

The liquidity preference theory: a critical analysis

Giancarlo Bertocco^{*}, Andrea Kalajzić^{**}

Abstract

Keynes in the *General Theory*, explains the monetary nature of the interest rate by means of the liquidity preference theory. The objective of this paper is twofold. First, to point out the limits of the liquidity preference theory. Second, to present an explanation of the monetary nature of the interest rate based on the arguments with which Keynes responded to the criticism levelled at the liquidity preference theory by supporters of the loanable funds theory such as Ohlin and Robertson. It is shown that this explanation is consistent with the definition of the non-neutrality of money that Keynes presented in his 1933 works in which he underlines the need to elaborate a monetary theory of production in order to explain the phenomena of the crisis and the fluctuations in income and employment.

^{*}Giancarlo Bertocco, Department of Economics, University of Insubria, via Monte Generoso 71, Varese, Italy, e-mail: giancarlo.bertocco@uninsubria.it

^{**}Andrea Kalajzić, Department of economics, University of Insubria, via Monte Generoso 71, Varese, Italy, e-mail: kalash@fastwebnet.it

Introduction

In his response to Ohlin's criticism of the *General Theory*, Keynes considers the interest rate as: "... a *monetary* phenomenon" (Keynes 1937b, p. 207). To regard the interest rate in this way means, as Smithin (2009) notes, to reject the thesis of the neutrality of money according to which money is only a means of exchange, a mere 'veil' which hides the economic forces such as productivity and thrift, that determine the interest rate. Keynes' assertion, therefore, implies that the presence of money changes the nature of the interest rate with respect to a barter economy or, in other words, that the presence of money is a necessary condition to explain the nature and the level of the interest rate. As is well known, Keynes in the *General Theory*, explains the monetary nature of the interest rate by means of the liquidity preference theory.

The objective of this paper is twofold. First, to point out the limits of an explanation of the monetary nature of the interest rate and thus of the non-neutrality of money, based on the liquidity preference theory. Second, to present an explanation of the monetary nature of the interest rate based on Keynes's own writings before and after the *General*

Theory. This alternative interpretation is based on the arguments with which Keynes responded to the criticism levelled at the liquidity preference theory by supporters of the *loanable funds theory* such as Ohlin and Robertson. It is shown that this explanation is consistent with the definition of the non-neutrality of money that Keynes presented in his 1933 works in which he underlines the need to elaborate a *monetary theory of production* (Keynes 1933a, 408) in order to explain the phenomena of the crisis and the fluctuations in income and employment in modern market economies.

The paper is divided in two parts. In the first one, after describing the main aspects of the liquidity preference theory we highlight the limits of this theory; in the second one, a different explanation of the monetary nature of the interest rate and of the non-neutrality of money is presented.

1. A critical analysis of the liquidity preference theory.

1.1 *The liquidity preference theory.*

Keynes starts the *General Theory* by stating that the classical theory is not able to describe the: “[...] economic society in which we actually live...” (Keynes 1936, p. 3), since it deals principally with the: “[...] distribution of a *given* volume of employed resources between different uses [...]” (Keynes 1936, p. 4), and overlooks the phenomenon of the crisis. He further asserts that the inability of the classical theory to explain the fluctuations in income derives from the way in which this theory explains the nature of the interest rate.¹ Keynes underlines that the classical theory has regarded the interest rate:

“[...] as the factor which brings the demand for investment and the willingness to save into equilibrium with one another. Investment represents the demand for investible resources and saving represents the supply, whilst the rate of interest is the ‘price’ of investible resources at which the two are equated ... [This theory drove] ... the ordinary man –banker, civil servant or politician...[to think that]...whenever an individual performs an act of saving he has done something which automatically brings down the rate of interest, that this automatically stimulates the output of capital, and that the fall in the rate of interest is just so much as is necessary to stimulate the output of capital to an extent which is equal to the increment of saving...” (Keynes 1936, pp. 175-177)

