and of money managed capitalism’ (Minsky 1988:36). He recognised the capacity of securitization to allow to overcome balance sheet limitations and to transfer the risk to the holder of the securities However, he did not have the chance to observe the evolutions of the financial system - *in primis* the deregulation of the financial system which led to the dismissal of the Glass Steagall Act – which eliminated crucial boundaries to the securitizing system. He believed that institutional fragility would have been replaced by inability to perform of**

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<sup>27</sup> See also Nightingale and Poll (2000) on this.

particular financial instruments. He could not witness the large diffusion of securities in the balance sheets of financial institutions nor their systemic role as collateral for repo operations in the money market. The financial system and the MMC itself evolved to something different from what he witnessed. A mutation that, as we will try to show in the next section ultimately led to the *sub-prime crisis*.

#### 4 AN ALTERNATIVE READING OF THE GREAT FINANCIAL CRISIS

Once the entrepreneurial innovative feature of financial institutions is acknowledged, it is possible to look at the GFC through the lens of Minsky's financial-Keynesian framework, thus obtaining an explanation of the events that does not substantially differ from the original FIH. Differences are limited to the 'location': unlike in the original exposition of the FIH, the destabilising dynamic in the building up of the recent crisis was not linked to the indebtedness of firms in the real sector, and rather took place among what we defined as 'financial firms'. In fact, a pretty standard Minskyian dynamic was ignited by innovations in the financial sector. As it should be clear by now, the process of securitization represented a sensational business for the financial sector, thus attracting an increasing number of financial firms. The business was at first both remunerative and secure, with financial firms playing the role of Minsky's *hedge* units. The *destabilizing stability* then exerted its effects, also thanks to the deregulation of financial markets (Sherman, 2009), and the units involved in the securitizing system shifted toward increasingly *speculative* and *Ponzi* positions (Acharya and Richardson, 2009; Dagher and Fu, 2017) up to the point in which the system was not sustainable anymore. The issuers of the loans, namely banks and other depository institutions, significantly lowered their credit standard. This translated in a dramatic deterioration of the financial commodities. The average Loans-to-Value ratio<sup>28</sup> reached its peak of 94% in 2005 and the sub-prime mortgages which used to represent an exception - 8% of total mortgages in 2003 - became almost consuetudinary, reaching the climax of one fifth of new originated mortgages in 2005 and 2006.<sup>29</sup> Also, the financing of financial activities became much easier. A measure of this can be found in the chain of repledgement of collaterals in the *repo* market, which Singh (2011, 2012) shows to have peaked before the crisis, and in the sky-rocketing increase in the amount of *repo* deals by investment banks (see Caverzasi et al., 2018). The boom in production of financial assets is well described by the words of Mike Francis, executive director at Morgan Stanley saying: "We almost couldn't produce enough to keep the appetite of our investors happy. More people wanted bonds than we could actually produce. That was our difficult task, was trying to produce enough" (cited in Goda and Lysandrou, 2014:314). Exactly like described by Minsky, when monetary authorities tried to counteract the booming supply of credit by raising interest rate, the crisis started.

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<sup>28</sup> See Duca et al. (2011) for a more accurate analysis of this measure.

<sup>29</sup> See Joint Center for Housing Studies of Harvard University (2008).

The new ‘location’ of the financialized FIH brings aspects of novelty in its consequences. First, financial firms panicked and started selling their assets (i.e. securities) whose values collapsed, as in a standard Fisherian debt-deflation story recovered by the FIH. This time, however, the ‘fire sale’ of assets affected mainly securities. The aforementioned obscurity of CDOs, which was actually a pro in the upward phase of the cycle (also allowing them to obtain triple AAA ratings), became a severe drawback due to the fact that it became impossible to determine their values. The destabilising effects were augmented by the vast use of these assets in the *repo* market. The Fisherian debt-deflation of this financialized FIH underpinned what Gorton and Metrick (2012) defined as a ‘run on *repo*’. Second, it is undeniable that the sub-prime mortgage crisis was characterized also by an unsustainable level of households’ indebtedness. It is also true that Minsky's taxonomy of financial positions can be fruitfully applied to the household sector, with households rolling over on debt in order to be able to meet their financial commitments perfectly representing *Ponzi* units. However, without neglecting the existence of speculative behaviours in the real estate market, we argue that the unsustainable dynamic primarily sprang from the behaviour of financial firms, with the unsustainable debt dynamics in the household sector representing a reverberation of destabilizing dynamics inherent to the financial sector itself. This last argument is supported by the descriptive evidence about the historical evolution of the sizes of household and financial firms respective debts to US gross domestic product. In fact, the accumulation of debt by US financial firms has been huge in comparison to the household sector, both in terms of levels and growth rates.

