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2011/15



UNIVERSITÀ DELL'INSUBRIA
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Printed in Italy in december 2011
Università degli Studi dell'Insubria
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FINANCE AND RISK. DOES FINANCE CREATE RISK?

Giancarlo Bertocco

Abstract

Rajan has earned a well-deserved reputation for having been one of the few to have hypothesized in a famous paper presented at the 2005 Jackson Hole conference that a disastrous financial crisis could have occurred. The key thesis put forward by Rajan was that the radical changes that had taken place over the previous decades rendered the economic system more fragile in that they induced the financial system to create a high amount of risk. The aim of this paper is to show: i) that Rajan's thesis is not coherent with the mainstream theory according to which finance does not create risk; ii) that a meaningful theory capable of explaining the meaning of the elements used by Rajan to assert that finance creates risk can be elaborated on the basis of the lesson of Keynes and Schumpeter.

Introduction

At the 2005 Jackson Hole Conference, the theme of which was the legacy of the Greenspan era, R. Rajan presented a paper in which he described the radical changes that had taken place in the financial system over the previous decades. The key thesis put forward by Rajan (2006) was that these changes contributed to increase the GDP growth rate, but at the same time, they rendered the economic system more fragile in that they had induced the financial system to create a high amount of risk.

Rajan's thesis garnered a lot of attention because it did not seem coherent with the celebratory tone of the conference towards Alan Greenspan, who was in the last year of his mandate. I believe there is another element that renders Rajan's thesis particular: the fact that it was not coherent with the mainstream theory of finance. Indeed, according to this theory, the financial system does not create risk; the risk is given and the task of the financial system is to allocate it, that is, to redistribute the risk in such a way that it is borne by agents who have a higher propensity to take it.

In his paper, Rajan did not tackle the issue of whether his thesis was coherent with the mainstream theory; we can find some important considerations on this point in a subsequent work in which Rajan (2010) proposes to explain the causes of the crisis. He maintains that there are different causes, and therefore different responsibilities, some more evident than others. Rajan attributes some responsibility also to economists who in the last few decades used macroeconomic models that did not consider explicitly the

financial system, and he invites them to elaborate macroeconomic models that incorporate the financial system.

The first objective of this paper is to show that in order to follow this suggestion it is necessary to abandon the finance neutrality principle that distinguishes the mainstream theory according to which the financial system has no influence on income, employment, growth, and also on the dimension of risk that characterises an economic system. This is the principle that allows us to describe a market economy through macroeconomic models that completely overlook the financial system. It will be postulated, in particular, that the elements on which Rajan's thesis is based, according to which in the last few decades the financial system created a high amount of risk, making the system more fragile, are not coherent with the mainstream theory of finance. The second objective is to show that a meaningful theory capable of explaining the reasons why finance is not neutral, and to define the meaning of the elements used by Rajan to assert that risk is not independent of finance, can be elaborated on the basis of the theories of Keynes and Schumpeter.

The paper is divided into three parts. In the first part the analysis of the link between finance and risk described by Rajan is presented. In the second part it will be shown that the elements used by Rajan to explain how finance can create risk are not coherent with the mainstream theory of finance. Finally, in the third part, a theory of finance constructed using the theories of Keynes and Schumpeter, which allows us to explain the reasons why finance can create risk, is proposed.

1. Why did finance make the world riskier?

1.1 Rajan's 2005 Jackson Hole paper.

In the paper he presented at Jackson Hole, Rajan identifies three factors that had caused the transformation of the financial system in the preceding decades: technological change, deregulation and institutional change. He points out that these factors changed the nature of the typical transaction in the financial system: "A number of financial transactions have moved from being embedded in a long-term relationship between a client and a financial institution to being conducted at arm's length in a market." (Rajan 2006, p. 504)¹

¹ For a detailed analysis of the distinction between relationship-based systems and arm's-length systems see: Rajan and Zingales 2003a, 2003b, 2003c.

Rajan notes that the transformation of the financial system had: “..beneficial real effects, increasing lending, entrepreneurship, and growth rates of GDP, while reducing costs of financial transactions...” (Rajan 2006, p. 504). But he also adds that economies’ greater reliance on arm’s length transactions had created: “new vulnerabilities” (Rajan 2006, p. 512). To explain this assertion Rajan focuses on the changes that occurred in the banking system, in particular the spread of the “originate-to-securitize process” (Diamond and Rajan 2009, p. 606). He emphasises the link between the process of standardisation of financial instruments made possible by technological developments and deregulation, and the process of securitisation that allowed banks to sell part of their assets on the market. Rajan notes that securitisation created a specialisation within the financial system: on the one hand, we have agents such as banks which, by granting credit to new clients originate the risk, and on the other agents, for example pension funds, that make their portfolio decisions taking a long term view, and therefore they are on the lookout for low-risk financial instruments.² Considering the effects of this process, Rajan explains that this specialisation should have brought significant advantages since the banks, by transferring the risk to other agents would have been able to lower the rates on loans and expand access to credit.³ In actual fact, while preparing his paper for the Jackson Hole conference, he realised, to his great surprise, that the securitisation process had made banks riskier.⁴

The view that the process of securitisation should have made banks less risky was based on the hypothesis that the risk was given. On the contrary, Rajan realised that this

² “The standardisation of contractual terms allows a loan to be packaged with other contracts and sold as a diversified bundle to passive investors who do not have origination capability. Alternatively, the cash flows from the bundle can be carved up or ‘tranching’ into different securities, differing in liquidity, maturity, contingency, and risk, each of which appeals to a particular clientele. This process of ‘securitisation’ allows for specialization in financial markets –those who have specific capabilities in originating financial transactions can be different from those who ultimately hold the risk. Securitization thus allows the use of both the skills and the risk bearing capacity of the economy to the fullest extent possible.” (Rajan 2006, p. 505)

³ “In theory, with the risk better spread across sturdier shoulders, investors would demand a lower return for holding the risk, allowing the bank to charge lower loan rates and expand borrower’s access to finance.” (Rajan 2010, p. 2)

⁴ “In preparation for writing the paper, I had asked my staff to prepare graphs and tables. As we looked through them, I noted a few that seemed curious. They were plots of different measures of the riskiness of large U.S. banks, and they suggested that banks had become, if anything, more exposed to risk over the past decade. This was surprising, for if banks were getting risky loans off their balance sheets by selling them, they should have become safer.” (Rajan 2010, p. 2)

hypothesis was unfounded⁵; the process of securitisation had induced the banks to create new risk which had not been completely transferred to other operators; in other words it made them riskier:

“Banks make returns both by originating risks and by bearing them. As plain vanilla risks can be moved off bank balance sheets into the balance sheets of investment managers, bank have an incentive to originate more of them. Thus they will tend to feed rather than restrain the appetite for risk. Banks cannot, however, sell all risks. They often have to bear the most complicated and volatile portion of the risks they originate, so even though some risk has been moved off bank balance sheets, balance sheets have been reloaded with fresh, more complicated, risks. In fact, the data suggest that despite a deepening of financial markets, banks may not be any safer than in the past. Moreover, the risk they now bear is a small (though perhaps the most volatile) tip of an iceberg of risk they have created.” (Rajan 2006, p. 502)