Keynes presents an alternative theory capable of explaining why in the presence of a level of effective demand insufficient to ensure full employment, the interest rate: “[...]”

does not automatically fall to the appropriate level.” (Keynes 1936, p. 31). In the second chapter of the *General Theory*, Keynes announces the essential role of money in his theory of the rate of interest: “We shall discover [...] that money plays an essential part in our theory of the interest rate.” (Keynes 1936, p. 32)

In chapter 13 of the *General Theory* Keynes remarks that an individual, after having decided how much to save, must decide: “[...] in *what form* he will hold the command over future consumption which he has reserved, whether out of his current income or from previous savings.” (Keynes 1936, p. 166). He thus states that the interest rate does not depend on saving decisions but on the liquidity preference: “The rate of interest is not the ‘price’ which brings into equilibrium the demand for resources to invest with the readiness to abstain from present consumption. It is the ‘price’ which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash.” (Keynes 1936, pp. 166-7)

The money demand function or, to use Keynes’s terminology, the liquidity preference schedule, specifies the factors that induce wealth owners to accumulate money; the interest rate is one of these factors. Keynes claims that the existence of liquidity preference depends on a necessary condition: the presence of uncertainty about the future rate of interest.² If there were no uncertainty, individuals would not employ money as a store of wealth. Keynes therefore, blames the classical theory of having elaborated a theory of money that completely overlooks the dimension of uncertainty.³

The presence of uncertainty allows Keynes to highlight a key aspect of the money demand function: its instability. The consequences of the fluctuations in the liquidity preference depend on the characteristics of the money supply function; in the *General Theory*, Keynes assumes that the quantity of money is controlled by the monetary authorities and that it can vary independently of the money demand. He therefore concludes that the fluctuations in liquidity preference do not cause changes in the quantity of money but that they influence the level of the interest rate.⁴ Given the quantity of money, the interest rate depends on operators’ expectations about its future level. This implies that the rate of interest could be at a different level from that consistent with Say’s law:

“[the] actual value [of the interest rate] is largely governed by the prevailing view as to what its value is expected to be. *Any* level of interest which is accepted with sufficient conviction as *likely* to be durable *will* be durable [...] [the rate of interest] may fluctuate for decades about a level which is chronically too high for full employment [...]” (Keynes 1936, 203-4)

The liquidity preference theory, based on the presence of uncertainty, thus constitutes a key element in the Keynesian explanation of fluctuations in income and employment resulting from the instability of investments.

1.2 The limits of the liquidity preference theory.

There are three important limitations in the explanation of the non-neutrality of money based on the liquidity preference theory. The first one can be described by recalling that the specification of the monetary nature of the interest rate assumes the presence of uncertainty. In the *General Theory* uncertainty is an exogenous element which is not explained by the liquidity preference theory. In chapter 18, Keynes defines the psychological expectation of future yield from capital assets as one of: "... our ultimate independent variables ...” (Keynes 1936, p. 246), that is, as one of the elements: “ ... we usually take as given ...” (Keynes 1936, p. 245).

Starting from uncertainty Keynes, in the *General Theory*, explains the store of wealth function of money and formulates the liquidity preference theory.⁵ It is evident that the thesis of the non neutrality of money would assume more weight if we could explain the significance of the dimension of uncertainty starting from money itself, that is, if it could be possible to show that money is a necessary condition to explain the presence of uncertainty. As we will see in the following pages, this is what Keynes tried to argue in his 1933 works where he underlines the need to elaborate a monetary theory of production.

The second limitation concerns the concept of wealth. The liquidity preference theory, as we recalled, underlines the store of wealth function of money. Wealth like uncertainty is an exogenous element, whose presence is not explained by the liquidity preference theory. In what follows it will be shown that the specification of the relation between money and uncertainty allows us to explain the concepts of wealth and wealth accumulation.

