Financial frictions and crises in a Minskyan perspective

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Abstract

The concept of financial frictions is at the core of the Financial Friction Approach (FFA) which underlines that to explain the financial crisis of 2007-2008 it is sufficient to add the financial system to the New Keynesian DSGE model. Many economists have cited Minsky among those who "emphasized the importance of financial frictions." The aim of this work is: i) to show that Minsky cannot be considered the precursor of the FFA and that FFA does not allow for a solid explanation of financial crises; ii) to present a sound explanation of the financial instability affecting capitalist economies based on two teachings characterizing Minsky's work. The first consists in Minsky's interpretation of Keynes's General Theory, which recovers the revolutionary elements of Keynes's thought neglected by the Neoclassical Synthesis. The second teaching consists in underlining the need to integrate Keynes's and Schumpeter's theoretical frameworks.

Keywords: Financial markets, Crises, Keynes, Schumpeter, Minsky.

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Introduction

The concept of *financial frictions* is at the core of a theoretical approach developed in the years after the global financial crisis of 2007-2008 and the subsequent Great Recession. Following these events, many economists have acknowledged a fundamental limit in the theoretical models elaborated after the monetarist counter-revolution started with Friedman's criticism of the Phillips curve, which consists in the fact that they neglect the financial system. The Financial Frictions Approach (hereinafter FFA) is the result of the work of a large number of economists believing that to explain the relevance of the financial system and the origin of the financial crisis it is not necessary to abandon the benchmark model developed in the last forty years. In fact, in their view it is sufficient to add the financial system to the New Keynesian DSGE model (hereinafter NK-DSGE model).[1]

Many authors have cited Hyman Minsky among the precursors who inspired the concept of financial frictions. Brunnermeier et al. (2013, p. 1), for example, cite Minsky as one of the economists that have: "emphasized the importance of financial frictions and inherent instability of the financial system.".[2] The aim of this work is twofold. First, we intend to show that Minsky cannot be considered a precursor of the FFA. Indeed, Minsky strongly criticizes the concept of non-neutrality of money emerging from the FFA, which is based on the presence of rigidities and frictions impeding the convergence of the economy towards the natural equilibrium; we will show that the FFA does not allow for a solid explanation of financial crises. The second objective instead, consists in presenting a sound explanation of the financial instability affecting capitalist economies based on two teachings characterizing Minsky's work. First, Minsky's interpretation of Keynes's *General Theory*, which recovers the revolutionary elements of Keynes's thought neglected by the Neoclassical Synthesis. The second teaching consists in underlining the need to integrate the theoretical approaches of Keynes and Schumpeter. The paper consists of two parts. In the first part, we summarize the main features and the theoretical limits of the FFA. Following Minsky's teachings, in the second part of the paper we present a sound explanation of financial instability.

1. The Financial Frictions Approach

1.1 The Great Recession and the Financial Frictions Approach

The global financial crisis of 2007-2008 and the ensuing Great Recession have led many economists to question the theoretical model accepted by the economics profession at the

time of the burst of the crisis, namely the NK-DSGE model. A survey by Gärtner et al. (2013), which involved 768 teachers working at 512 colleges and universities in Western Europe and United States, shows that only 10 percent of the respondents believe that: "modern macroeconomics possesses the models and concepts needed to understand and deal with such crisis" (Gärtner et al., 2013, p. 408), and that only a similar minority (17 percent) argues for the need to elaborate an alternative theoretical paradigm. The vast majority of the respondents (73 percent) recognizes that the Great Recession has revealed a significant limit of the NK-DSGE model: it neglects the financial system. However, the latter respondents are convinced that the NK-DSGE model should not be abandoned. These results have then been confirmed by an investigation conducted by Aigner et al. (2018) and by the work of Vines and Wills (2018, p. 1) who: "asked a number of leading macroeconomists to describe how the benchmark New Keynesian model might be rebuilt in the wake of 2008 crisis."[3] Vines and Wills conclude that virtually all the economists involved in the survey have underlined the need to develop a new version of the benchmark DSGE model based on the abandonment of the 'frictionless finance' hypothesis. In other words, a vast majority of economists supports the need to elaborate a FFA explaining the relevance of the financial system through the introduction of financial frictions.

The specification of the most significant elements of the FFA requires a brief description of the characteristics of the NK-DSGE model and of the reasons leading this model to completely neglect the financial system. The NK-DSGE model is an expression of what has been defined as a New Neoclassical Synthesis to underline the existence of a link with Samuelson's Neoclassical Synthesis (see Samuelson 1955, Goodfriend and King 1997, De Vroey and Duarte 2018, Farmer 2018, Palley 2018). The common element between these two syntheses is that they are both based on the distinction between a short run characterized by the rigidity of wages and prices in which the Keynesian principle of effective demand holds, and a long run instead marked by the flexibility of wages and prices in which, in accordance with the neoclassical theory, the levels of income and employment depend on the labor demand and supply functions, and in which Say's Law and the quantity theory of money are valid.

There are at least two significant differences between the NK-DSGE model and the IS-LM model developed by the supporters of the Neoclassical Synthesis. First, the explicit consideration of inflation expectations, testifying the deep influence of Friedman's criticism of the Phillips curve (Friedman 1968, 1977). Secondly, the specification of the instrument used

by the monetary authorities. A common element between the pre-Keynesian theoretical approach, and the approaches of Keynes and Friedman consists in identifying the quantity of money as the instrument controlled by monetary authorities. NK-DSGE models instead make use of the Wicksellian distinction between the rate of interest on money and the natural rate of interest (Wicksell 1898), and assume that monetary authorities vary the level of the rate of interest on money depending on deviations of the levels of inflation and income from target values defined, for instance, according to Taylor's rule.

The concept of natural rate of interest, which characterizes Friedman's concept of natural equilibrium (Friedman 1968, 1977) represents the fundamental pillar of the neoclassical theory which explains the role of the financial system starting from the dissociation between saving and investment decisions. This approach emphasizes the link between saving decisions and the supply of credit and the link between investment decisions and the demand for credit. Within this theoretical framework, the rate of interest is the price allowing to equilibrate the demand and the supply of credit and, thus, saving and investment decisions that can be defined in terms of goods and are independent from money.[4] For this reason, in the years preceding the Great Recession, the supporters of the neoclassical synthesis have developed models focused on saving and investment decisions, without taking into account the financial system (on this point see, for example, McCallum 1989). These elements allow us claiming that NK-DSGE models did not neglect the financial system in order to simplify the analysis, but because they are a reflection of the neoclassical theory underlining the neutrality of money and finance.

The fundamental feature of the FFA is that it attributes the relevance of the financial system to the presence of financial frictions impeding the smooth transfer of funds from savers to businesses.[5] Since the 1980s, Akerlof's seminal work on information asymmetries has been widely used to develop a theoretical approach applying his conclusions to the credit market.[6] According to the supporters of the FFA, the presence of imperfect information leads to the birth of institutions, like the banks, specialized in gathering information about the qualities of potential borrowers and of their investment projects. This implies that investment decisions and, more generally, spending decisions are influenced not only by the level of the rate of interest, but also by the availability of credit offered by the banks in agreement with their creditworthiness criteria.[7] The fact that asymmetric information can persist in spite of the presence of banks, can prevent the credit market from reaching an equilibrium consistent

with full employment and can generate a rationing equilibrium (see, for example, Stiglitz and Weiss 1981).