[Figure 1 about here]

Figure 1 is highly telling, showing a dramatic increase for both households and financial firms, although between 1960 and 2008 the debt of the latter showed an astonishing growth rate of about 2303% (against a still important 152% growth for households, which still remains relatively less important than the debt dynamics in the non-financial sector). In the various decades, the growth rate of household debt has always been lower than the one of financial firms, apart from the period 2000-2008, in which the two growth rates almost coincide (43.51% vs. 42.67%).<sup>30</sup> This empirical comparison between the relative evolution of households' and financial firm's debt suggest that, in the long-run, and especially since the mid-1980s, the GFC could be read as a story of progressive and unsustainable indebtedness of the financial sector. Following Botta et al. (2015), the increasing demand of securitized debt from financial firms (i.e. brokers and dealers or investment banks) triggered the supply of credit by the banking sector to be securitized, which was then sold to non-banking financial institutions. **Albeit happening in a new ‘location’ and the aforementioned differences,**

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<sup>30</sup> Data source FRED: <https://fred.stlouisfed.org/series/> (last accessed June 27, 2018), Federal Reserve Bank of St. Louis; Debt for the household (and no-profit organization) sector is the sum of credit market instruments and home mortgage (codes CMDEBT + HHMSDODNS); non-financial corporate and financial sector debt consists of their debt securities (codes NCBDBIQ027S and FBDSILA027N respectively).

the crisis can be read through the lens of Minsky's financial Keynesianism in each of its components recalled in section 2.2. First, the very attempt of actualising the FIH by putting financial firms and the production of financial assets at the centre of the stage is deeply in line with Minsky's view of Capitalism, namely an evolving system whose core is within the financial sector. Second, Minsky's inter-temporal dimension according to which the “capital development of a capitalist economy is accompanied by the exchange of present money for future money” (Minsky, 1992b: 2), perfectly describes the market of securities, where deposits (*present money*) are exchanged for financial assets, which are nothing but ‘claims’ on future streams of money.<sup>31</sup> The securitization process captures the very gist of this description of a capitalist economy abstracting from (or trying to get rid of) the direct link with real production. While the indirect links, via the housing markets, were merely a by-product. Uncertainty played its crucial role, inducing 'euphoric expectations' in the securitization system, a blind confidence on the continuous growth in the house price, and a (over)confidence in the liquidity of Asset-Backed Securities as collateral. Hence, increasingly unsustainable speculative behaviours within the financial system became conventional. Similarly, uncertainty was central in the unfolding of the crisis, as financial markets froze, and trust vanished (Gorton and Metrick, 2012). This led a *deb-deflation*, just as described in the original version of the FIH. Moreover, money and its creation has never been so central and, albeit the production process has changed, a monetary theory of production can fully grasp the securitization process.