The last limitation of the liquidity preference theory is that it overlooks the presence of banks and bank money. Indeed, by regarding the quantity of money as an exogenous variable, Keynes drove his readers to identify money with the liabilities of the central banks and to overlook that in an economy where a bank money is employed, banks can widen the supply of money independently of the central banks' decisions.⁶ This feature of the liquidity preference theory has two consequences. First, this theory only partially defines the phenomenon of credit. Keynes defines the phenomenon of credit by assuming that the agents who need liquidity turn to the wealth owners, who transfer their idle balances for a premium constituted by the interest rate which: "...is, in itself, nothing more

than the inverse proportion between a sum of money and what can be obtained for parting with control over the money in exchange for a *debt* for a stated period of time.” (Keynes 1936, p. 167). Within this framework wealth owners are the only agents that can offer credit since it is assumed that they hoard the quantity of money which is exogenously given. However, this is a very questionable way to define the credit phenomenon as it is excluded that the demand for liquidity from debtors, could be met by banks through the creation of new money.

Secondly, by neglecting bank money, the liquidity preference theory tends to minimise the capacity of the monetary authorities to influence the interest rates. In a world where bank money is used, central bankers directly set the interest rate at which they finance the banking system; this reinforces their capacity to influence the interest rate level which conditions the firms’ investment decisions. As a matter of fact, in recent years the monetary authorities of the industrialised countries have abandoned the control of monetary aggregates and now target short-term interest rates. (see, for example: Bank of England (1999); Mishkin (1999), Smithin (2003, 2009), Romer (2000), Woodford (2003), Bindseil (2004), Fullwiler (2006), Nishiyama (2007), Docherty (2011)). We can therefore maintain that the monetary authorities, by setting the short-term interest rate at any level desired, even at a rate close to zero, affect households’ liquidity preference and the long-term interest rates, making it more difficult to presume that unemployment can be attributed to the effects of liquidity preference on long-term interest rates. In other words, we can assume that expectations regarding future interest rate values are influenced by the level of the interest rate set by the monetary authorities, (see, for example: Wray 2006, p. 274; Tily 2007, chap. 7). It is therefore difficult to hypothesize that the presence of unemployment is due to the liquidity preference that determines a value of the interest rate higher than the one coherent with full employment.

The deep recession resulting from the financial crisis following the collapse in the subprime mortgage market, is an important example which confirms this thesis. The very low rates of interest set by the monetary authorities in countries all over the world prevents us from considering the big rise in unemployment in Europe and in the United States as a consequence of the liquidity preference that determines excessively high rates of interest. Moreover, we can recall that many economists have considered the over-expansionary monetary policy implemented by the Federal Reserve in the first half of the last decade, as the principal reason of the crisis. It is not necessary to accept this argument to recognize

that after 2001 the Fed has pushed interest rates to a very low level and, therefore, to highlight that monetary authorities are able to control interest rates.

The aim of this paper is to put forward a sounder and more convincing explanation of the reasons of the non-neutrality of money than the one based on the liquidity preference theory. This alternative explanation will allow to show: i) the relation between money and uncertainty; ii) the importance of the concept of wealth and of the phenomenon of speculation; iii) the monetary nature of the fluctuations in income and employment.

2. An alternative explanation of the monetary nature of the interest rate.

2.1 *Real-exchange economy and monetary economy.*

The explanation of the non-neutrality of money presented in this paper is based on the arguments that can be found in two groups of Keynes's works written before and after the *General Theory*. The first one includes Keynes's 1933 works in which he highlights the need to elaborate a monetary theory of production. The second one consists of the works published between 1937 and 1939, in order to respond to the criticism levelled at the *General Theory* by the supporters of the *loanable funds theory* such as Ohlin and Robertson.