1.2 A critique of the Financial Frictions Approach

Minsky cannot be considered a precursor of the FFA because he strongly criticized the fundamental element common to the New Neoclassical Synthesis and the Neoclassical Synthesis. In his analysis of the work of Bernanke (1993), who is a very precursor of the FFA, Minsky observes that this first version of the FFA still maintains the typical structure of the conventional macroeconomic model in which: "money and finance are neutral" (Minsky 1993a, p. 77):

> Macroeconomic models building since Lucas' day has largely consisted of first accepting that a 'real system' determines equilibrium and then inventing *imperfections* in the economic structure, money system, or financial markets so that non-neutrality results. Such a model is New Keynesian if the result is the existence of a number of equilibria that are not necessarily at full employment and if policy is effective. A popular way to generate non-neutrality of money or financial factors is to assume that information is asymmetric. (Minsky 1993a, p. 77)

Minsky claims that New Keynesian models are characterized by a logical flaw because, on the one hand, they accept the concept of natural equilibrium, which implies conditions of perfect information, but on the other hand they recognize the presence of information asymmetries, namely the presence of financial frictions.[8] The supporters of the FFA aim to overcome this contradiction through the distinction between a short run characterized by the manifestation of the effects of information asymmetries, in which the concept of non-neutrality of money holds, and a long run in which the effects of information asymmetries disappear and the system returns to the position of natural equilibrium. This seems to be an arbitrary hypothesis. In fact, if it is recognized that banks are born to eliminate the effects produced by asymmetric information it must be explained why the banks are able to achieve this objective only in the long run and not in the short run. Minsky has expressed his perplexities with regard to the way the FFA explains the concept of non-neutrality of money by observing that: "non neutrality [of money] depends upon borrowers being smart and bankers being dumb" (Minsky 1993, p. 78).

Furthermore, Minsky deeply criticizes the founding pillar of the Neoclassical Synthesis and the New Neoclassical Synthesis, namely the thesis that in the long run, when wages and prices are flexible and the effects of financial frictions disappear, a market economy converges

towards Friedman's natural equilibrium (see, in particular, Minsky 1975, 1982). Minsky's aim is not to complete the conventional paradigm by adding financial frictions, but rather to develop an alternative paradigm explaining why: i) a capitalist economy does not converge towards any natural equilibrium determined by real variables; ii) it is not possible to distinguish between a short run in which money is not neutral and a long run in which money is neutral, since actually money is never neutral; iii) the reasons for the non-neutrality of money do not depend neither on the rigidity of wages and prices nor on the presence of financial frictions:

> The conventional economic paradigm is not the only way economic interrelations can be modelled. Every capitalist economy can be described in terms of sets of interrelated balance sheets. [...] Balance sheets relations link yesterdays, todays, and tomorrows: payment commitments entered in the past lead to cash payments that need to be executed now as well as future cash payments. [...] In this structure the real and the financial dimensions of the economy are not separated: there is no so-called real economy whose behavior can be studied by abstracting from financial considerations. [...] This system [...] is not a well-behaved linear system. Furthermore, the presumption that this system has an equilibrium cannot be sustained. This modelling of the economy leads to a process in time that generates a path that can fly off to deep depressions and open-ended inflations, even in the absence of exogenous shocks or strange displacements. In this model, money is never neutral. (Minsky 1993a, p. 78)

In conclusion, following Minsky, we can conclude that it is impossible to explain the global financial crisis of 2007-08 by using the FFA approach because this approach applies to a system where economic crises cannot occur. In other words, it seems impossible to explain economic crises by introducing imperfections in a model describing the working of a world without imperfections, as imperfections set off a process aimed at their elimination, and at steering the system towards the ideal state. Indeed, if the function of the banks is to select the most creditworthy debtors and to avoid savings being allocated to incompetent borrowers, it must be concluded that the banks, like the mechanics in the Akerlof's market for *lemons*, will be able to eliminate the negative consequences of the presence of asymmetric information and to grant the realization of the results that would be obtained in an ideal world characterized by the presence of perfect information. Within such a world, the probability of the outbreak of a global economic crisis is equal to the probability of the occurrence of a general block of the automobile traffic imputable to the sudden inability of the mechanics to assess the quality of the cars in circulation. (See Bertocco 2017; Bertocco and Kalajzić 2019b).

In the next pages we present the significant elements of an alternative approach to the mainstream paradigm based on two teachings of Minsky. First, Minsky's interpretation of Keynes's *General Theory*, which deeply diverges from the interpretation of the Neoclassical Synthesis.[9] In fact, Minsky's purpose is to make explicit the revolutionary elements of Keynes's *General Theory* neglected by the conventional interpretation of his thought.[10] Secondly, the need underlined by Minsky to integrate the theoretical approaches of Keynes and Schumpeter.

2. The alternative theoretical model

2.1 Minsky and the interpretation of Keynes's theory

Writing in the 1970s, Minsky emphasizes that, on the one hand, economists have recognized the effectiveness of Keynesian policies in dealing with recessions but that, on the other hand, they have been unable to accept Keynes's explanation of the origin of economic crises:

> [T]he primary policy message of Keynes – that slumps are unnecessary and a waste of both human and nonhuman resources – has become a fundamental political axiom guiding economic policy. [...] However, this victory for Keynes's policy objectives and activist policy posture obscures the fact that implicit in his analysis is a view that a capitalist economy is fundamentally flawed. (Minsky 1975, p. 11)[11]

According to Minsky, Keynes's revolutionary contribution consists in underlining that crises are not the consequence of exogenous shocks but structural phenomena, that is, the expression of fundamental characteristics of capitalist economies. In 1933, while writing the first drafts of *The General Theory*, Keynes underlined the need to elaborate a monetary theory of production, that is, a theory clarifying that the origin of economic crises lies in the reasons for the non-neutrality of money: "[...] booms and depressions are phenomena peculiar to an economy in which [...] money is not neutral" (Keynes 1933a, p. 411).

The interpretation of Keynes's *General Theory* developed by Minsky, as opposed to the Neoclassical Synthesis, highlights the fundamental role of the financial system for the explanation of the relationship between money and crises. In fact, Minsky claims that the same financial system representing an essential element for the process of development of a capitalist economy is also at the roots of the fragility of contemporary economies:

> This flaw [of capitalist economy] exists because the financial system necessary for capitalist vitality and vigor – which translates entrepreneurial animal spirits into effective demand for investment –

contains the potential for runaway expansion, powered by an investment boom. This runaway expansion is brought to a halt because accumulated financial changes render the financial system fragile, so that not unusual changes can trigger serious financial difficulties. (Minsky 1975, p. 12)

Minsky claims that the revolutionary content of *The General Theory* consists in having led to the elaboration of a theoretical framework emphasizing the double dimension of the financial system. On the one hand, it is necessary for 'capitalism vitality and vigor', but on the other hand it represents the factor determining the fragility of the system. Minsky's interpretation of *The General Theory* highlights another element of Keynes's theoretical framework neglected by the supporters of the Neoclassical Synthesis: the dimension of uncertainty. In particular, Minsky underlines that in the presence of uncertainty the effects of Keynesian policies may be very different from what is described in the IS-LM model. In fact, Minsky observes that in conditions of uncertainty Keynesian policies may generate instability:

> Because Keynes arrived at his views on how a capitalist economy operates by examining problems of decision-making under conditions of intractable uncertainty, in his system stability, even if it is the result of policy, is destabilizing. (Minsky 1975, p.12)

In our view, the second teaching of Minsky consists in having stressed the need to integrate the theoretical approaches of Keynes and Schumpeter.[12] In the following pages we will show that Schumpeter's analysis of the role of bank money in the process of economic development based on the introduction of innovations allows developing a monetary theory of production more solid than that produced by the Neoclassical Synthesis.

2.2 Keynes, Schumpeter, Minsky and the reasons for the non neutrality of money

To develop a solid monetary theory of production we start from the distinction between a *real-exchange economy* and a *monetary economy*. Keynes (1933b) explains the differences between these two economies by making use of two formulas originally developed by Marx. With the sequence $C\,(commodity) \to M\,(money) \to C'\,(commodity)$, $C\,(commodity) \to M\,(money) \to C'\,(commodity)$, Keynes characterizes a *real-exchange economy*, namely an economy in which the production of goods represents the necessary condition to demand other goods, and in which money is no more than a tool allowing to cut the costs of exchanges. With the sequence $M\,(money) \to C\,(commodity) \to M'\,(money)$ Keynes instead describes the features of a *monetary economy*.