Concluding his paper, Rajan wondered what the consequences of the presence of this *iceberg* of risk created by the banks might be on the stability of the financial system and he did not exclude the possibility that there could be a catastrophic meltdown:

“...what can we say about how the stability of the system has evolved as the nature of the system has changed? While the system now exploits the risk bearing capacity of the economy better by allocating risks more widely, it also takes on more risks than before. ... While it is hard to be categorical about anything as complex as the modern financial system, it is possible that these developments are creating more financial-sector induced procyclicality than in the past. They may also create a greater (albeit still small) probability of a catastrophic meltdown. ... It is ... true that the financial system has survived some large shocks in the past, under the able stewardship of Chairman Geenspan...Nevertheless, the experience thus far should not make us overly sanguine.” (Rajan 2006, pp. 521-2)

1.2 Housing bubble and tail risk.

The subprime mortgage crisis that erupted in the summer of 2007 and its dramatic consequences in terms of the drop in income and employment seem to confirm Rajan’s most pessimistic forecasts. To demonstrate this thesis it is necessary to specify whether there is a link between the risk created by the financial system which Rajan talks about,

⁵ “I eventually realized that I was committing the economist’s cardinal sin of assuming *ceteris paribus*, that is, assuming that everything else but the phenomenon being studied, in this case securitization, remained the same. Typically, everything does not remain the same. Most important, deregulation and developments like securitization had increased competition, which increased the incentives for bankers (and financial managers more generally) to take on more complex forms of risk.” (Rajan 2010, p. 2)

and the subprime mortgage crisis. Rajan describes this link in some works published after the crisis broke (Diamond and Rajan, 2006; Rajan 2010).

Diamond and Rajan (2009) emphasise that the crisis originated in the United States, the country with the most developed financial system, that is the system in which the transformations described in the paper presented at the Jackson Hole conference occurred with greater intensity. They maintain that the spread of the securitisation process caused the creation of an *iceberg* of risk by the banking system, to use Rajan's expression, of bad quality.⁶ This relation between securitisation and quality of risk was not expected; indeed, according to the theory, the spread of the process of securitisation should have improved the working of the financial system since it should have allowed the issue of high quality securities against a set of low quality credits, due to the advantages deriving from the aggregation of credits whose probability of failure are not perfectly correlated. In this way against the mortgages granted to agents with low incomes, and therefore singularly at high risk, low risk securities underwritten by international investors could have been issued. The deterioration in the quality of risk must therefore be explained by some elements that induced the banking system to use the instrument of securitisation in a distorted way.⁷

Rajan identifies this element in the structure of incentives that influenced the decisions of investment managers, and in particular those of bank managers, in recent years. This structure has changed dramatically due to the modification of the remuneration system for investment managers that in recent years has been increasingly linked to their results.⁸ He points out that this system of remuneration induced the banks to create a great mass of risk through the increase in the supply of subprime mortgages and to bear a significant amount

⁶ "... why did the crisis first manifest itself in the United States? Probably because the US innovated by securitizing subprime loans, thus drawing more marginal-credit-quality buyer into the market." (Diamond and Rajan 2009, p. 606)

⁷ According to Diamond and Rajan (2009), the subprime mortgage crisis can be considered as the undesired consequence of the process of securitisation: "The 'originate-to-securitize' process had unintended consequences." (Diamond and Rajan 2009, p. 606)

⁸ "In the 1950s and 1960s, banks dominated financial systems. Banks managers were paid a largely fixed salary... In the new, deregulated, competitive environment, investment managers cannot be provided the same staid incentives as bank managers of yore. Because they have to have the incentive to search for goods investments, their compensation has to be sensitive to investment returns, especially returns relative to their competitors." (Rajan 2006, p. 501)

of this risk by keeping on their balance sheets a substantial quantity of mortgage backed securities (MBS).⁹

Rajan illustrates this point by noting that the results obtained by bank managers, on which their remuneration depends, cannot be evaluated by simply considering the yields achieved, since it is always possible to obtain greater returns by taking on greater risks. The results therefore must be assessed by considering the degree of risk and the yields obtained by competitors. In order to improve their relative returns (measured by the *alpha* index) bank managers can be induced to make financial decisions to which a tail risk is associated, that is decisions that produce very high yields in stable situations but with a very low risk of catastrophic losses.¹⁰ Rajan emphasises that the propensity of investment managers to seek tail risk¹¹ can explain two choices that played an essential role in causing

⁹ "...what enveloped all of us was not some sort of collective hysteria or mania. Somewhat frighteningly, each one of us did what was sensible given the incentives we faced. Despite mounting evidence that things were going wrong, all of us clung to the hope that things would work out fine, for our interest lay in that outcome. Collectively, however, our actions took the world's economy to the brink of disaster.... There are deep fault line in the global economy, fault lines that have developed because in an integrated economy and in an integrated world, what is best for the individual actor or institution is not always best for the system." (Rajan 2010, p. 4)

¹⁰ Rajan illustrates this point with an example: "Suppose a financial manager decides to write earthquake insurance policies but does not tell her investors. As she writes policies and collects premiums, she will increase her firms' earnings. Moreover, because earthquakes occur rarely, no claims will be made for a long while. If the manager does not set aside reserves for the eventual payouts that will be needed (for earthquakes, though rare, eventually do occur), she will be feted as the new Warren Buffet: all the premium she collects will be seen as pure returns, given that there is no apparent risk. The money can all be paid out as bonus or dividends. Of course, one day the earthquake will occur, and she will have to pay insurance claims. Because she has set aside no reserves, she will likely default on the claims, and her strategy will be revealed for the sham it is. But before that, she will have enjoyed the adulation of the investing masses and may have salted away enough in bonuses to retire comfortably to a beach house in the Bahamas. With luck, if the earthquake occurs in the midst of a larger cataclysm, she can attribute her disastrous performance to a one-in-ten-thousand-year event and back in another job soon. Failing in a herd rarely has adverse consequences." (Rajan 2010, pp. 138-9)

¹¹ "More generally, at times when financing is plentiful, so that there is immense competition among bankers and fund managers, the need to create alpha pushes many of them inexorably toward taking on tail risk. For tail risk occurs so rarely that it can be well hidden for a long time: a manager may not even be aware he is taking it. But the return are high, because people are willing to pay a lot to avoid being hit by cataclysmic losses in bad times. So if the manager produces the returns but his investors do not (at least for a while) account for the additional risk the manager is taking with their money, the manager will look like a genius and be rewarded handsomely. He may well come to believe that he is one. In other words, it is the very

the subprime mortgage crisis: i) the decision of banks to expand the supply of mortgages to agents with low incomes; ii) the decision of banks to keep a large number of MBS created through the process of the securitisation on their balance sheets. These decisions caused considerable losses for the banking system after the bursting of the housing bubble culminating with the bankruptcy of Lehman Brothers. Indeed this failure paralysed the banking system and triggered a credit crunch that had serious consequences for production and employment levels.