In his 1933 works Keynes highlights the need to elaborate a *monetary theory of production* in order to explain the phenomena of the crisis and the fluctuations in income and employment. He underlines 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.⁷ In these works Keynes introduces the distinction between a *real-exchange economy* and a *monetary economy*. As is well known, Keynes (1933a, 1933b) uses the former term to refer to an economy in which money is merely a tool to reduce the cost of exchange and whose presence does not alter the structure of the economic system, which remains substantially a barter economy. A *monetary economy* instead refers to an economic system in which money radically transforms the nature of exchange and the characteristics of the production process. Keynes (1933a, p. 410) remarks that the classical economists formulated an explanation of how the *real-exchange economy* works, convinced that this explanation could be easily applied to a *monetary economy*. He believed that this conviction was unfounded and stressed the need to elaborate a: “monetary theory of production, to

supplement the real–exchange theories which we already possess” (Keynes, 1933a, p. 411).

Keynes regards the phenomena of the crisis and of the fluctuations in income and employment caused by the variations in the effective demand as the key feature characterizing a *monetary economy*. We will show that the arguments presented in Keynes’s works written before and after the *General Theory*, allows us to develop a theory that explains fluctuations in income and employment in a sounder way than the one based on the liquidity preference theory. We will point out: i) that the presence of money is a necessary element to explain the importance of uncertainty and its monetary nature; ii) that through the specification of the relationship between bank money and uncertainty it is possible to explain the concepts of wealth, wealth accumulation, liquidity preference and speculation iii) that the specification of the relationship between bank money and uncertainty will allow us to explain the monetary nature of the interest rate and the reasons why in a *monetary economy* Say’s Law does not apply.

2.2 Money and uncertainty.

The causal relationship between money and uncertainty is the fundamental point on which the interpretation of the Keynesian principle of the neutrality of money, explained in this work, is based. Whereas in the *General Theory* Keynes regards uncertainty as an exogenous element, in his 1933 works we can find a causal relationship between money and uncertainty.

2.2.1 The law of production of a monetary economy.

In his 1933 works Keynes observes that in a *monetary economy* or, as it is otherwise defined, in an *entrepreneur economy*, the presence of money changes the law of production compared to the one that characterises the economic system described by the classical theory. To illustrate this thesis he uses a framework developed by Marx:

“[Marx] pointed out that the nature of production in the actual world is not, as economists seem often to suppose, a case of C- M- C’, i. e. of exchanging commodity (or effort) for money in order to obtain another commodity (or effort). That may be the standpoint of the private consumer. But it is not the attitude of *business*, which is a case of M-C-M’, i. e. of parting with money for commodity (or effort) in order to obtain more money. This is important for the following reason. The classical theory supposes that the readiness of the entrepreneur to start up a productive process depends on the amount of value in terms of product which he expects to fall to his share; i. e. that only an expectation of more *product* for himself will induce him to offer more employment. But in an entrepreneur economy this is a wrong analysis of the nature of business calculation. An entrepreneur is interested, not in the

amount of product, but in the amount of *money* which will fall to his share. He will increase his output if by so doing he expects to increase his money profit, even though this profit represents a smaller quantity of product than before.” (Keynes 1933b, 81-2)

Keynes, quoting Marx, underlines that the objective of the entrepreneur is not to produce goods but to make money. This would seem to be an obvious truth: a car producer is not interested in accumulating unsold cars in his store rooms, but in making profits by selling cars for money. Selling what was produced is the key point in the entrepreneur’s activity. The challenge is to explain why the definition of the goals of an entrepreneur presented above should be valid only in a *monetary economy*. Indeed even a *real-exchange economy* or, as it is otherwise defined a *real-wage economy*, is characterised by the division of labour and by the opportunity to exchange goods using money as a medium of exchange. Therefore we could conclude that also in this kind of economy the aim of the entrepreneur is not to produce goods, but to make a profit measured in terms of goods or money. Even to a *real-wage economy* we could apply the words used by Keynes to explain the sequence M-C-M’ which he linked to a *monetary economy*:

“The explanation of [the sequence M-C-M’] is evident. The employment of factors of production to increase output involves the entrepreneur in the disbursement, not of product, but of money. The choice before him in deciding whether or not to offer employment is a choice between using money in this way or in some other way or not using it at all. He has the command of £ 100 (in hand or by borrowing), and he will use it if by so doing he expects... to turn it into more than £100. The only question before him is to choose, out of the various ways of employing £100, that way which will yield the largest profit in terms of money.” (Keynes 1933b, p. 82)

Both the entrepreneur operating in a *monetary economy* and the one operating in a *real-exchange economy* take their decisions on the basis of their expectations of profits whether they are expressed in terms of products or money. Nevertheless we believe that by associating with these two economies a different law of production, Keynes intended to emphasise that there is an element that differentiates the expectations of the two groups of entrepreneurs: the degree of uncertainty about future profits. The entrepreneur who operates in a *real-exchange economy* knows the results of his choices with a high level of certainty when he decide to hire a new worker because he is sure to sell everything he produces. In fact in the economic system described by the sequence C-M-C’ the production of goods is the essence of the economic activity. It can be assumed that this economy is composed of a set of very small producers, for example farmers and artisans producing corn, furniture and clothes that are sold in exchange for other goods. Money is

only a tool that facilitates the exchanges. In such an economy the availability of goods is the necessary condition to obtain other goods; it can be said that every good is money, as goods are produced in order to be exchanged for other goods. The decision of an entrepreneur to hire a new worker can therefore be defined in terms of quantities produced: bushel of wheat, number of tables, and so on. The entrepreneur will decide to hire a new worker only when the marginal productivity, measured in terms of goods, is equal to the real wage.⁸ In this economy production decisions determine the levels of income and employment, therefore Say's Law applies:

“From the time of Ricardo the classical economists have taught that supply creates its own demand; -which is taken to mean that the rewards of the factors of production, must, directly or indirectly, create in the aggregate an effective demand exactly equal to the costs of the current supply [...]” (Keynes, 1933b, p. 80)

On the contrary, in a *monetary economy* the entrepreneur acts under uncertainty. When he decides to hire a new employee he cannot determine the future results by considering the marginal productivity of labour because he is not sure to sell everything he produces. In a *monetary economy* there are no mechanisms that ensure the presence of an effective demand that can absorb the entire production undertaken by firms, but as Keynes observed: “For the proposition that supply creates its own demand, I shall substitute the proposition that expenditure creates its own income, i.e. an income just sufficient to meet the expenditure” (Keynes 1933b, pp. 80-81). In a *monetary economy* the decision to produce goods is affected by the expectations about the likelihood to sell all that is produced in exchange for money. Keynes used the M-C-M' sequence to stress that in a monetary economy the production phase and the selling phase do not coincide, and the production process is not aimed at manufacturing goods but at selling them. Keynes underlines that uncertainty concerning the sale proceeds is due to the fluctuations of effective demand:

“The explanation of how output which would be produced in a co-operative economy may be ‘unprofitable’ in an entrepreneur economy, is to be found in what we may call, for short, *the fluctuation of effective demand*.... In a co-operative or in a neutral economy, in which sale proceeds exceed variable cost by a determinate amount, effective demand cannot fluctuate... But in an entrepreneur economy the fluctuations of effective demand may be the dominating factor in determining the volume of employment...” (Keynes 1933b, 80)

Keynes regards this economy as a *monetary economy* in order to emphasize that the presence of a money with particular features is the cause of fluctuations in aggregate

demand. In fact, he considers the fluctuations of effective demand that give rise to booms and depressions as: “[...] a *monetary* phenomenon...” (Keynes 1933b, 85).

In the *General Theory* Keynes uses the liquidity preference theory to explain the monetary nature of the fluctuations in aggregate demand. This explanation, as recalled above, considers uncertainty as an exogenous element; this contrasts with the causal link between money and uncertainty which characterizes Keynes’s 1933 works. In those works Keynes uses Marx’s formula and expresses the costs and the marginal proceeds in monetary terms to highlight the fact that the presence of money, by making possible fluctuations in aggregate demand, *originates* uncertainty. The aim of the following pages is to explain this causal relationship between money and uncertainty.