As described in section 2, Minsky enlarged Keynes' portfolio analysis to the liability side: any investment, real or financial, requires to be financed, therefore it is linked to debt. Here, we somehow expand the FIH along this very same lines and adopting his view of the economy as a set of interrelated balance sheet. The very same debt (e.g. mortgage) that is used to finance the acquisition of an asset (house) represents an asset for someone else, which is usually located in the financial sector. This asset is then ‘commodified’ in the first step of the securitization process, and used in the manufacturing of financial products. Money creation through credit has, therefore, the double role of financing the purchase of the asset on the one hand, and of creating a financial commodity on the other hand. Furthermore, credit, usually in the form of *repos*, is needed by financial institutions in order to purchase their financial raw material (e.g. mortgages) to be transformed (e.g. into MBS) and sold. Therefore, the link between money and production that is at the core of both Schumpeterian and Minsky' analysis is still present in this *financialized monetary theory of production*. A crucial and characterizing element of this form of production is that the endogenous nature of money creation made the dynamic self-feeding, hence highly explosive. Banks were able to create the commodity *ad libitum* and, at the same time, to finance their purchase through *repo* for the production of structured finance. The macroeconomic implications of the link between money and investment discussed in the introduction - which Minsky views as the connection between Schumpeter and Keynes - takes here a peculiar form. Just as Minsky described happening after the Second World War, with housing at the centre of the US economy and

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<sup>31</sup> A very similar vision about the basic function of the money market can be found also in Schumpeter's *Treatise on Money* (see Schumpeter 2014/1970; 316).

residential investment taking the place of entrepreneurial investment in the Kaleckian scheme. Residential investment in 2005 amounted to 6.6% of the US GDP from being around 4% during the 90s. The banking system was at the very centre of the securitization scheme. It supplied liquidity in form of *repo* agreements to financial firms (i.e. brokers and dealers and investment banks), which in turn used this funds to purchase Asset-Backed Securities (e.g. mortgage-backed securities, home equity loans) that had been previously assembled by the banking system itself. Financial firms obtained access to *repo* using Asset-Backed securities held as collateral. From this, it becomes clear how banks have been able to stimulate the demand for these securities. We might say that Schumpeter's *ephors* led the economy toward a dangerous path, as the banks took on their Minskyian role of endogenous destabilizer. The dynamic described above stimulated the production of structured financial products by financial firms, with a counterpart in the increasing indebtedness of households. In fact, the expansion of credit from banks to back the 'diffusion' of the new financial innovation has been sustained by an 'enforced indebtedness' of households. To sustain demand of Asset-Backed Securities from financial firms, banks had to induce households to get indebted. How they managed to do this? It is worth reminding that the main reason behind indebtedness of households, and especially the US ones, is the purchase of a dwelling. The peculiar environment of the US market from 1996 to 2005 saw house prices rising by 45%, an increase not driven or explained by fundamental factors such as income or population growth (Baker, 2005). Within this context, securitization allowed banks, and the financial system as a whole, to leave their 'usual' position in which lending is hedged against default, and in which the borrower could always pay back both interests and principal through mortgage re-payments. Banks encouraged lending also by altering the risk assessment ratio used in the decision for conceding a loan: instead of the 'mortgage-to-income' ratio, they started employing the 'loan-to-value' ratio, where the denominator indicates the appraised value of the asset (i.e. dwellings). It is easy to see that when considering the latter relation, if there is a situation of apparently everlasting increase in the price of houses, the amount lent will be higher.<sup>32</sup> In addition, with increasing houses' prices the new stipulated mortgages will have to be relatively larger. In a context of sluggish household income as in the US in the period before the crisis (Cynamon and Fazzari, 2008; Barba and Pivetti, 2011), substituting the mortgage to income ratio with the loan-to-value one proved to be a real boost to banks' lending. The relative importance of house prices as a determinant of households' borrowing has been modelled Ryoo (2016)<sup>33</sup> and empirically assessed by Stockhammer and Wildauer (2017) for a sample of OECD countries. Moreover, Stockhammer and Wildauer (2017) shows how, specifically for the US, the 'expenditure cascade hypothesis' (Frank et al., 2014) seems to hold, thus household may also take higher consumption norms as a reference, and be more willing to borrow on top of their more valued houses. As a result of the increase in house prices, a perverse dynamic in which on the one side the banking system was pushing lending,

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<sup>32</sup> Qi and Yang (2009) discuss the importance of the usage of this new ratio in banks' lending by empirically showing how current loan-to-value has been the most important, and positive, determinant of the size of banks' losses when the borrower default on loans.