The latter sequence enables to elaborate a first explanation of the reasons of the non-neutrality of money that does not depend on the rigidity of wages and prices and on the presence of financial frictions. The first part of the sequence $(M \rightarrow C)$ shows that the availability of money is not only the necessary condition for the *purchase* of goods, but also the necessary condition for the *production* of goods. In modern economies, money is the fundamental tool enabling to start production processes. Schumpeter's theory of development allows explaining this point. According to Schumpeter, capitalist economies present two distinctive features. First, the process of change triggered by the innovations introduced by entrepreneurs. In Schumpeter's view, innovations do not coincide with the introduction of machines increasing the productivity of the workers employed in the production of consumer goods. In fact, he argues that innovations also consist in the production of new goods deeply modifying the consumption habits of households.

The second distinctive feature of capitalist economies relates to the role of bank money. To explain the fundamental role of bank money Schumpeter observes that the introduction of innovations consisting in new goods requires particular skills differing from those needed to manage incumbent firms. Those introducing innovations must be able to act in conditions of uncertainty since their decisions aim at changing the consumption habits and life styles of the population (Schumpeter 1912, p. 66). Schumpeter thus concludes that, generally, innovations are introduced by 'new men' who, unlike those running incumbent firms, do not control the basic production factors (i.e. labor and land). Schumpeter's analysis leads us to underline that the ability to take decisions in conditions of uncertainty distinguishes entrepreneurs from wage workers; indeed, Schumpeter associates the terms 'entrepreneur' and 'enterprise' to the introduction of innovations changing the consumption patterns of households (Schumpeter 1912, p. 74). He explains that the expansion of the supply of credit by the banks provides new purchasing power to the entrepreneurs-innovators, thus allowing them to demand labor services (Schumpeter 1912, pp. 106-109). According to Schumpeter, without banks and credit it is impossible to explain the process of economic development of a capitalist economy.[13] Schumpeter's analysis allows us underlining that in a capitalist economy the production of goods is not independent from money, since the availability of money represents the necessary condition for the introduction of innovations. (See Bertocco and Kalajzic 2019a).

Furthermore, Schumpeter's theory of development allows explaining the second part of the above sequence $(C \rightarrow M')$, which highlights that in a monetary economy the goal of economic

activities does not consist in the production of goods but in the obtainment of a monetary profit. In other terms, in a monetary economy the production of goods represents the means enabling to accumulate money. According to Schumpeter, in an economy characterized by the relationship between bank money and innovations, the presence of money allows homogenizing the production costs and the outcome of production processes. Therefore, money is the tool enabling the definition of profits. In fact, Schumpeter (1912, p. 128) states that "entrepreneurial profit [...] is the difference between receipts and outlay in a business."[14] Consequently, in a monetary economy monetary values are not a simple 'veil', but represent the only element on which entrepreneurs-innovators and bankers base their decisions (Schumpeter 1954, p. 278).

In the following pages we present a simple macroeconomic model based on the two teachings of Minsky illustrated above. The model shows that: i) Keynes's monetary economy and Schumpeter's and Minsky's capitalist economy do not converge towards a natural equilibrium determined by real variables; ii) the financial system necessary for the vitality and vigor of capitalist economies represents also a source of instability.

2.3 The characteristics of the alternative model

The first fundamental characteristic of the model concerns the introduction of Schumpeterian innovations, which consist in the production of new goods by entrepreneurs. To take into account this phenomenon we abandon the hypothesis underlying the IS-LM model and the NK-DSGE models that the economy is marked by the production of a single homogeneous good that can be either consumed or invested. Instead we assume that, due to the introduction of innovations, a plurality of different goods is produced. Moreover, the explicit consideration of Schumpeterian innovations distinguishes the model presented in this work from many models developed to offer a formal representation of Minky's hypothesis of financial instability which are based on the assumption of the production of a single good that is used both for consumption and investment purposes.[15] Other models, instead, distinguish between the current production of a consumption good and the production of a capital good.[16] In our opinion, models assuming that the only produced good can be either consumed or invested as a capital good, or assuming that only one consumption good is produced by labor and by an homogeneous capital good are conditioned by a fundamental limit: they are unable to explain some significant phenomena characterizing contemporary economies. First, it must

be recognized that it is difficult to explain the employment of bank money and the presence of banks offering credit through the creation of new money within an economic system in which a single consumption good is produced.

Secondly, we must observe that an economy marked by the production of a single final good, for example a corn economy, is doomed to have a limited life over time. In fact, in a corn economy the only innovations are those enabling to increase the productivity of labor; for example, the realization of spades, plows and tractors increasing the productivity of agricultural workers. A corn economy is bound to disappear when innovations will have increased the productivity of the workers up to a point at which humankind is free to live dedicating only a limited part of its time to production.

As is well known, this is the conclusion reached by Keynes in his famous essay published in 1930 in which he commented on the economic possibilities of 'his' grandchildren. Keynes dealt with this question having in mind the process of economic development that unfolded from the industrial revolution onwards, which he believed to depend on the introduction of innovations that greatly increased the productivity of the workforce. Keynes thus concluded that: "in the long run [...] *mankind is solving its economic problem*. I would predict that the standard of life in progressive countries one hundred years hence will be between four and eight times as high as it is today. [...] This means that the economic problem is not – if we look into the *future – the permanent problem of the human race*" (Keynes 1930, pp. 325–326).

Minsky observes that Keynes's prophecy was based on: "a view that human wants, for those items that required substantial capital resources, were satiable" (Minsky 1975, p. 152). Minsky's explanation of Keynes's forecast error is that we don't live in a corn economy in which always the same goods are produced and the needs of households are given and immutable. On the contrary, we live in an economic system in which: "what Keynes called relative needs have grown. [...] Whereas Keynes contemplated in his 1930 essay [...] that the satiation of absolute needs would lead to a situation where 'we prefer to devote our further energies to non-economic purposes' in fact, in the affluent societies, energies above those needed to satisfy the absolute needs have been devoted to the pursuit of relative needs" (Minsky 1975, p. 153). Minsky underlines that a capitalist economy is not characterized by the principle of satiety of needs, but, on the contrary, by the principle of insatiability of needs.

The relationship between bank money and the process of development that is central in the analysis of Schumpeter allows us to explain the relevance of the principle of insatiability of

needs. Schumpeter's analysis shows that firms cannot be considered as simple instruments directed at meeting a given set of needs defined by the principle of consumer sovereignty. On the contrary, the introduction of innovations by businesses constantly changes the consumption patterns of households and expands the size of their needs; Schumpeter thus underlines that in a capitalist economy the principle of consumer sovereignty in not valid.[17]

To explicitly consider the Schumpeterian notion of innovation, in the model described in these pages we have introduced a particular concept of investments. Investments do not coincide to the production of new capital goods perfectly equal to those already existing, but consist of instruments enabling to produce new goods. We can illustrate this concept of investments by means of an example built on Schumpeter's hypothesis that: "... development ... arise[s] out a position without development," (Schumpeter 1912, p. 64). To this end, we start from a corn economy, in which only one consumer good is produced, and suppose that an entrepreneur-innovator plans the realization of an innovation, for example the construction of a railway. We further assume that labor is the only productive factor required to produce corn or to realize the railway. Therefore, in our model we distinguish between two groups of workers: those employed in the production of corn and those employed to realize tracks and locomotives. Correspondingly, we also distinguish between two kind of businesses: agricultural businesses (farms) producing corn, and the company of the entrepreneur-innovator engaged in the construction of the railway.

Moreover, we assume that the life of businesses can be divided in two phases. During the first phase, entrepreneurs realize the instruments needed to produce a certain good by employing labor. For example, during the first phase of their life farmers realize spades, plows and tractors that will be used during the second phase by the workers employed to produce corn. We thus assume that in each period two groups of businesses coexist. The first group consists of the businesses born in the past that in the current period are able to produce goods that can be sold to consumers. In our example these businesses are the farms employing labour to produce corn; hence, corn represents the only good sold in the period in consideration. The second group of businesses instead consists of those businesses employing labor to realize the instruments needed to produce new goods or services in the subsequent period; in our example this second group of businesses is represented by the company employing workers to realize tracks and locomotives.

The second fundamental characteristic of our model concerns the specification of the role of the financial system. Following Schumpeter, the model emphasizes the role played by the banks in the process leading to the realization of innovations. In our model the construction of the railway by the entrepreneur-innovator depends on the possibility to obtain funding from the bankers, who are able to grant credit by creating new money. The model shows that the supply of credit does not depend on saving decisions and that the role of the banks does not depend on the presence of financial frictions.