2.2.2 *The money employed in a monetary economy*

To explain what makes the use of money special in a *monetary economy* as opposed to a *real exchange economy*, we should wonder if in both types of economy the same money is employed, or if the money used in a *monetary economy* has particular properties. We can recall that Keynes in his 1933 works emphasizes that the money used in a *monetary economy* is not produced by labor, but it is a fiat money which has no intrinsic value. In chapter 17 of *General Theory* two essential properties of money are defined: (a) zero elasticity of production; and (b) zero elasticity of substitution between liquid assets and reproducible goods. The first property refers to the fact that entrepreneurs cannot cause more money to be produced by hiring additional labour. By the second property, Keynes means that: “[...] as the exchange value of money rises there is no tendency to substitute [producible goods] for it” (Keynes, 1936, p. 231).

Another key element that is crucial in defining the characteristics of the money used in a *monetary economy* is contained in Keynes’s response to the criticism of the *General Theory* presented by the supporters of the *loanable funds theory*. These criticisms urged Keynes to explicitly consider the issues of investments financing and the process of money creation through which banks finance firms. Keynes replies to the critiques of Ohlin and Robertson with the objective of defending his thesis about the monetary nature of the rate of interest and the independence of the interest rate from saving decisions. Keynes’s strategy consists, on the one hand, in accepting some elements of Ohlin’s analysis, and on the other, in reiterating the monetary nature of the interest rate. In the face of Ohlin’s criticism, Keynes recognizes the importance of the concept of *ex ante* investment; he acknowledges that the planning of an investment decision leads the entrepreneur to obtain

liquidity to finance this cost and thus associates the investment decisions with the demand for credit.⁹ However, he does not accept Ohlin's thesis that the credit supply depends on *ex ante* savings, but he highlights the role of banks in creating new money.¹⁰ Not only does Keynes accept an important point of the *loanable funds theory*, but he uses the presence of bank money to underline, in contrast with this theory, that the demand for credit is satisfied through the creation of money by banks and not by savings:

“[...]the banks hold the key position in the transition from a lower to a higher scale of activity. If they refuse to relax, the growing congestion of the short-term loan market or of the new issue market, as the case may be, will inhibit the improvement, no matter how thrifty the public propose to be out of their future incomes. On the other hand, there will always be *exactly* enough *ex post* saving to take up the *ex post* investment and so release the finance which the latter had been previously employing. The investment market can become congested through shortage of cash. It can never become congested through shortage of saving.” (Keynes, 1937c, p. 222)

These elements allow us to assume that the kind of money used in a *monetary economy* has the same characteristics of bank money. In order to confirm this hypothesis it is necessary to explain why the presence of a bank money constitutes the required element to explain the structural characteristics which differentiate a *monetary economy* from a *real exchange economy*. We have to consider that it is not enough to observe that banks finance firms by creating money. In fact, even Wicksell (1898) and the *loanable funds theory* supporters acknowledge that banks create money and that the credit supply may vary independently of saving decisions. What distinguishes the *loanable funds theory* is the thesis that the presence of bank money does not change the structure of the economy. According to this theory saving is always the true source of the credit supply and the nature of the credit does not change with the presence of banks. This fundamental aspect of the *loanable funds theory* is confirmed by the importance that this theory attaches to the concept of the natural rate of interest that characterizes an economy in which capital goods are exchanged in kind. The natural rate of interest constitutes the reference point to which the rate of interest on money, determined by the banking system, converges. As is well-known, Keynes in the *General Theory* abandons the concept of the natural rate of interest; he underlines the monetary nature of the rate of interest. Keynes's thesis can be justified only if it is shown that the presence of bank money changes the nature of the credit phenomenon in comparison with the world in which the concept of natural rate of interest applies, and changes the structure of the economy turning a *real exchange economy* into a

monetary economy. In the next two paragraphs it will be analysed the first element that characterises a monetary economy: the monetary nature of uncertainty.