The banks took these two decisions early in the new century, in a period in which housing prices were rising. As Shiller (2008) demonstrates, the prices of housing started to increase in the US from the second half of the 1990s, in concomitance with the growth of the dot.com bubble. This phase of price growth did not stop with the bursting of the dot.com bubble in 2001; on the contrary, the fall in the stock of the technological firms and the policy of low interest rates adopted by the Fed, stimulated demand for housing and led to a continuous rise in prices. The bank managers' decision to expand the supply of mortgages to agents with low incomes contributed to expand the demand for housing and therefore to fuel the housing bubble.

The continuous rise in the price of housing became a key factor in the profits made by the banks since it was the necessary condition to induce subjects with low incomes to underwrite mortgages that provided for future payment commitments that could be met only in the case of a constant rise of the real estate prices.¹² Thus the tail risk associated with the decision of the banks to expand the supply of subprime mortgages corresponded to the probability that the housing bubble could burst, and therefore that the rise in housing prices could be stopped.¹³ When the housing bubble burst, it became evident that the

willingness of the modern financial market to offer powerful rewards for the rare producer of alpha that also generates strong incentives to deceives investors" (Rajan 2010, p. 139)

¹² "A significant portion of the additional demand came from segments of the population with low credit ratings or impaired credit histories –the so-called subprime and Alt-A segments –who now obtained access to credit that had hitherto been denied the them. Moreover, rising house prices gave subprime borrowers the ability to keep refinancing into low interest rate mortgages (thus avoiding default) even as they withdrew the home equity they had build up to buy more cars and TV set. For many the need to repay loans seemed remote and distant." (Rajan 2010, pp. 5-6)

¹³ "... during an asset price boom, ... investment managers are willing to bear the low probability 'tail' risk that asset prices will revert to fundamentals abruptly, and the knowledge that many of their peers are herding on this risk gives them comfort that they will not under perform significantly if boom turns to burst." (Rajan 2006, p. 501)

banks held a large amount of MBS, and this surprised many observers who deemed that the banks, who were aware of the low quality of the mortgages issued, had abstained from underwriting these securities.

Rajan notes that this behaviour by the banks is not a sign of madness, but it is coherent with the structure of incentives that led them to seek short term gains and to bear a large quantity of risk by means of the creation of subprime mortgages and the acquisition of MBS.¹⁴ The strategy of the banks was influenced by what he considers the two mistakes made by the Federal Reserve in the period preceding the crisis. The first is the policy of low interest rates adopted by the Fed to support the employment level after the bursting of the dot.com bubble. Rajan underlines that this policy contributed significantly to the formation of the housing bubble as it induced the agents to expect that rates of interest would not be raised to halt the growth of housing prices.¹⁵ These expectations were confirmed by the second wrong decisions taken by the Fed, known as the *Greenspan put*, which was the pledge not to intervene to avoid the formation of the bubble since the monetary authorities are not able to identify a bubble before it bursts, and instead to intervene to reduce the consequences of the bursting of the bubble.¹⁶

¹⁴ “Given that originators would have understood the deterioration of the underlying quality of mortgages, it is surprising that they held on so many of the mortgage-backed securities (MBS) in their own portfolios. ... The amounts of MBS held seemed too high to be purely inventory. Some holdings could have been portions of the package they could not sell, but then this would not explain why banks held on to AAA-rated securities, which seemed to be the most highly demanded of mortgage backed securities. The real answer seems to be that bankers thought these securities were worthwhile investments, despite their risk. Investment in MBS seemed to be part of a culture of excessive risk taking that had overtaken banks. ... Of course, originators could not completely ignore the true quality of borrowers since they would be responsible for initial defaults, but because house prices were rising steadily over this period, even this source of discipline weakened: the house price rise would give the homeowner the ‘equity’ with which he could finance loan repayment.” (Diamond and Rajan 2009, p. 607). See also: Rajan 2010.

¹⁵ “... bubbles develop based on a kind of ‘greater fool’ theory –that even if an asset is already trading at an inflated price, someone will be willing to buy it at an even more inflated price. By signaling that it will tighten liquidity conditions, and thus constrain financing and trading, the central bank can signal to investors that there will be fewer fools out there with the capacity to buy, making it more difficult for the bubble to grow.” (Rajan 2010, p. 112)

¹⁶ “... the Fed encouraged [bubbles] through an implicit commitment, which might have done far more damage than any other Fed action. This commitment, the so-called ‘Greenspan put’, essentially said that the Fed could not really tell when asset prices were building up into a bubble, and so instead the Fed would ignore asset prices but stand ready to pick up the pieces when the bubble burst. ... The logic was ... positively dangerous. It fueled the flames of asset-price inflation by telling Wall Street and banks across the

The Fed's decisions contributed to encouraging the banks to bet on the continuous rise in housing prices even though bank managers were aware of the fact that the real estate prices were clearly overvalued. Theoretically, an agent who deems that the price of a certain asset is strongly overvalued could obtain a profit by betting on the fall in the prices of that asset. In reality, this strategy became very difficult to implement in a period in which the remuneration of investment managers was linked to short term results; to bet against the market in these conditions implied forgoing the profits that the competitors obtained in the short term on account of the continuous increase in housing prices. This exclusive focus on short term results and the particular attention to the results obtained by competitors induced investment managers to take the same decisions, relying on the continuous rise in housing prices, and led the top managers to support, within the financial institutions, the decisions of traders with a greater propensity for risk.¹⁷ There is an additional reason that encouraged bank managers to herd with other investment managers and it is the fact that in this way none of them would obtain worse results than the others even in the case of the catastrophic event associated with tail risk. In this case, no individual banker could have been accused of having obtained worse results than the others since the catastrophic event whose probability of occurring was one in a million, would have affected the entire financial system.¹⁸

In conclusion, according to Rajan, the crisis was a consequence of the combination of a distorted system of incentives and the erroneous decisions of the Fed which led the financial system to create and hold an excessive quantity of risk:

country that the Fed would not raise interest rates to curb asset prices, and that if matters went terribly wrong, it would step in to prop prices up. The commitment to put a floor under asset prices was dubbed the 'Greenspan put'. It told traders and bankers that if they gambled, the Fed would not limit their gains, but if their bets turned sour, the Fed would limit the consequences. ... the willingness to flood the market with liquidity in the event of a severe downturn sent a clear message to bankers: 'Don't bother storing cash or marketable assets for a rainy day; we will be there to help you.'" (Rajan 2010, pp. 112-3)

¹⁷ "When a CEO adjudicated a dispute between his star trader, who had produced \$ 50 million in profits every quarter for the past ten quarters, and his risk manager, who had opposed the trader's risk taking all along, the natural impulse would be to side with the trader. The risk manager was often portrayed as the old has-been who do not understand the new paradigm –and the risk takers had the track record to prove it." (Rajan 2010, p. 141)

¹⁸ "Unlike ordinary loans or individuals mortgages, where defaults occur in isolation, highly rated, diversified mortgage-backed securities were likely to risk default only if mortgages across the country defaulted... the systematic nature of tail risks ensured that banks would be collectively in trouble if a crisis occurred, and that government support would be forthcoming. This mitigates the costs of those risks." (Rajan 2010, pp. 148-9)

“... I want to emphasize that the combination of incentives for high-powered performance that are inherent in modern financial system and the unwillingness of a civilized government to let failure in the financial sector drag down ordinary citizens generates the potential for tail risk tacking and periodic, costly meltdowns.” (Rajan 2010, p. 153)

2. Tail risk, housing bubble and the mainstream theory of finance.

The explanation of the origin of the crisis elaborated by Rajan, and shared by many economists, is not coherent with the mainstream theory of finance since it is based on two points that are at odds with this theory: i) the first point is the assertion that the financial system has created an excessive quantity of risk; ii) the second regards the nature of the *tail risk* that bank managers took on to improve their results, driven by a distorted system of incentives.