<sup>33</sup> Ryoo (2016, p.471) explains that his "framework combines household debt dynamics with behavioural asset price dynamics in a Keynesian macro model. [...] endogenous boom-bust cycles can emerge through the interaction between household debt and housing price dynamics".

and on the other side the households sector was increasing demand for borrowing, emerged. Furthermore, banks became less strict about the screening of potential borrowers, and there is evidence that this behavioural twist has been incentivized specifically by securitization practices (Keys et al., 2010), which allowed them to substantially get rid of lender's risk. The reason that make mortgages the ideal instrument for the securitization system is twofold, and linked to the double nature of banks' business, which were both credit provider and creator of financial commodities. On the one hand, as a source of funds mortgages were highly demanded by borrowers for their housing needs, and for speculative reasons in face of the aforementioned boom. On the other hand, mortgages appeared as very attractive financial commodities since considered safe due to the increasing prices of the underlying collateral, i.e. dwellings. In brief, especially in the case of sub-prime mortgage lending, the increase in house prices temporarily put a veil on the potential negative effects of both pro-lending risk assessment ratio, as well as a poor screening of borrowers (Demyanyk and Van Hemert, 2009).<sup>34</sup> When a condition in which both house prices rise and economic growth is sustained materializes, the credit provision mechanism rest on the optimism of both lenders and borrowers, which are becoming less and less risk averse. Exactly as Minsky described in the FIH. The growth in bank lending pushes house prices up, at the same time increasing broad confidence and fostering expectations about further rising prices (and profits). At the same time, within the financial system itself, this condition was translated to an intensification of the *repo-for-ABS* mechanism described above. In sum, financial firms increasing demand for securitized assets was sustained through the novel banks-households credit relationship. During this phase, credit, (and thus profits) for financial firms seemed to have no limits. 'Speculative lending' replaced 'hedged borrowing', on the basis of rising asset (houses) prices, and thus the perceived high liquidity of Asset-Backed Securities. This situation embodied the switching point from *hedge* to *speculative* and eventually *Ponzi* positions described by Minsky in the case of firms (Minsky, 1992b), in which 'success breeds excess'. *Ponzi* positions are by definition not sustainable in the long period, and the bubble inevitably had to burst. As discussed above, we can identify two interconnected drivers of overconfidence that were distinctive of this phase: the rising price of houses and the consequential high liquidity of ABS. Following Gorton and Metrick (2012), the explosion of the bubble for this financial innovation started in the summer of 2007. We saw that the activity in the financial system became so complex and decoupled from the real system such that counterparties' risks became unidentifiable and unmeasurable (Botta et al., 2015).

The obscurity of the structured securities, from being the driver of high credit ratings, became a motive for panic, due the impossibility of pricing the assets.<sup>35</sup> This situation led to a fire sale of securities that took the

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<sup>34</sup> In addition, another feature securitization that is similar to what happened for previous innovations has been its impact on the relative cost structure, which further promoted the rise of this new 'paradigm'. In fact, going back to the discussion about financial innovation (Section 3.2), and again borrowing the terminology from Perez (2009), this new input a) provided relatively cheap credit, b) was unlimited in the foreseeable future, and was c) all-pervasive in its applications (on these three points see also Botta et al., 2018).

<sup>35</sup> In a press release, on the 9 of August 2007 BNP Paribas suspended the calculation of the Net Asset Value of major investment funds, given the "complete evaporation of liquidity in certain market segments of the US securitisation market". See the full statement here: <https://group.bnpparibas/en/press-release/bnp-paribas-investment-partners-temporaly-suspends-calculation-net-asset-funds-parvest-dynamic-abs-bnp-paribas-abs-euribor-bnp-paribas-abs-sonia> (last accessed June 27, 2018) and a comment here:

form of a 'run on *repo*' (Gorton and Metrick, 2012). The increase in *repos* haircut presented by Gorton and Metrick (2012) in Figure 4, which is the amount of collateral demanded for these transactions (thus measuring the supposed underlying risk of the collateral) mirrored a decrease in the valuation of the asset compared to its market value: "With declining asset values and increasing haircuts, the US banking system was effectively insolvent for the first time since the Great Depression" (Gorton and Metrick, 2012:425). The second 'run on *repo*', with a 20 percentage points increase in the haircut in just one month, occurred in September 2008 (see again Figure 4 in Gorton and Metrick, 2012), when Lehman Brothers was declared bankrupt: "In this second event, we see parallels to 19th century banking crises, with a famine of liquidity leading to significant premia on even the safest of assets" (Gorton and Metrick, 2012:448). These fire sales of securities and their subsequent fall in price represent nothing more than the last step of the FIH, i.e. a Fisherian debt-deflation. As abovementioned, Minsky captured the new phase in the evolution of capitalism (MMC), and was able to grasp the cornerstone role that securitization played in it. However, he did not have the chance to observe the unfolding of the new financial practices, together with the changes in financial regulations that made an innovation (securitization) at the centre of a whirlpool of speculation. This innovation evolved from the financial sector and involved the 'real side' of the economic system, in particular what was believed to be one of its most stable components, namely the real estate market.

## 5 CONCLUDING REMARKS

In this paper we propose a description and an explanation of the so-called 'Great Financial Crisis', which builds on both Schumpeter's (and neo-Schumpeterian) and Minsky's contributions. We developed and described a new version of Minsky's Financial Instability Hypothesis, which is consistent with the key features of a *financialized monetary theory of production*. We explained how, in our view, the FIH is the outcome of a complex theoretical framework developed by Minsky, in which the investment (and financial) decision is paramount in driving the business cycle. The 'ingredients' of Minsky's financial theory of business cycles shed new light on the importance of the FIH beyond its traditional representation. We discussed Schumpeter's contribution by proposing a 'financial' reading of his theory of innovation, also referring to the recent neo-Schumpeterian theories about the 'innovation-credit-crisis' cycle. We then presented our argument according to which the evolution experienced by US financial institutions led them to transcend their traditional role of credit providers, making them become 'producers' of financial products, through securitization. The coincidence of this double role within the same entity made the dynamic in the credit provisioning system explosive. Our 'evolutionary' reading of Minsky's work in combination with Schumpeter's contribution, which

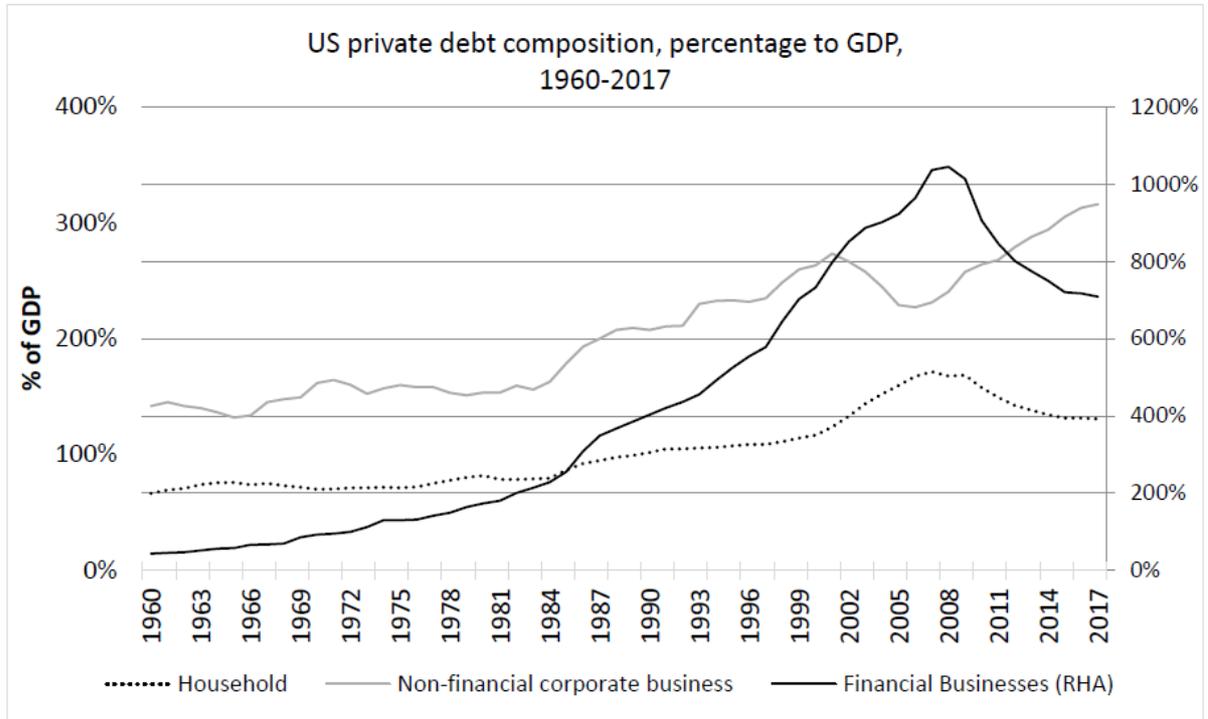
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<https://www.reuters.com/article/us-bnpparibas-subprime-funds/bnp-freezes-2-2-bltn-of-funds-over-subprime-idUSWEB612920070809> (last accessed June 27, 2018).