2.2.3 Investment decisions and uncertainty.

The causal relationship between bank money and uncertainty is based on two points. The first one is the link between investment decisions and uncertainty; the second one concerns the relation between bank money and investment decisions. Keynes specifies that an economy without uncertainty is characterised by the prevalence of consumption decisions and the absence of decisions on investment and wealth accumulation, whose results – not predictable in probabilistic terms - are seen in a more or less distant future (Keynes 1937a, p. 113). On the contrary, an economy with uncertainty is an economy where investment decisions and the process of wealth accumulation are important.

By recalling the distinction between a *real-exchange economy* and a *monetary economy*, it is possible to state that a *real-exchange economy* is an economy based on consumption decisions, in which few goods are produced in order to meet what Keynes defines as ‘absolute needs’ (Keynes 1931, p. 237); this would be the case of an agricultural economy, for example. It is an economy whose behavior can be described by using theoretical models which assume that just one good is produced and it can be either consumed or invested. This hypothesis is a common thread in the work of classical and neoclassical economists, and also of contemporary supporters of the mainstream theory. Classical economists, for instance, often describe the effects of saving decisions on the development of the economic system, by considering a world in which only corn is produced. In this economy savings correspond to the amount of corn produced which is not consumed and that can therefore, be used to manufacture capital goods that will be used to obtain more corn. Saving is constituted, for example, by the amount of corn that is required to pay the workers involved in the production of the ploughs. The agents who save may be the same ones who decide to build ploughs and in this case credit is absent. Alternatively we can hypothesise that the agents who save are different from those that invest, and in this case the credit phenomenon becomes relevant.

Of course 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 one is the specification of the characteristics of investment decisions. In the *monetary economy* described by Keynes investments are closely associated with the dimension of uncertainty; that is they constitute the necessary element

to explain why entrepreneurs, in deciding whether to start a production process entrepreneurs, are not able to formulate the results of their decisions in probabilistic terms. It is obviously possible to assume that 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 is due to extra-economic factors such as unfavourable climatic conditions that ruin the harvest, or to social-political events such as the break-out of a war; these are all events that prevent the entrepreneur from obtaining the desired quantity of product. What distinguishes the investments that are made in a *monetary economy* is the fact that the inability of predicting their results in probabilistic terms is not due to the uncertainty regarding the possibility to obtain the desired amount of product. It rather depend on the uncertainty regarding the sale of the goods produced and the opportunity to achieve a profit in terms of money: such uncertainty has an economic nature. The investment decisions analyzed by Keynes are the element that makes the distinction between the production and the sale phase relevant and justifies the association of the sequence M-C-M' with a *monetary economy*. This conclusion can be understood if we consider the examples of investment decisions used by Keynes:

“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 is not easily foreseeable because it does not coincide with the productivity of some specific productive factor such as land in the case of a *corn economy*, as the entrepreneur is not sure to sell everything he produced. The investments considered by Keynes have the same characteristics as the innovations which are at the centre of Schumpeter's analysis. As is well known, Schumpeter (1912, 1939) holds that innovations constitute the first endogenous factor that brings about the process of change characterising a capitalist economy. The phenomenon of innovation concerns the production sphere and 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 through which firms launch new products, or modify the productive process through which the existing goods are realized; so the Keynesian

entrepreneur who takes the investment decisions coincides with the Schumpeterian entrepreneur who introduces innovations.¹¹

The presence of investments and innovations gives prominence to the uncertainty dimension. We can distinguish at least two types of innovations: the innovations that modify the productive process through which the existing goods are realised and the innovations by means of which new goods are produced. The first type of innovation can be realised even in a corn economy by, for example, the introduction of the plough or the tractor. In this case, the investments correspond to the quantity of corn that is used to pay the workers involved in the production of ploughs or tractors. The second type of innovation gives 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 with particular skills, that is by agents who, driven by their *animal spirits*, are able to take decisions in conditions of uncertainty (Keynes 1936, pp. 161-2).¹²

The relationship between investment decisions and innovations allows us to explain the reasons why the dimension of uncertainty is relevant in an economy that is characterized by a high level of investments.