Furthermore, in line with Schumpeter's thought, we define capital as the purchasing power available to entrepreneurs-innovators for the realization of innovations. In fact, to emphasize the role of money in the process of development Schumpeter abandons the traditional definition of capital, according to which capital is a set of goods used as means of production. In particular, he claims that this definition cannot be applied to capitalist economies because it may be applied to any economic system and it does not describe the characteristics of contemporary economies (Schumpeter 1912, p. 123). Schumpeter instead identifies capital with the purchasing power made available to entrepreneurs and enabling them to carry out innovations (Schumpeter 1912, p. 122).

In our model investment decisions give rise to the realization of instruments enabling to produce new goods. In the first period, these instruments are represented by tracks and locomotives; in the subsequent periods investments consist, for example, of the instruments required to produce automobiles or computers. We can observe that these investment decisions do not give rise to the accumulation of a homogeneous stock of capital goods that can be defined in real terms.

To complete the description of our model it is necessary to specify the labour market and, thus, the labour demand and supply functions. We suppose that the money wage (w_t) and the price of corn (P_t), which in the current period is the only good that can be sold, are fixed in different moments. At the beginning of the period bargaining between workers and businesses determines the level of the money wage, which will be equal for both the workers employed to produce corn and those employed to build the railway; moreover, we assume that the money wage is equal to 5 units of money while the productivity of each agricultural worker (A) is equal to 10 quintals of corn. This implies that the cost of labor per unit of corn is equal to (w_t/A). We also suppose that, once the money wage has been determined, agricultural entrepreneurs (farmers) fix the price of corn (P_t) by applying a mark-up $(1 + m)$

to the cost of labor per unit of product (w_t/A). Thus we obtain: $P_t = (1 + m) \, w_t/A$, and since we assume that m = 1, the price of a quintal of corn (P_t) fixed by the farmer will be equal to one unit of money. The real wage will be equal to: $w_t/P_t = A/(1 + m)$, a value lower than the marginal productivity of each worker (A). Consequently, the farmers, who are able to fix the real wage at a level coherent with their profit objectives, will be willing to hire all the available workers, which we indicate with N^* (we hypothesize that $N^* = 1{,}400$ workers). This means that the labor demand curve is perfectly elastic in correspondence with a real wage equal to five quintals of corn ($w/P = A/(1 + m) = 5$). With regard to the labor supply function, we assume that the workers accept the nominal wage fixed by the bargaining between workers and entrepreneurs, and that they accept the real wage that will be fixed by the entrepreneurs.[18] In other words, we assume that the labour supply function and the labour demand function overlap.

Given these hypotheses about the configuration of the labor market, we can show that the level of employment changes significantly depending on whether we observe a corn economy or a capitalist economy. In a corn economy the agricultural entrepreneurs employ all the workers whose productivity is higher than the real wage expressed in term of corn. Therefore, in a corn economy farmers hire all the $N^* = 1{,}400$ available workers. Nevertheless, this conclusion does not hold in a capitalist economy.

In a capitalist economy the objective of entrepreneurs does not consist in the production of goods but in the obtainment of a monetary profit through the sale of the goods produced. As recalled in par. 2.2, Schumpeter and Keynes stress that profits are exclusively a monetary phenomenon. This implies that production decisions depend on the expectations of the entrepreneurs concerning the monetary revenues they will be able to obtain in the future by selling the goods produced. This decision criterion is adopted not only by the entrepreneurs introducing an innovation, but even by the entrepreneurs producing corn. In fact, in a monetary economy even farmers do not want to obtain a profit in terms of corn but a monetary profit. Consequently, a level of the actual real wage (w_t/P_t) lower than the marginal productivity of the workers employable in the agricultural sector (A) does not represent a sufficient condition to induce the farmers to hire all the N^* available workers.

To illustrate this point, for the sake of simplicity, we assume that the workers spend all their salary to buy corn, while entrepreneurs do not demand corn and save their profits. If the farmers hired all the available workers, they would produce 14,000 quintals of corn (1,400 ·

A). However, since only workers buy a quantity of corn equal to their wage, it is possible to sell just 7,000 quintals of corn (1,400 · 5). Farmers would thus realize monetary revenues equal to 7,000 units of money, which correspond to the wages paid to the 1,400 available workers. Therefore, farmers would not obtain a monetary profit, but only a surplus in terms of corn. This means that, contrary to what happens in a corn economy, the farmers will not hire all the 1,400 workers employable to produce corn.

We can underline that in a capitalist economy, the demand for labor, and thus the production decisions of entrepreneurs, do not depend only on the level of the real wage, but even on the level of aggregate demand. In a capitalist economy, the decisions of the farmers about the number of workers to be employed in the production process depend on their expectations about the future demand for corn and, thus, on the expectations about the monetary revenues they will be able to obtain.

Since only employed workers demand corn, these expectations in turn depend on the expectations concerning the total number of employed workers. For example, if the farmers expect that all the 1,400 available workers will be employed, they would estimate a demand for 7,000 quintals of corn (1,400 · 5). As the productivity (*A*) of agricultural workers is equal to 10 quintals of corn this implies that the farmers will hire 700 workers. To reach full employment it is necessary that the 700 workers not employed to produce corn are employed to realize investments, for example, the construction of a railway. But if there were no investments and the number of workers employed to realize the railway was equal to zero, farmers would not hire any agricultural worker since they would not be able to sell not even the corn produced by a single worker. Therefore, we can conclude that in a monetary economy the levels of income and employment depend on investments with the characteristics of Schumpeter's innovations. In other terms, in a monetary economy Say's law does not hold and the system is characterized by the validity of the principle of effective demand.

2.4 *The principle of effective demand and the irrelevance of the concept of natural rate of interest.*

The relationship between investments, innovations and the levels of income and employment can be illustrated with the help of some simple equations.[19] Income is identified by Y, and as we do not consider the public sector and trade relationships with foreign countries, Y is the sum of consumption (C) and investments (I):

1) $Y = C + I$.

Income, consumption and investments are all defined in monetary terms. Since we have hypothesized that the workers spend their whole salary to buy corn, while entrepreneurs do not demand corn, consumption corresponds to the monetary value of the corn consumed by agricultural workers (C_{ag}) and railway workers (C_R):

2) $C = C_{ag} + C_R = wN_{ag} + wN_R$.

Investments, instead, correspond to the monetary value of Schumpeter's innovations, which in our example correspond to the construction of the railway. We assume that the monetary value of the railway is equal to the production costs, and since the only productive factor employed to realize the railway is labor, the value of the railway equals the wages paid to the railway workers. Investments are determined by three factors. First, they depend on the presence of entrepreneurs who, based on their *animal spirits* (AS), plan to produce innovative goods and services. Secondly, they depend on the level of the rate of interest set by the banks (r^*). We indicate investments planned by entrepreneurs-innovators with I_d. Thus, we have:

3) $I_d = f(AS, r^*)$.

Finally, investments also depend on the decisions taken by the banking system. As pointed out by Schumpeter, entrepreneurs can realize innovative investments only if they borrow from the banks. However, we assume that, after defining the level of the rate of interest (r^*), bankers do not automatically accept all the credit applications submitted by the entrepreneurs but only those deemed creditworthy. If we indicate the flow of credit created by the banks with L^*, we have:

4) $I = L^* \leq I_d$.

Equation 4) shows that usually the investments realized thanks to the creation of new money by the banks are lower than those desired by the firms: in a monetary economy banks ration credit. As we have assumed that the monetary value of investments (L^*) corresponds to the wages paid to the railway workers, that is, to the monetary value of their consumption of corn, we have:

5) $L^* = C_R = wN_R^*$.

N_R^* represents the number of railway workers hired thanks to the funds obtained by the entrepreneur-innovator. By substituting equations 4), 5) and 2) in equation 1) we obtain:

6) $Y = wN_{ag} + wN_R^* + wN_R^*$.