we centred on the innovative features of financial institutions, allowed us to achieve the key goal of this paper. In fact, the resulting theoretical framework has been employed to provide a novel explanation of the GFC. According to our argument, the pathogens that led to the crisis were congenital to the specific (innovative) form that the US capitalism assumed since the early 1980s, and that the bursting happened in the sub-prime mortgage market precisely because of the specific forces fostered by the new role that financial firms acquired through securitization. Our analysis aimed at providing a 'structural interpretation' of the GFC, that is the identification and understanding of the endogenous forces that progressively drove the US economy towards an unsustainable financial position, making the crisis an inescapable event. This paper calls for future research about a deeper understanding of the novel, active, and ultimately innovative role of financial firms within developed capitalist systems. Future research would explore the steps of financial production in more details, the specific phases of the formation of a financial bubble, as well as the role of technological innovation in financial production.

**FIGURES AND TABLES**

**Figure 1. An historical view on household and financial firms’ debts, 1960-2017**



<i>Growth rates by decade and full period for household and financial businesses' debt component</i>						
	1960-1969	1970-1979	1980-1989	1990-1999	2000-2008	1960-2008
Household debt to GDP	7.94%	14.89%	21.14%	12.09%	43.51%	151.93%
Financial firms debt to GDP	97.43%	76.14%	122.22%	74.06%	42.67%	2302.87%

**Source:** Authors' calculation based on series provided by Federal Reserve Economic Data (FRED).

**Table 1. An updated taxonomy of technological revolutions**

<b>Technological Revolution</b>	<b>Popular name for the period</b>	<b>‘Big-bang’ initiating the revolution</b>	<b>Year</b>	<b>Core country (or countries)</b>
First	The Industrial Revolution	Arkwright’s mill opens in Cromford	1771	Britain
Second	Age of Steam and Railways	Test of the Rocket steam engine for the Liverpool-Manchester railway	1829	Britain (spreading to Europe and USA)
Third	Age of Steel, Electricity, and Heavy Engineering	The Carnegie Bessemer steel plant opens in Pittsburgh, PA	1875	USA and Germany (and later Britain)
Fourth	Age of Oil, the Automobile and Mass Production	First Model-T comes out of the Ford plant in Detroit, MI	1908	USA spreading to Europe
Fifth	Age of ICT	The Intel microprocessor is announced in Santa Clara, CA	1971	USA to Europe and Asia
<i>Sixth</i>	<i>Securitization</i>	<i>Fannie Mae issues its first Mortgage Backed Security (1981)? First Asset Backed Security (1985)? First Collateralized Debt Obligation (1987)?</i>	<i>1981-1987</i>	<i>USA to Europe and worldwide</i>

**Source:** Authors' elaboration based on Perez (2011)

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