The thesis that the financial system creates risk is extraneous to the mainstream theory which holds that the degree of risk is independent of the financial system whose role is to allocate, that is, to redistribute resources and therefore risks from savers to those who are able to manage the resources bearing the risks.¹⁹ The mainstream theory defines the phenomenon of finance starting from saving decisions and investment decisions and it underlines that finance becomes relevant in a world in which the agents that save do not coincide with the agents who invest, that is in a world characterised by the dissociation between investment decisions and saving decisions. The key function of the financial system is to make possible the transfer of the resources saved by savers to agents who invest which we can identify with the firms. The saved resources are transferred by the savers to firms by means of a credit contract; the mainstream theory defines a causal sequence according to which saving decisions determine the supply of credit and therefore investment decisions. The rate of interest is the variable that puts in equilibrium demand for and supply of credit and therefore saving decisions and investment decisions.

According to the mainstream theory, the presence of financial intermediaries is justified by the existence of obstacles that make the direct exchange of the saved resources between the savers and entrepreneurs difficult. The principal obstacle on which

¹⁹ This definition appears also in Rajan's book: “The role of financial markets is to allocate resources to those most capable of using them, while spreading the risks to those most capable of bearing them,” (Rajan 2010, p. 228)

economists' attention has focused since the 1970s is the presence of asymmetric information. According to the mainstream theory the credit market can be compared to the used car market described by Akerlof (1970), who emphasised that the presence of asymmetric information stimulates the creation of agents whose purpose is to reduce the information costs; he considered, in particular, the activity of merchants that specialize in evaluating the quality of the goods exchanged. The banks play the same role in the capital market as the merchants play in Akerlof's used car market; as asserted by Blinder and Stiglitz (1983, p.299): "Imperfect information about the probability of default has several fundamental implications for the nature of capital markets... it gives rise to institutions – like banks – that specialize in acquiring information about default risk." These arguments allow us to conclude that according to the mainstream theory the dimension of risk depends only on the flow of saved resources and it is not affected by the decisions of financial intermediaries. Indeed, banks' function is only to allocate the saved resources to those most capable of using them.

There is a second element of Rajan's explanation that is not coherent with the mainstream theory: the nature of the tail risk taken on by bank managers. As we have seen, the tail risk borne by the banking system corresponds to the risk that the rise in house prices stops, triggering the insolvency of the mortgage holders and the drop in the prices of the MBS.

This concept applies in a world in which the phenomenon of speculation is prominent and this presupposes the existence of markets in which financial assets are constantly traded, while the mainstream theory applies to a world in which these markets are not present and the phenomenon of speculation does not exist. To illustrate this point, following the approach of Vernon Smith (1988, 2009), we can distinguish two types of market: the first are markets in which producers and purchasers trade goods that disappear from the market once they have been purchased; the second are markets in which goods that can be sold again at any subsequent time are traded. A speculative bubble can occur only in an economic system in which the second type of market exists where a good can be bought not in relation to the utility its use produces but depending on the price at which it can be sold in the future.

The mainstream finance theory applies to an economic system comprising only the first type of markets, indeed, the presence of the second type of markets characterises an economic system in which the concept of wealth is important, a concept which is difficult to associate with the world described by the mainstream theory. In fact, this theory, as we

have recalled, defines the phenomenon of credit starting with the concepts of saving and investment: saving decisions determine the credit supply and therefore the flow of investments; banks are simply intermediaries who eliminate the effects of the presence of obstacles that impede the direct transfer from savers to firms. These relations can be applied to an economic system in which few goods are produced and in which money is a mere means of exchange. The traditional economic theory describes the functioning of this economic system using models in which it is assumed that a single good is produced; this hypothesis is a common thread in the work of classic economists, neoclassicals right up to contemporary supporters of the mainstream theory. Smith (1776), for instance, describes the effects of saving decisions on the development of the economic system by considering a world in which only corn is produced; Böhm Bawerk (1884) instead considers a fishermen's economy in which only fish are produced. In these economies the saving corresponds to the amount of corn or fish produced which is not consumed and which can therefore be used to produce capital goods that will allow the system to produce more corn or fish; the saving is represented, for example, by the quantity of corn or fish that is needed to pay the workers involved in producing ploughs or boats.

It is difficult to associate wealth with this type of economic system; it is unrealistic to assume that, for example, a carpenter is willing to accumulate a big quantity of tables that permit him to purchase at any future time, an unlimited quantity of food or clothing. We can reasonably assume that in this economy there is a limit to the amount of goods that an individual wishes to accumulate and, therefore, that the concept of wealth is hardly relevant.

If we exclude the concept of wealth it becomes unrealistic to assume the existence of markets in which financial assets are traded on the basis of the expectations about the price that they will fetch in the future, and therefore to hypothesise the presence of speculative bubbles and of financial crises caused by the underestimation of the risk of insolvency of those who gamble on the continuous rise in the price of assets. In the economy described by the mainstream theory the only risk is that associated with the presence of asymmetric information; this risk can be described by means of the example proposed by Stiglitz and Weiss (1990) to illustrate the role of banks by considering an agricultural economy, in which the object of the exchange is seed to be planted in plots of land having different productivity:

“The need for credit arises from the discrepancy between individual's resource endowments and investment opportunities. This can be seen most simply if we imagine a primitive agricultural economy, where different individuals own different plots of land and

have different endowments of seed with which to plant the land. ... The marginal return to additional seed on different plots of land may differ markedly. National output can be increased enormously if the seed can be reallocated from plots of lands where it has a low marginal product to plots where it has a high marginal product. But this requires *credit*, that is, some farmers will have to get more seed than their endowment in return for a *promise* to repay next period, when the crop is harvested. Banks are the institutions within this society for screening the loan applicants, for determining which plots have really high marginal returns, and for monitoring, for ensuring that the seed are actually planted, rather than, say, consumed by the borrower in a consumption binge” (Stiglitz and Weiss 1990, pp. 91-92)

It is difficult to hypothesise that in this economic system a crisis could occur due to the propensity of banks to take on a tail risk; if we consider the example proposed by Stiglitz and Weiss we can observe that the risk that banks must face is the one related to the evaluation of the quality of the plots of land and the characteristics of the farmer who wishes to use the saved corn. Of course, it is possible to imagine that there could be a banker who is incapable of assessing the quality of the plots of land or to distinguish a good farmer from a swindler, but that is not sufficient to trigger a crisis. A crisis could manifest itself only if we assume that a large part of the bankers-merchants have become suddenly incapable of assessing the quality of the terrain or to distinguish a good farmer from a swindler.