In order to determine the level of income (Y), it is necessary to define N_{ag}, namely the number of workers that will be employed by the farmers. Remember that the production decisions of

the farmers depend on their expectations about the demand for corn and, as only employed workers demand corn, that these expectations in turn depend on the expectations concerning the total number of employed workers $(N_{ag} + N_R)$. For the sake of simplicity, we assume that the farmers are able to know the number of workers that will be employed for the construction of the railway (N_R^*).[20] Thus, we can show that once farmers have defined N_R^*, they are able to determine how many agricultural workers (N_{ag}) will be employed. Indeed, each agricultural worker produces a quantity of corn equal to A and consumes a quantity of corn equal to $w < A$. Consequently, each agricultural worker produces a surplus of corn equal to $(A - w)$ allowing farmers to satisfy the demand for corn of the railway workers. The number of agricultural workers can thus be calculated from equation 7), in which wN_R^* indicates the demand for corn expressed by the railway workers, while $(A - w)N_{ag}$ enables to define the number of agricultural workers needed to satisfy this demand:

7) $wN_R^* = (A - w)N_{ag}$.

From this equation, we obtain:

8) $N_{ag} = [w/(A - w)] N_R^*$.

With $A = 10$ quintals of corn and $w = 5$ quintals of corn, we have $N_{ag} = N_R^*$. Equation 8) shows that the number of agricultural workers depends on the number of workers employed for the construction of the railway. If we substitute equation 8) in equation 6) we obtain:

9) $Y = w[w/(A - w)]N_R^* + wN_R^* + wN_R^*$.

Thus, we finally obtain:

10) $Y = [(2A - w)/(A - w)]wN_R^*$.

Equation 10) shows that in a monetary economy the value of income is a multiple of the monetary value of investments (wN_R^*). In our example A corresponds to 10 units of corn, while w is equal to 5 units of money/corn (recall that we have assumed that $P = 1$). Hence, the value of the multiplier is 3. In other terms, the monetary value of income is equal to three times the monetary value of the investment consisting in the construction of the railway. The employment of a railway worker earning a wage of 5 units of money implies a corresponding investment. Since, following this investment, the demand for the consumption of corn rises by 5 units of money, farmers are induced to hire an additional agricultural worker who, in turn, will consume corn corresponding to further 5 units of money. In the end, income will rise by 15 units of money.

If the entrepreneur-innovator employed 700 workers to realize the railway, investments would rise by 3,500 units of money leading to an equivalent change in the consumption of corn by the railway workers (3,500) and by the agricultural workers (3,500). Consequently, total income would amount to 10,500 units of money. Total income corresponds to the sum of consumption (C), which is equal to the wages paid to the agricultural workers and the railway workers (7,000), and of investments (I), which instead equal the wages paid to the 700 workers employed for the construction of the railway (3,500). Total income also corresponds to the sum of wages $(R = 7,000)$ and profits $(\Pi = 3,500)$. In our example, profits are realized by the farmers as they sell 7,000 quintals of corn in exchange of 7,000 units of money, while their production costs correspond to the wages of 700 agricultural workers (3,500 units of money). As we have assumed that farmers do not consume, profits are equal to their savings (S):

11) $Y = C(7,000) + I(3,500) = R(7,000) + \Pi(3,500) = C(7,000) + S(3,500)$.

We must underline that this explanation of the principle of effective demand significantly differs from that deriving from the IS-LM model, or the NK DSGE models. In the IS-LM model the principle of effective demand is explained with the liquidity preference theory, according to which, given the presence of a level of effective demand insufficient to ensure full employment the rate of interest: "does not automatically fall to the appropriate level" (Keynes 1936, p. 31).

This explanation has a fundamental limit because the concept of appropriate rate of interest is substantially similar to the Wicksellian concept of natural rate of interest which characterizes the NK DSGE models. In fact, the recognition of the existence of an appropriate or a natural rate of interest consistent with full employment leads to the conclusion that involuntary unemployment may be easily eliminated by closing the gap between the level of the rate of interest balancing the supply and the demand for money and the level defined as 'appropriate'. According to the supporters of the Neoclassical Synthesis and of the New Neoclassical Synthesis, the phenomenon of involuntary unemployment appears only in the short run when prices and wages are rigid, while in the long run the flexibility of prices and wages leads the system towards the position of full employment equilibrium. The adjustment mechanism based on the flexibility of wages and prices works even if investments are not sensitive to the rate of interest because, as Friedman (1968) recalls by quoting Pigou, "changes

in the real quantity of money can affect aggregate demand even if they do not alter interest rates" (Friedman 1968, p. 2).

The model described in the previous pages allows us underlining that in a monetary economy an 'appropriate' or a natural rate of interest do not exist. In fact, in a monetary economy the existence of a flow of investments consistent with full employment does not depend only on the level of the rate of interest but, given the rate of interest, it depends on the following two conditions: i) the presence of entrepreneurs-innovators motivated by their *animal spirits* to realize a sufficient number of investments; ii) the willingness of the banks to fund the investment projects submitted by the entrepreneurs-innovators. Hence, once the banking system has fixed the rate of interest, the flow of investments depends primarily on the *animal spirits* of entrepreneurs planning to carry out innovative projects. If these entrepreneurs did not exist, even a rate of interest equal to zero would not be sufficient to ensure the full employment of the available workforce.

Moreover, given the level of the rate of interest, not even the presence of entrepreneurs-innovators planning to realize an adequate flow of investments represents a sufficient condition for the achievement of full employment. Nothing ensures that the banks will finance these projects. In a monetary economy, the banks fund investments by creating new money and, like entrepreneurs-innovators, they take their decisions under conditions of uncertainty. Therefore, their evaluations of the investment projects can sharply differ from those formulated by the entrepreneurs. For example, the banks may consider an entrepreneur planning to realize a railway as an eccentric individual whose investment project has no chance of success. In this case, the innovative investment will not be realized, and the system will not reach a condition of full employment of the available workforce.

2.5 Minsky, Keynes, Schumpeter and the endogenous nature of crises
Following Minsky's interpretation of *The General Theory* and his suggestion to integrate the lessons of Keynes and Schumpeter, we have shown that a capitalist economy does not converge towards a natural equilibrium. The second important result that can be achieved by following Minsky is to show that, in a monetary economy, crises are not the outcome of

exogenous shocks or frictions but they are endogenous, structural phenomena. [21] In particular, Minsky's lesson allows specifying three aspects of the endogenous nature of economic crises.

2.5.1 The financial theory of investments

First, crises are the outcome of the same mechanisms underlying the process of economic development based on the introduction of innovations described by Schumpeter. In his interpretation of Keynes's *General Theory*, Minsky (1975) has shown that the evolved financial system that is at the core of Schumpeter's process of economic development and that generates "capitalism vitality and vigor" (Minsky 1975, p. 11) also introduces an element of fragility that can cause deep economic crises. In fact, the debt contracts agreed upon to finance investments can end up with the default of the borrowers. This may seem a trivial observation: entrepreneurs may be unable to repay loans and go bankrupt. However, we must remember that the bankruptcy of entrepreneurs is completely excluded in conventional macroeconomic models, which are based on the assumption that only a single homogeneous good is produced. In a corn economy, entrepreneurs hire all the workers whose marginal productivity is higher than their real wage; this allows us to assume that they will be able to make sufficient profit to repay the lenders.

In the monetary economy described by Schumpeter, Keynes and Minsky, the credit agreements necessary for the realization of investments do not concern a real good, as for example corn, but monetary values. As observed by Minsky: "To borrow is to receive money today in exchange for promises to pay money in the future." (Minsky 1982, p. 212). Moreover, the relationship between bank money and the process of development described by Schumpeter allows observing that in a monetary economy credit agreements generate uncertainty. According to Minsky: "Underlying all financing contracts is an exchange of certainty for uncertainty; the current holder of money gives up a certain command over current income for an uncertain future stream of money" (Minsky 1980, p. 214).