We can conclude that Rajan’s explanation should lead economists to elaborate a new theory of finance which, unlike the mainstream one, is capable of explaining how finance can create risks and the phenomenon of asset price bubbles. Rajan acknowledges that this crisis has highlighted: “...the failings of academic economists in the macroeconomic sphere.” (Rajan 2010, p.116) as witnessed by the fact that in the last few decades economists have used macroeconomic models that completely overlooked finance:

“Many past macroeconomic models had a single representative agent making all decisions. The representative-agent models were easy to work with and did offer useful prediction about policy, but they took for granted the plumbing underlying the industrial economy –the financial claims, the transactions, the incentive structures, the firms, the banks, the markets, the regulations, and so on. ... In coming years, macroeconomic modeling must incorporate more of plumbing, which has been studied elsewhere in economics.” (Rajan 2010, pp. 116-7)

The problem of macroeconomics is not simply that of creating models that specify the financial sector, but in the first place it is that of elaborating a theory that explains the role of finance and therefore permits the definition of the relation between finance and the other components of the economic system. The mainstream theory does not allow the elaboration of models that assign a significant role to finance. The macroeconomic models based on the concept of representative agent overlook the financial system not for reasons

of simplicity, but because they are based on the mainstream theory of finance that affirms the principle of the neutrality of finance. According to this principle, financial relations are simply the reflection of saving decisions and investment decisions and therefore, once the variables that influence these decisions have been defined it is not necessary to specify the financial relations.²⁰ According to the mainstream theory, therefore, the financial system does not have a distinct role with respect to the real economy.

In conclusion, the explanation of the origin of the crisis elaborated by Rajan should lead economists to elaborate an alternative finance theory to the mainstream one; a theory that is: i) able to explain how finance can create risk; ii) able to explain the phenomenon of speculation. In the last part of this paper it will be shown that it is possible to build a theoretical model that possesses these characteristics using what we learned from Keynes and Schumpeter.

3. An alternative theory of finance

Many economists have highlighted the need to recuperate Keynes's teachings and to reevaluate the work of Minsky.²¹ In this paper we set out a theory of finance which takes as a starting point Keynes's 1933 works in which he highlights the need to elaborate a *monetary theory of production* in order to explain the phenomena of the crisis and the

²⁰ This point has been well explained by, for example, McCallum (1989) who introduces his Monetary Economics text by making explicit the reasons why he looks at the money market, completely leaving aside the credit market; he observes that this decision: "... rests basically on the fact that in making their borrowing and lending decisions, rational households (and firms) are fundamentally concerned with goods and services consumed or provided at various points in time. They are basically concerned, that is, with choices involving consumption and labour supply in the present and in the future. But such choices must satisfy budget constraints and thus are precisely equivalent to decisions about borrowing and lending - that is, supply and demand choices for financial assets. ... Consequently, there is no need to consider *both* types of decisions explicitly. ... it is seriously misleading to discuss issues in terms of possible connections between 'the financial and real sectors of the economy', to use a phrase that appears occasionally in the literature on monetary policy. The phrase is misleading because it fails to recognise that the financial sector *is* a real sector." McCallum (1989, pp. 29-30)

²¹ See for example: Akerlof and Shiller 2009, Krugman 2009, 2011, Skidelsky 2009, 2011, Sachs 2009, Colander 2009, 2010, Crotty 2009, 2011, Kregel 2009, Lawson 2009, Leijonhufvud 2009, Wray 2009, Arestis and Singh 2010, Stiglitz 2010, Laidler 2010, Roubini and Mihm 2010, Goodhart 2010, Lucarelli 2011.

fluctuations in income and employment. He also notes that the inability of the classical theory to explain these phenomena is due to the fact that this theory considers money as a neutral variable.²² Keynes's key message is to stress that the presence of money constitutes the necessary condition to explain the crises and thus the two elements on which the explanation of the origin of the crisis elaborated by Rajan is based. Following Keynes it is possible: i) to specify the relation between money and the concept of uncertainty, which allows us to elaborate a meaningful explanation of the reasons why: 'finance creates risk'; ii) specify the relation between money and speculation. The next section describes the relation between money and uncertainty, while in the following one the relation between money and speculation will be presented. The last section contains an explanation of the crisis elaborated on the basis of the new theory of finance.

3.1 Money and uncertainty

The causal relation between money and uncertainty can be defined by considering a world in which a particular money, such as bank money, is used. This is a point common to Keynes and Schumpeter; they both distinguish between two types of economies. The first one is an economic system, which Keynes defined as a *real exchange economy* while Schumpeter as a *pure exchange economy*, in which money is neutral. The second one, which Keynes defines as a *monetary economy* and Schumpeter as a *capitalist economy*, is an economic system in which the presence of bank money radically changes the structure of the economic system compared with a *real exchange economy*. It is not simply the presence of money that characterises a *monetary economy* but the presence of money that has particular characteristics that Keynes and Schumpeter identify in bank money. They both underline that the spread of bank money has a big impact on the structure of the economic system. The causal sequence that links bank money and uncertainty and thus permits us to consider the financial system as a creator of uncertainty, in line with Rajan's affirmation, can be defined by considering two relations: the former is the relation between investment decisions and uncertainty; the latter is the relation between money and investment decisions. These relations are dealt with in the next two sections.

²² "...the conditions required for the 'neutrality' of money... are, I suspect, precisely the same as those which will insure that crises *do not occur*." (Keynes 1933, 410-11)

3.1.1 Investments, innovation and uncertainty

The relation between investment decisions and uncertainty can be explained by recalling what Keynes (1937a) argues on the classical theory; in his view this theory is able to describe only a world without uncertainty, that is an economy in which consumption decisions prevail and decisions on investment and wealth accumulation are absent.²³ Naturally it would be excessive to claim that the classical theory describes an economic system based only on consumption decisions; instead, what divides the classical theory from the Keynesian theory is the specification of the characteristics of investment decisions. The classical theory considers investments as a phenomenon that depends on saving decisions and is independent of the presence of bank money. This conception can be applied to a *corn economy* in which corn is at the same time, according to Smith (1776), a consumer good if it is used to maintain an unproductive worker, that is a worker involved in the production of services in favour of the upper classes, or a capital good if instead it is used as wages to pay the productive worker, i.e. a worker involved in producing corn.

What distinguishes the investments that characterise the *monetary economy* described by Keynes is the fact that they are closely associated with the dimension of uncertainty. Of course even in the case of an economy that produces just one good, we can assume that an entrepreneur is not able to predict in probabilistic terms the future results of his decisions. This situation arises due to extra-economic factors such as unfavourable climatic conditions that ruin the harvest, or social-political events such as the break-out of a war, and so forth. What distinguishes the investments that are made in a *monetary economy* is the fact that the impossibility of predicting their results in probabilistic terms is due to factors of an economic nature, that is the factors which make the distinction between the production phase and the sale phase relevant. This conclusion can be understood if we consider the examples of investment decisions used by Keynes:

²³ “The whole object of the accumulation of wealth is to produce results, or potential results, at a comparatively distant, and sometimes at an *indefinitely* distant, date. Thus the fact that our knowledge of the future is fluctuating, vague and uncertain, renders wealth a peculiarly unsuitable subject for the methods of the classical economic theory. This theory might work very well in a world in which economic goods were necessarily consumed within a short interval of their being produced. But it requires, I suggest, considerable amendment if it is to be applied to a world in which the accumulation of wealth for an indefinitely postponed future is an important factor; and the greater the proportionate part played by such wealth accumulation the more essential does such amendment become.” Keynes (1937a, p. 113).

“Our knowledge of the factors which will govern the yield of an investment some year hence is usually very slight and often negligible. If we speak frankly, we have to admit that our basis of knowledge for estimating the yield ten years hence of a railway, a copper mine, a textile factory, the goodwill of a patent medicine, an Atlantic liner, a building in the City of London, amounts to little and sometimes to nothing; or even five years hence.” (Keynes 1936, 149-50)

The future yield of a railway, a copper mine or an Atlantic liner are not easily foreseeable because they do not coincide with the productivity of some specific productive factor such as land in the case of the Smith’s *corn economy*, or the boat in the case of Böhm-Bawerk’s *fishermen’s economy*. The investments considered by Keynes have the same characteristics as the innovations that are at the centre of Schumpeter’s analysis. As is well known, Schumpeter (1912) holds that innovations constitute the first endogenous factor that brings about the process of change characterising a capitalist economy. The phenomenon of innovation regards the sphere of production and it may consist of the realization of a new product, the introduction of a new productive method or the opening of new markets.

We can consider the investments of the keynesian entrepreneur as the tool that firms use in order to launch new products on the market, or modify the productive process through which the existing goods are realized, or even open new markets; so the keynesian entrepreneur who takes the investment decisions coincides with the schumpeterian entrepreneur who introduces innovations. This economy cannot be described using a theoretical model that assumes that a single good is produced since the entrepreneurs, with their investment decisions, introduce innovations which create new goods. This characteristic gives prominence to the uncertainty dimension. In an economy in which just one good is produced, such as a *corn economy* whose investments are made up of unconsumed corn, entrepreneurs are sure of selling everything they produce because the good produced is what ensures the survival of consumers. This does not hold when we consider innovations that give rise to the production of new goods: the entrepreneur who produces the new good is not at all sure that he will be able to sell, making a satisfactory profit, all of the production because the innovation alters the existing world, making it very difficult to predict the reaction of the consumers to the new proposal (Schumpeter 1912, 65). For this reason, both Keynes and Schumpeter note that investment decisions and innovations are carried out by agents who have particular skills, that is by agents who are able to take decisions in conditions of uncertainty, guided by what Keynes defined as *animal spirits*:

“... a large proportion of our positive activities depend on spontaneous optimism rather than on a mathematical expectation, whether moral or hedonistic or economic. Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits – of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by quantitative probabilities. Enterprise only pretends to itself to be mainly actuated by the statements in its own prospectus, however candid and sincere. Only a little more than an expedition to the South Pole, is it based on an exact calculation of benefits to come. Thus if the animal spirits are dimmed and the spontaneous optimism falters, leaving us to depend on nothing but a mathematical expectation, enterprise will fade and die...” (Keynes 1936, 161-2)²⁴

In a world in which several goods are produced, the investments that lead to the production of new ones are made in conditions of uncertainty as the innovator-entrepreneur is not able to know, for example, how many cars he will be able to sell and at what price.

3.1.2 Bank money and investment decisions

The second link of the causal sequence between money and uncertainty is constituted by the relation between bank money and investments. To explain this relation we can observe that both the Keynesian entrepreneur and the Schumpeterian innovator-entrepreneur must have the resources available to them to carry out their investments; bank money is the tool that enables them to obtain these resources. The importance of bank money can be explained by recalling that the investments that characterise a *monetary economy* are very different from those that are found, for example, in Smith’s *corn economy*. In a *corn economy* to invest means to decide not to consume a part of the corn crop in order to produce more corn, while in a *monetary economy* to invest means, for example, to decide to build a railway; building a railway would be very difficult without bank money.

Indeed, let us suppose that in our *corn economy* an entrepreneur emerges who, following his *animal spirits*, plans to build a railway the construction of which requires the employment of a certain number of workers for ten years. Let us further assume that the existing production techniques make it possible to produce a quantity of corn sufficient to guarantee the survival of the farm workers and those that might be employed in the construction of the railway. We can observe that the railway, at least theoretically, could be built also in a *corn economy*; in this case the construction of the railway is financed by the corn producers who give to our entrepreneur the corn necessary to pay the workers

²⁴ Some years earlier Schumpeter (1912) noted that the introduction of innovations required very different capabilities from those needed to run existing firms and he describes the decisions of the innovating entrepreneur using similar terms to those used by Keynes (see: Bertocco 2007).

involved in building the railway. In return, they receive debt claims that will give them, when the railway is built, the right to obtain a quantity of corn equal to the amount lent during construction plus a premium consisting of the interest.

There is at least one fundamental element that impedes the realisation of this credit contract. It is the fact that it is very difficult for corn producers to assess whether the entrepreneur who plans to construct the railway will be able to return the loaned capital. Indeed the credit contract necessary to finance the construction of the railway is very different from the one, that is usually made in a *corn economy*, under which the corn producer gives the excess corn over the amount he intends to consume to another producer who will use it to produce corn. In this case, given the production technique, it is easy for the creditor to calculate the yield of the loaned corn and thus to define the rate of interest to apply to the debtor; in the case of the railway this evaluation is much more difficult because there is no physical law that makes it possible to calculate how much corn will be obtained by the sale of train tickets starting from the amount of corn used to build the railway.

The construction of the railway becomes easier in a world in which bank money is used. In this case our entrepreneur will have to convince the banks, not the corn producers, of the profitability of his project. The banks will finance the construction of the railway by creating new money with which our entrepreneur will pay the workers who will then be able to buy corn. The corn producers will not have any difficulty in exchanging corn for bank money, which is a perfectly liquid debt claim that can be used as a means of payment at any time. Although they do sell corn to the workers involved in building the railway, the corn producers are not creditors of our entrepreneur who is instead in debt to the bank, which is in turn in debt to those who own bank money. These agents may be the corn producers if we assume that the latter decide to accumulate the money obtained by selling the corn, or other agents that decided to accumulate the money obtained from payment of goods or services.