The fragility of a monetary economy can be illustrated by means of the model described in the preceding pages; the model shows that the level of income depends on the flow of investments funded thanks to a credit contract by which the banks give new money to the entrepreneurs-innovators. These credit contracts give rise to future payment commitments that, as underlined by Minsky, create a link between past, present and future: "our economy has a past, which is present today in maturing payment commitments, and a future, which is

present today in debts that are being created" (Minsky 1982, p. 18). Thus, according to Minsky, the present is characterized by two distinct financial transactions: the validation of debts incurred in the past, and the provision of additional loans for new investments. These financial transactions are closely interconnected. In fact, Minsky notes that the ability of entrepreneurs to repay the loans obtained in the past depends on the amount of profits earned in the present. Following an important contribution by Kalecki, Minsky emphasizes that current profits depend on the investments made in the present based on the expectations driving entrepreneurs-innovators to incur new debts to earn profits in the future.[22] In other words, Minsky shows that the ability of businesses to validate debts incurred in the past depends on the flow of investments, based on expectations concerning future profits, realized in the present by means of new loans obtained from the banking system.

We can verify the meaning of these relationships by making use of the model described earlier. The model shows that the flow of investments corresponding to the realization of the railway, which was funded by the banks and is equal to 3,500 units of money, generates an equivalent flow of savings and profits (see equation 11). Furthermore, the model allows stressing that the fact that investment decisions give rise to an equivalent flow of profits does not represent a sufficient condition to conclude that the entrepreneurs that went into debt with the banks will be able to validate the credit contracts. In fact, at the end of the period considered in the model, the entrepreneur that realized the railway will have a debt with the banks of 3,500 units of money, equalling the production cost of the railway, and no profits, while the farmers obtain a profit of 3,500 units of money. The farmers can use these profits to reimburse the debts possibly incurred in the past, and to increase their wealth by accumulating money. In any case, the profits of the farmers do not allow the entrepreneur who realized the railway to reimburse his debt with the banks.

The reimbursement of the debt incurred by the entrepreneur-innovator will be possible only thanks to the profits he will be able to obtain in the future. We can hypothesize that in the subsequent period, when the construction of the railway will have been completed, even the railway company will be in the condition to sell the results of its production activity. The profits of the railway-entrepreneur will depend of the future demand for train tickets. As we have assumed that the workers employ their whole salary to purchase corn, we can suppose that, thanks to their profits, only farmers will be able to buy train tickets. The amount of revenues of the railway-entrepreneur will thus depend on the profits and preferences of the

farmers. Moreover, the flow of profits of the farmers will depend on the levels of income and employment recorded in subsequent periods, which, as seen earlier, in turn depend on the future flow of investment-innovations.

These elements are sufficient to conclude that in a monetary economy there are no mechanisms ensuring that, even though the causal relationship between investments and profits is valid, the entrepreneurs will be able to obtain a flow of profits allowing them to reimburse the debts incurred with the banking system. The entrepreneur-innovator who realized the railway may go bankrupt if the farmers will not show any interest for travelling by train, or if they will not obtain sufficient profits due to an insufficient future level of investments.

2.5.2 *Stability is destabilizing*

The claim that, in a monetary economy, crises are endogenous phenomena does not mean that crises are inevitable. Minsky recognizes that after the Great Depression advanced economies have been strengthened by the presence of institutions such as the Federal Reserve (big bank) and the Federal Government (big government) in the United States that, at least until the global financial crisis of 2007-2008, have impeded the repetition of the crisis of the 1930s. However, Minsky warned us that the intervention of a big bank and of a big government cannot ensure the permanent stability of the system. In other terms, Minsky has observed that a situation of full employment and low inflation obtained by means of Keynesian policies may generate a crisis. In fact, Minsky maintains that: "stability even if it is the result of policy, is destabilizing" (Minsky 1975, p. 11). This is the second element allowing to define the endogenous nature of economic crises.

To explain the relationship between stability and instability, that is, the shift from 'tranquil' to 'booming' periods preparing the conditions for the outbreak of a crisis, we must consider two characteristics of a monetary economy. First, it is necessary to remember that in a monetary economy, in which investments have the characteristics of Schumpeter's innovations and investment decisions are taken in conditions of uncertainty, the positive results obtained during tranquil periods may lead businesses and banks to underestimate the risks of default and to take on riskier positions. When entrepreneurs and bankers tend to forget previous crises and stories about the beginning of a 'new era' for the economic life of humanity begin to be credible, it is possible to experience periods of euphoria.[23] If, on the one

hand, the bankruptcy of an entrepreneur-innovator may produce negative effects on the animal spirits of entrepreneurs and bankers, on the other hand, the success of investment-innovations realized in the past can push entrepreneurs to embark on risky projects and the bankers to loosen the criteria for evaluating loan applications.

The second feature of a monetary economy enabling to explain the relationship between stability and instability is the presence of speculative markets in which financial assets representing the value of the businesses producing corn, railways etc. are traded. Minsky credits Keynes with the merit of having underlined the importance of these markets, and points out that the Keynesian analysis of the phenomenon of speculation allows completing Schumpeter's analytical approach:

> The special insight of Keynes was the recognition that in a capitalist economy capital assets, collections of capital assets in production units, and a vast array of financial assets need to be priced. In a capitalist economy there is a price system for capital and financial assets as well as one for current output. [...] If we add Keynes' theory of asset process as a capitalization of expected profits, where the capitalization rate reflects portfolio opportunities, to the Schumpeter view that the function of banking is to determine the investment ideas that become investment projects, we are on our way to integrating Schumpeter and Keynes. Keynesian theory, centering around the pricing of assets, capital and financial, in an economy where profits exist because development is the normal state, offers just the analytical framework in which the power of Schumpeter's vision becomes evident. (Minsky 1990, pp.57-58)

As underlined by Keynes in *The General Theory*, to justify the presence of speculative markets it is necessary to introduce the concept of wealth and to specify the relationship between saving decisions and wealth. The wealth of an individual is made up of all the financial assets or durable goods owned at a given point in time. Over time, wealth can vary depending on the flows of savings. When an individual decides to save part of his income, he adds money, new financial assets or new durable goods to his pre-existing stock of wealth. The relationship between saving decisions and wealth is central to Keynes's theoretical approach.[24] We can underline that the relevance of the relationship between saving decisions and wealth emerges in an economy populated by individuals with unlimited needs. An economy of this kind is characterized by the principle of insatiability of needs and, as a consequence, by the scarcity of resources. To explain the presence of individuals aiming at accumulate wealth because they have unlimited needs we return to Schumpeter's concept of innovation. Schumpeter (1939, p. 47) emphasizes that the introduction of innovations constantly changes the consumption patterns of households, thus expanding the boundaries of their needs. Due to the continuous

introduction of innovations, households do not know neither the quality nor the quantity of goods they will desire to buy in the future. Therefore, they are pushed to accumulate a potentially unlimited amount of wealth.

The process of wealth accumulation based on the relationship between saving decisions and wealth represents the mirror image of the process that leads to the realization of investments - innovations occurring from period to period and giving rise to the emission of financial assets accumulated by the wealth owners. These two processes are at the origin of the existence of speculative markets. The presence of speculative markets can play a significant role in the transition to booming phases. In fact, the euphoric attitude inducing entrepreneurs and bankers to underestimate the risks of default may involve the speculators, whose choices are motivated by the goal to make profits by anticipating what Keynes called the "psychology of the market". This attitude of speculators can trigger a booming phase. Minsky has underlined that the financial system can accelerate the outset of a booming phase by introducing financial innovations driving entrepreneurs to expand their investments and speculators to generate speculative bubbles.[25]

2.5.3 Crises and the process of change

To define the third element allowing to emphasize the endogenous nature of crises, we remember that, following the lesson of Schumpeter, Minsky has pointed out that capitalism is marked by a continuous process of change.[26] In particular, Minsky (1993b, 1996) distinguishes between four models of capitalism: i) commercial capitalism; ii) financial capitalism; iii) managerial capitalism; iv) money manager capitalism. Commercial capitalism corresponds to the model of capitalism that preceded the industrial revolution. The industrial revolution of the 19th century has instead been marked by the parallel development of financial capitalism, in which the function of the financial system consisted in financing big industries requiring huge funds for the production of durable capital assets.