Banks therefore carry out a key role in a *monetary economy*: they evaluate the applications for financing presented by entrepreneurs. The banks share with the entrepreneurs the responsibility of deciding which investments are carried out; with their decisions they influence the development of the economic system; it is a very different role from that of mere intermediary that they could perform in a *corn economy* by facilitating the transfer of corn saved to the producers who intend to expand their grain production. Thus, we can maintain that the presence of bank money, and a well-developed credit

market, constitutes the necessary condition for the development of an economy in which investment decisions become relevant and in which the presence of uncertainty becomes an essential factor. It is an economic system in which banks create uncertainty through the production of money and credit, since, by financing the construction of railways, they induce the economic system to take on a risk, which cannot be calculated in probabilistic terms, about the success of the railway; we can state that uncertainty is not merely an exogenous dimension, but it becomes a factor whose presence is explained by the spread of bank money.

3.2 Bank money and speculation

The phenomenon of speculation is the second element that must be explained by a theory of finance coherent with Rajan's analysis of the origin of the subprime mortgage crisis. To explain the phenomenon of speculation it is necessary to justify the presence of what V. Smith (1988, 2009) defines as asset markets, that is markets dealing in assets that after purchase do not disappear from the market but can be continuously traded in the future. To explain the presence of these markets it is necessary, as we have already noted, to define the concept of wealth. It can be shown that the presence of a bank money and the elements that characterise the relation between bank money and uncertainty that we have illustrated in the previous section, allow us to define the concept of wealth and thus of speculation.

We have already noted that it is unrealistic to associate the concept of wealth with an economic system that can be compared to Smith's *corn economy* in which a single good is produced. This does not apply in the case of the *monetary economy* described by Keynes where the existence of bank money radically changes the concepts of credit and saving. In a *corn economy* decisions of the producer-saver are at the origin of the causal sequence that determines the supply of credit and therefore investment decisions, but in a world in which bank money is used this causal sequence is no longer valid. In this case the farmer, for example, produces corn to meet the demand of the workers involved in the construction of the railway who purchase the corn in exchange for the money created by the banks to finance the innovator-entrepreneur who decided to build the railway.

The farmer does not become a saver at the moment when he decides to produce grain and to consume just a part of it, but at the moment in which he sells the corn for money and decides to accumulate money. The corn producer becomes a saver not because he is

the creditor of a specific agent to whom he lent corn, but because he decides to accumulate purchasing power, obtained by selling corn, that can be used at any future moment to purchase goods. Money transforms savers into wealth owners; this point is highlighted by Keynes when he states that: "... 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, p. 211).

Of course the presence of savers-wealth owners cannot be explained within an economic system in which a single good is produced, rather it characterises a system in which multiple goods are produced. These products can be classified in two categories: the goods necessary to satisfy what Keynes describes as the absolute needs, and the goods that are required to meet the relative needs.²⁵ In this economic system any carpenter or corn producer who would not be willing to accumulate wealth in the form of tables or corn, will instead be willing to accumulate wealth in the form of money.

After having defined the concept of wealth and considering the elements of the relation between bank money and uncertainty described in the previous section, it is possible to explain the presence of markets in which financial assets such as long term bonds and stock are traded. The presence of these markets allows wealth owners to become speculators; once the savers-wealth owners decide how to use their disposable income by choosing between consumption and saving, they will have to define the composition of their wealth by choosing money or alternative financial instruments.²⁶

²⁵ "Now it is true that the needs of human beings may seem to be insatiable. But they fall into two classes – those needs which are absolute in the sense that we feel them whatever the situation of our fellow human beings may be, and those which are relative in the sense that we feel them only if their satisfaction lifts us above, makes us feel superior to, our fellows. Needs of the second class, those which satisfy the desire for superiority, may indeed be insatiable; for the higher the general level, the higher still are they. But this is not so true of the absolute need – a point may soon be reached, much sooner perhaps than we are all of us aware of, when these needs are satisfied in the sense that we prefer to devote our further energies to non-economic purposes." (Keynes 1931, *CW vol. IX*, p. 326)

²⁶ "The psychological time-preferences of an individual require two distinct sets of decisions... The first... determines for each individual how much of his income he will consume and how much he will reserve in *some* form of command over future consumption. But this decision having been made, there is a further decision which awaits him, namely in *what form* he will hold the command over future consumption which he have reserved... Does he want to hold it in the form of immediate, liquid command (i.e. money or its equivalent)? Or is he prepared to part with immediate command for a specified or indefinite period, leaving it to future market conditions to determine in what terms he can, if necessary, convert deferred command over specific goods into immediate command over goods in general?" (Keynes 1936, p.166)

Keynes considers at least two alternative assets to money: long term bonds and shares. The presence of long term bonds can be associated with the realisation of long term investments such as, for example, railways, and/or the presence of a public sector that produces services that represent a significant amount of GDP. Keynes uses the presence of long term bonds to explain an important aspect of the phenomenon of speculation, i.e. speculative demand for money; wealth owners become speculators in that they choose the composition of their wealth depending on their forecasts, formulated in conditions of uncertainty, about prospective gains to be made from bonds which depends on the future value of the rate of interest.

The second type of asset that can be accumulated by savers as an alternative to money is shares. Keynes (1936, chapter 12) notes that the spread of shares characterises a phase in the development of the modern economy where the ownership of the firm is divided up among many owners who do not directly manage the firm; this evolution can be explained by thinking of the realisation of innovations that require large investments as in the case of railways. In this phase markets in which shares and long term bonds are continuously traded develop, and the figure of the speculator emerges alongside that of the entrepreneur. Keynes distinguishes between speculation and enterprise by proposing to use: "... the term *speculation* for the activity of forecasting the psychology of the market, and the term *enterprise* for the activity of forecasting the prospective yield of assets over their whole life..." (Keynes 1936, 158). The element that the activity of the speculator and the entrepreneur share is the fact that they both rely on expectations even if these expectations happen to be different. The entrepreneur takes his decisions on the basis of expectations about the future profits of investments 'over their whole life' while the speculator must predict 'the psychology of the market'.

Keynes distinguishes two categories of speculators; the first is made up of professional speculators who take their decisions by gathering information on the financial situation of the various firms, making evaluations about their future value. These decisions are taken on the basis of the so-called fundamentals. The second category is made up of 'ignorant individuals' that is, those who purchase and sell firms' stock without having professional knowledge of the firm or the economic system (Keynes 1936, 154). Keynes further notes that in the financial markets, although it may not seem logical, the effects of the choices of the professional speculators do not necessarily prevail over those of the second group of speculators (Keynes 1936, 154). And this influences the behaviour of the professional speculators for whom it is more profitable to try to predict how the market

will evaluate bonds and stock rather than elaborate forecasts based on their professional competencies (Keynes 1936, 155).²⁷

Keynes wonders how speculation can influence investment decisions such as the construction of a railway, an ocean liner, a new drug, on which society's welfare depends. He notes that the presence of very liquid financial markets and an intense speculative activity can impede the realisation of these investments since the speculation may offer easier opportunities for gains.²⁸ Keynes believes that speculation can compromise the entrepreneurial spirit:

“Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done. The measure of success attained by Wall Street, regarded as an institution of which the proper social purpose is to direct new investment into the most profitable channels in terms of future yield, cannot be claimed as one of the outstanding triumphs of *laissez-faire* capitalism -which is not surprising, if I am right in thinking that the best brains of Wall Street have been directed towards a different object.” (Keynes 1936, p. 159)²⁹

²⁷ Keynes's arguments are the same ones that Rajan uses to explain why even the bank managers who were aware of the fact that housing prices were over valued continued to herd with other investment managers: “Would a few enterprising managers not want to buck the trend and thus return prices to fundamentals? Unfortunately, few would want to go up against the enormous mass of managers pursuing the trend. The reason is that their horizon is limited. If the mispricing in stocks does not correct itself in a relatively short while, the investment manager will see an erosion of his customers as he underperforms. It takes a very brave investment manager with infinitely patient investors to fight the trend, even if the trend is a deviation from fundamental value.” (Raian 2006, p. 517)

²⁸ “Investment based on genuine long-term expectation is so difficult to-day as to be scarcely practicable. He who attempts it must surely lead much more laborious days and run greater risks than he who tries to guess better than the crowd how the crowd will behave; and, given equal intelligence, he may make more disastrous mistakes. ... It needs *more* intelligence to defeat the forces of time and our ignorance of the future than to beat the gun. Moreover, life is not long enough; -human nature desire quick results, there is a peculiar zest in making money quickly, and remoter gains are discounted by the average man at a very high rate.” (Keynes 1936, p. 157) Recently many economists have underlined this concept; see for example: Tobin 1984, Stiglitz 2010.

²⁹ The prevalence of speculation over enterprise would have high social costs: “The social object of skilled investment should be to defeat the dark forces of time and ignorance which envelop our future. The actual, private object of the most skilled investment to-day is ‘to beat the gun’, as the Americans so well express it, to outwit the crowd, and to pass the bad, or depreciating, half-crown to the other fellow.” (Keynes 1936, p. 155)

These considerations allow us to underline the weakness of the mainstream theory that assumes the presence of asset markets and speculative bubbles in a world in which one good is produced, and in which the role of the financial system is to intermediate funds from savers to entrepreneurs. Finally, we can highlight that the causal sequence between money and uncertainty and the phenomenon of speculation that characterises the *monetary economy* described by Keynes allows us, unlike with the mainstream theory, to give a theoretical foundation to the relation between finance and risk that characterises Rajan's analysis:

“... we have to recognize that the only truly safe financial system is a system that does not take risks, that does not finance innovation or growth, that does not help draw people out of poverty, and that gives consumers little choice. It is a system that reinforces the incremental and thus the status quo. In the long run, though, especially given the enormous challenges the world faces –climate change, and aging population, and poverty, to name just a few –settling for the status quo may be the greatest risk of all, for it will make us unable to adapt to meet the coming challenges.” (Rajan 2010, p. 19)

3.3 The explanation of the crisis

The lessons of Keynes and Schumpeter permits us to state that finance creates uncertainty, to underline the link between saving and wealth accumulation and to define the concepts of wealth and speculation. These features which characterise Keynes's *monetary economy* and Schumpeter's *capitalist economy* have two important consequences. First, they lead us to recognise that there is no ideal world without imperfections in which the financial system is made only of savers who directly finance firms, and towards which concrete economic systems converge thanks to the action of financial intermediaries such as banks, whose function is to annul the effects of the imperfections that characterise the real economy.

Second, these features are crucial in illustrating the concept of tail risk presented by Rajan and to highlight the fragility of an economy characterised by the presence of a developed financial system, that is to emphasise the fact that the *monetary economy* is prone to crises. Minsky (1975, 1980, 1982) who had been a student of Schumpeter, and on several occasions had recommended combining the approaches of Keynes and Schumpeter³⁰ is the contemporary economist who described the financial nature of the

³⁰ As well as Minsky (1986, 1993) other authors have emphasised the desirability of integrating the Keynesian theory of income determination with Schumpeter's theory of economic development; see for example: Morishima (1992); Goodwin (1993); Vercelli (1997); Bertocco (2007).

instability of a *monetary economy*. It is easy to understand the reasons for this instability if we bear in mind that the money is created by means of a credit contract that provides that the debtor must repay the amount received at a set future date. It is a different credit contract from the one that characterises Smith's *corn economy*; in that case, the farmers who produced more grain than they required for their own consumption needs and their investment capacity, loan the corn to other farmers who are willing to invest it to produce more corn in the future. The higher production of corn obtained through the investment will allow the debtor to reimburse the loan obtained; a *corn economy* is not a fragile economy even in the presence of a high level of dissociation between saving and investment.

Instead, in the case of a *monetary economy* the credit contract permits the creation of money used to finance investments with which innovations are realised; the financing of innovations makes the system fragile because it occurs in conditions of uncertainty. The entrepreneur who took out a loan to build a railway will be able to repay the loan only if he is able to sell a sufficient quantity of train tickets. Unlike what happens in the case of corn, in which the proceeds are determined by the productivity of the corn used as a means of production, there is no objective criteria for predicting the monetary proceeds that will be produced by the railway.

The fragility of a *monetary economy* does not only derive from the financing of innovations but also from speculation. Indeed, the credit contract through which money is created can serve to finance the speculative demand for assets; also this operation is performed in conditions of uncertainty and therefore the stability of the system increases. The subprime crisis can be seen as an important example which confirm Keynes's thesis that a *monetary economy* is very fragile: "...when enterprise becomes the bubble on a whirlpool of speculation..." (Keynes 1936, p. 159)

We can conclude that the meaning of the elements used by Rajan to assert that risk is not independent of finance can be explained by taking into account the features that characterise a *monetary economy*: i) the process of money creation managed by the banking system that makes it possible to explain the expansion in the supply of mortgages; ii) the creation of uncertainty on the part of the financial system by means of the expansion of the supply and demand of subprime mortgages determined by the widespread expectations of a continuous increase in housing prices; iii) the importance of the speculation phenomenon.

Conclusions

Rajan has earned a well-deserved reputation amongst economists for having been one of the few to have hypothesised, in a deservedly famous paper presented at the Jackson Hole conference, that a disastrous financial crisis could occur.

In this paper it has been shown that the analysis of the origin of the crisis developed by Rajan is based on two points that are not coherent with the mainstream theory of finance: i) the thesis that finance can create risk; ii) the concept of the asset price bubble necessary in order to define the *tail risk* taken on by the banks. In the last part of this paper a theory of finance has been presented, based on the theories of Keynes and Schumpeter, which is capable of giving a theoretical justification to these two elements. Starting with the Keynesian concepts of *monetary theory of production* and *monetary economy*, it has been shown that the importance of the dimension of uncertainty derives from the existence of a money such as bank money. In a *monetary economy*, finance, which can be identified with the process of money creation through a credit contract, not only creates uncertainty but it determines the conditions for the concepts of wealth and speculation to come to the fore. This relation between money, uncertainty and speculation was illustrated by highlighting the complementary nature of the theories of Keynes and Schumpeter. Finally, referring to Minsky's theory, it is concluded that the causal sequence that links money to uncertainty and speculation allows us to explain the financial nature of the instability that characterises a *monetary economy*.

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