With the expression managerial capitalism Minsky defines: "The post-Second World War big government capitalist regimes [that] gave rise to an unprecedented period of prosperity before bureaucratic stagnation set in; big government capitalism proved to be more recession and depression resistant than pre-depression small government capitalism" (Minsky 1993b, p.110). Finally, Minsky has called the new form of capitalism that developed starting from the 1970s money manager capitalism. The main characteristic of this form of capitalism consists in a

profound change of the behavior of the banking system and of other financial institutions. Minsky has observed that during the era of money manager capitalism bankers act no more as the *ephors* of capitalism described by Schumpeter, but as the professional speculators described by Keynes, that is, as agents moved exclusively by the objective to obtain short-term profits by anticipating 'the psychology of the market': "Today's narrowly-focused financiers do not conform to Schumpeter's vision of bankers as the *ephors* of capitalism who assure that finance serves progress. Today's financial structure is more akin to Keynes' characterization of the financial arrangements of advanced capitalism as a casino. (Minsky 1993b, p. 113).[27]

This observation by Minsky allows us underlining that beneath all the forms of economic crises linked to the function of *ephor* of capitalism performed by the banking system and described in the preceding two paragraphs, it is possible to specify a different kind of crisis produced by the speculative behavior of the banks. The speculative behavior of the US banking system indeed represents an important factor enabling to explain the financial crisis erupted in the spring of 2007, at the end of a period in which the US financial system had greatly increased the supply of mortgages and in which this increase was accompanied by the deterioration in the quality of the loans.

The Keynesian concept of speculation is of fundamental importance to explain the behavior of the US banking system that generated the subprime mortgage crisis. To fully understand the meaning of Keynes's definition of speculation, it is worth recalling that he identifies two separate categories of speculators. The first consists of the 'professional' speculators, that is, individuals who have the necessary information and skills to properly assess the present situation and the prospective returns of a business. The second category of speculators consists of 'a large number of ignorant individuals [...] who do not manage and have no special knowledge of the circumstances, either actual or prospective, of the business in question' (Keynes 1936, pp. 153–154).

After introducing the distinction between ignorant and professional speculators, Keynes explains that it is not at all obvious that financial markets are driven by the choices of professional speculators. In fact, the choices made by ignorant speculators, which are influenced by 'factors which do not really make much difference to the prospective yield' (Keynes 1936, p. 154), might well prevail, and the prices of financial assets may reach values that are very far from those consistent with a professional evaluation of the prospective yield of a business. The potential prevalence of ignorant speculators' evaluations affects the

behavior of the professional speculators as they may decide to act not on the basis of their informed and knowledge-based estimates of a company's future performance, but according to their expectations of how the mass of ignorant operators will evaluate the company's situation. Professional speculators will thus specialize in foreseeing the 'psychology of the market'.

It is interesting to note that, without quoting Keynes, mainstream economists like Gorton (2012), Amati and Hellwig (2013), and Rajan (2010) have claimed that the speculative behavior of the US banking system is at the origins of the Great Recession. Two factors have fostered the speculative behavior of US bankers: i) financial innovations; ii) the deregulation of the financial markets that has occurred since the beginning of the 1980s. In particular, two fundamental innovations have pushed the US banking system to increase the supply of subprime mortgages. First, the standardization of financial instruments due to the ICT revolution, which produced a higher availability of information that increased the liquidity of the banks' loans. Banks' loans thus became assets that could be sold on the financial markets. The second innovation consists in the process of securitization that allowed banks to sell part of their standardized assets on the market. This process profoundly transformed the business model of the banks, resulting in the transition from the traditional 'originate to hold' model to a new 'originate to distribute' model. The process of securitization should have improved the efficiency of the financial system, since the division of labor between the banks and the so-called Special Purpose Vehicles (SPV) increased the variety of financial assets. Actually, allowing the banks to transfer their credits and the associated default risks, the process of securitization reduced the banks' incentive to scrupulously assess the quality of the loans granted, therefore generating problems of moral hazard.

The second factor that explains the behavior of the US banking system is the process of deregulation of financial markets and the liberalization of capital movements that marked a clear detachment from the rules introduced after the Great Crash of 1929. The deregulation of the financial system transformed the banking system into a homogeneous organism dominated by the presence of huge universal banks set up in the form of joint stock companies pursuing the exclusive goal of the maximization of the shareholder's value by means of speculation. This evolution was accompanied by a substantial change in the compensation system for bank managers. In order to align the goals of the managers with those of the

shareholders, banks introduced a new remuneration scheme based on bonuses linked directly to the economic results obtained.

The theoretical justification for a political program based on deregulation of financial markets was simple: more deregulation means more competition, and more competition means more innovations and more efficiency. The link between market deregulation, greater competition, innovations and a substantial improvement in the working of market mechanisms may be valid in non-speculative markets. However, in a monetary economy characterized by the presence of speculative markets deregulation and financial innovations may generate instability and crises because, as pointed out by Keynes, they may prepare the conditions for the prevalence of 'speculation' over 'enterprise'.

We can conclude that the recognition that capitalism can take several forms over time allows us observing that crises can be seen as the expression of the fragility of a particular form of capitalism and as the cause of the transition from one form of capitalism to another (see, for example, Kotz 2015). The Great Depression marked the end of financial capitalism and the passage to managerial capitalism; the crisis of the 1970, which can be considered as the expression of the fragility of managerial capitalism, has favored the emergence of money manager capitalism, whose fragility, in turn, has been unveiled by the Great Recession.[28]

This interpretation of the crises that occurred in the last century and of the Great Recession is coherent with the theoretical model presented in this work, which shows that a monetary economy does not converge towards a natural equilibrium determined by real factors and independent from money.

Conclusions

The Financial Frictions Approach (FFA) is the result of the work of a large number of economists believing that to illustrate the relevance of the financial system and the origin of the Great Recession it is sufficient to add the financial system to the NK-DSGE model. Many supporters of the FFA have cited Hyman Minsky as a precursor of the FFA. The first aim of this work has been to show that Minsky cannot be considered a precursor of the FFA. Following two teachings of Minsky, the second objective of this work has thus been to develop a theoretical framework alternative to the mainstream approach. The first of these teachings consists in an interpretation of Keynes's *General Theory* that profoundly differs from that elaborated by the supporters of the Neoclassical Sinthesis. The second teaching instead

regards the importance attributed by Minsky to the need to integrate Keynes's and Schumpeter's analyses. Based on these two teachings, in this paper we have presented a simple macroeconomic model illustrating the main features of what Keynes has defined as a monetary theory of production. The model shows that in a capitalist economy money is never neutral because it modifies the structure of the economic system compared to that characterizing the economy described by the NK-DSGE models and the FFA. In particular, we have observed that in a capitalist economy: i) investments have the characteristics of Schumpeterian innovations; ii) profits and the rate of interest are exclusively monetary phenomena; iii) Say's Law does not hold; iv) the causal relationship between saving and investment decisions is replaced by the causal relationship between savings and wealth; v) the process of wealth accumulation allows explaining the presence of speculative markets and the importance of the phenomenon of speculation; vi) crises are endogenous phenomena.

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Notes

[1] See, for example, De Grauwe (2012), Blanchard (2014, 2015, 2018), Matsuyama et al. (2016), De Grauwe and Gerba (2018), Christiano et al. (2018), Galì (2018), Gertler and Gilchrist (2018), Ghironi (2018), Hendry and Muellbauer (2018), Kehoe et al. (2018), Lindé (2018), Vines and Wills (2018).

[2] According to Blanchard and Summers: "Hyman Minsky [...] had warned for decades about the consequences of buildups in financial risk. [...] Yet prevailing macroeconomic paradigms largely ignored the possibility of financial developments as drivers of economic performances. Neither financial euphoria as a source of booms nor financial crisis as a cause of bursts played a prominent role in macroeconomic thinking of academics or policymakers." (Blanchard and Summers 2019, p. xvii).

[3] These leading macroeconomists are: Blanchard, Carlin and Soskice, Ghironi, Haldane and Turrell, Hendry and Muellbauer, Krugman, Lindé, McKibbin and Stoeckel, Reis, Stiglitz, Wren-Lewis, and Wright. Their answers have been published in 2018 by *The Oxford Review of Economic Policy*, vol. 34 (1-2).

[4] Wicksell defines the natural rate of interest by referring to: "the phenomena of capital and interest on capital, as they would appear if liquid capital, production's means of support, was in reality lent in kind, without the intervention of money; and only then is it possible to distinguish what modifications are in reality caused by the introduction of money. In the former case, i.e. if capital was lent in kind, there would undoubtedly develop, through the supply of and the demand for available capital, a certain rate of interest on the lending market, which would be the natural rate of interest on capital in the strictest sense." (Wicksell 1898, p. 84).

[5] According to Brunnermeier et al. (2013, p. 1): "in a setting without financial frictions it is not important whether funds are in the hands of productive or less productive agents and the economy can be studied with a single representative agent in mind."

[6] See, for example, Stiglitz and Wiess (1981, 1990), Bernanke (1993), Gertler and Gilchrist (2018).

[7] "A common way to make financial market frictions endogenous is to introduce [...] some type of informational asymmetry that leads borrowers to be more informed than creditors. [...] Accordingly, rational lenders in this setting will impose constraints on the terms of lending, like credit limits, collateral requirements, and bankruptcy contingencies. [...] [Informational asymmetry] makes raising funds externally more expensive than using internal funds, which Bernanke and Gertler (1989) call the 'external finance' premium. [...] The link between borrower balance sheets and the external finance premium leads to mutual feedback between the financial sector and the real activity. A weakening of balance sheets raises the external finance premium, reducing borrowing spending, and real activity. The decline in real activity reduces cash flows and asset process, which weaken borrower balance sheets, and so on." (Gertler and Gilchrist 2018, pp. 5-6).

[8] "There seems to be a logical flaw in the asymmetric information argument, for perfect foresight is first postulated to obtain an equilibrium and then repudiated in order to get targeted results." (Minsky 1993a, p.78).

[9] Minsky believed that the crisis of the 1970s shed light on the limitations of the Neoclassical Synthesis: "The world is now performing in ways that can be interpreted as anomalous from the point of view of the current standard theory. In these circumstances a radical reformulation of economic theory such as Keynes attempted, once again seems attractive. The synthesis of classical formulations and Keynesian constructs that Professor Joan Robinson has characterized as Bastard Keynesianism seems to be dissolving." (Minsky 1975, p. 18).

[10] In the book published in 1975 Minsky maintains that: "The position taken in this book is that the evaluation by Keynes [...] of the *General Theory* as revolutionary is correct; the work does contain the seeds for a deep intellectual revolution in economics and in the economists' view of society. However,

these seeds never reached their full fruition. The embryonic scientific revolution was aborted." (Minsky 1975, p. 3).

[11] For an analysis of Minsky's thought see Minsky (1975, 1980, 1982, 1986b, 1996), Tymoigne and Wray (2013), Mazzucato and Wray (2015), Wray (2016), and Nikolaidi and Stockhammer (2017).

[12] "Schumpeter and Keynes are best viewed as complements, not as substitutes. It is useful to integrate their work. In so doing we should reveal the power of Schumpeter's vision, fill in gaps left by the standard interpretations of Keynes, and hopefully make some progress in our main scientific concern, to understand the ways of capitalism." (Minsky 1990, p. 54; see also Minsky 1986a, 1993b).

[13] "The banker [...] is not so much primarily a middleman in the commodity 'purchasing power' as a *producer* of this commodity. [...] He is essentially a phenomenon of development. [...] He makes possible the carrying out of the new combinations, authorizes people, in the name of society as it were, to form them. He is the ephor of the exchange economy." (Schumpeter 1912, p. 74)

[14] Similarly, Keynes (1933, p. 89) states that: "The firm is dealing throughout in terms of sum of money. It has no object in the world except to end up with more money than it started with. That is the essential characteristic of an entrepreneur economy."

[15] See, for example, Charles (2008), Nishi (2012), Passarella (2012), Keen (2013, 2020), Nikolaidi (2014), Sordi and Vercelli (2014), Nikolaidi and Stockhammer (2017).

[16] See, for example, Taylor and O'Connell (1985), Fazzari et al. (2008), Delli Gatti et al. (2010), Chiarella and De Guilmi (2011), Ryoo (2013), Stockhammer and Michell (2017), Dafermos (2018), Gusella and Stockhammer (2021).

[17] "Railroads have not emerged because any consumers took the initiative in displaying an effective demand for their service in preference to the services of mail coaches. Nor did the consumers display any such initiative wish to have electric lamps or rayon stockings, or to travel by motorcar or airplane, or to listen to radios, or to chew gum. The great majority of changes in commodities consumed has been forced by producers on consumers who, more often than not, have resisted the change and have had to be educated up by elaborate psychotechnics of advertising." (Schumpeter (1939) [1964], p. 47).

[18] This is equivalent to assume that, in each period, the workers expect an inflation rate equal to zero, independently from the inflation rate observed in the past.

[19] For a detailed description of the model see Bertocco and Kalajzić (2020).

[20] By introducing this hypothesis, we eliminate the dimension of uncertainty associated to the decisions of the farmers, but we do not eliminate uncertainty from the model. In fact, the decisions of the entrepreneur-innovator intending to realize the railway and those of the bankers who must decide whether or not to fund the investment project, are taken in conditions of uncertainty.

[21] "The view that instability is the result of the internal processes of a capitalist economy stands in sharp contrast to neoclassical theory, whether Keynesian or monetarist, which holds that instability is due to events that are outside the working of the economy." (Minsky 1975, p.123)

[22] "Profits are critical in a capitalist economy because they are a cash flow which enables business to validate debt *and* because anticipated profits are the lure that induces current and future investment. It is anticipated profits which enable business to issue debts to finance investment and positions in capital assets. Any theory that aims to explain how an investing capitalist economy works must focus upon the determination of total profits." (Minsky 1982, pp. 34–35)

[23] "[S]uccess breeds a disregard of the possibility of failure; the absence of serious financial difficulties over a substantial period leads to the development of a euphoric economy in which increasing short-term financing of long positions becomes a normal way of life. As a previous financial crisis recedes in time, it is quite natural for central bankers, government officials, bankers, businessmen, and even economists to believe that a new era has arrived. Cassandra-like warnings that nothing basic has changed, that there is a financial breaking point that will lead to a deep depression, are naturally ignored in these circumstances." (Minsky 1986a, p. 237)

[24] "An act of individual saving means – so to speak – a decision not to have dinner to-day. But it does not necessitate a decision to have dinner or to buy a pair of boots a week hence or to consume any specified thing at any specified date. [...] the act of saving implies [...] a desire for 'wealth' as such, that is for a potentiality of consuming an unspecified article at an unspecified time." (Keynes 1936, pp. 210-211)

[25] "Whenever full employment is achieved and sustained, businessmen and bankers, heartened by success, tend to accept larger doses of debt-financing. During periods of tranquil expansion, profit-seeking financial institutions invent and reinvent "new" forms of money, substitutes for money in portfolios, and financing techniques for various types of activity: financial innovation is a characteristic of our economy in good times. Each new type of money that is introduced or an old one that is used to a greater extent results in the financing of either some additional demand for capital and financial assets or of more investment. This results in a higher price of assets. Financial innovation therefore tends to induce capital gains, to increase investment, and to increase profits: the economy will try to expand beyond any tranquil full-employment state." (Minsky 1986a, p. 199)

[26] "A Schumpeterian insight [...] is that capitalism is resilient because it takes many particular forms. In one sense this is trivial: big government and active central banking have contained the endogenous dynamic processes that, from time to time, made the market system behave in an incoherent fashion. In another sense it is not trivial, for the endogenous evolutionary dynamics of capitalist economies change the relations between financial and real economic variables which, in turn, change the dynamic pattern of the economy." (Minsky 1990, p. 65)

[27] In particular, Minsky has underlined the relevant role played by mutual and pension funds. According to Minsky, their performances fundamentally depend on capital gains: "The pension and mutual funds have made business management especially sensitive to the current stock market valuation of the firm. They are essential ingredient in accentuation of the predatory nature of current American capitalism." (Minsky 1996, p, 363)

[28] On this point, see Bertocco (2017), and Bertocco and Kalajzić (2018).