2.2.4 Bank money, investment decisions and uncertainty.

In order to elaborate a monetary theory of uncertainty it is not sufficient to define the relationship between investment decisions, innovations and uncertainty, but it is necessary to explain the reason why the use of a kind of money with the characteristics of bank money is crucial to justify the presence of a significant flow of investments and innovations. In a monetary economy the banks play a dual role: i) by creating new money they enable the entrepreneur-innovator to obtain the productive factors necessary to make the investment; ii) they influence the conditions on which the entrepreneur-innovator can obtain the monetary profits necessary to repay loans. The essential role of bank money in a *monetary economy* can be illustrated through an example.

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. The presence of an entrepreneur-innovator allows to explain the transition from a real-

exchange economy to a monetary economy. 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 suppose that the existing production techniques allow to produce a quantity of corn sufficient to guarantee the survival of the farm workers and of those that might be employed in the building of the railway. It seems that the railway, at least theoretically, could be built also in a *corn economy*; in this case the construction of the railway would be financed by the corn producers who would lend out the corn required by the new entrepreneur to pay the workers involved in building the railway.

In a *corn economy* banks can act as mere intermediaries, collecting the corn that the producers decide not to consume and lending it to the entrepreneurs. The presence of banks could be justified, for example, by the existence of asymmetric information that prevents the savers from directly financing the entrepreneurs. But there is at least one fundamental element that impedes the realisation of this credit contract. In fact the credit contract necessary to finance the construction of the railway is very different from the one usually closed in a *corn economy*, where producers lend the corn exceeding their consumption, to other producers who will use it to produce other corn. In this case, given the production technique, it is easy for the creditor to determine the yield of the loaned corn and thus the rate of interest to apply to the debtor because this decision is not taken under uncertainty. On the contrary, in the case of the railway this evaluation is much more difficult because this decision is made under uncertainty. Indeed, the entrepreneur cannot be sure that he will manage to sell whatever he produces. The production phase is separated from the sale phase and there is no physical law enabling to calculate how much corn could be obtained by the sale of train tickets starting from the amount of corn used to build the railway.

The credit contract between the bank and the entrepreneur who is willing to build the railway must be expressed in monetary terms. The bank will lend money, not corn, and the entrepreneur will undertake to repay the bank by money as its revenues could be obtained only in monetary terms. In fact, the aim of the entrepreneur is not to accumulate corn. If so, he could employ the available workers in the production of corn instead of building the railway.

For this reason it is difficult to imagine that our entrepreneur-innovator can build the railway in a world in which banks act as mere intermediaries who loan the corn that savers did not consume. The railway can be built instead, in a world in which bank money is used and banks are not simple intermediaries. 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 key actors which operate in the credit market are not savers and entrepreneurs but banks and entrepreneurs. 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 sell corn to the workers involved in building the railway, the corn producers are not creditors of the entrepreneur who, instead, is 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.

It follows from this example, moreover, that the presence of bank money constitutes the necessary condition for our entrepreneur-innovator to obtain a profit. By building the railway, he does not produce corn, but services from the sale of which he hopes to generate sufficient monetary profits to repay the loan obtained and to pay the interests. The necessary condition for this expectation to be met is the existence of a sufficient number of consumers willing to purchase train tickets for money. This depends on the ability of the entrepreneur-innovator to convince consumers to use the railway, and on the presence of an institution such as the banking system, able to create money that will finance the demand for train tickets. Since the banks create money to finance the firms' investments, we can assert that the monetary profits of the entrepreneur who builds the railway depend on the amount of new investments that the banks will finance when the construction of the railway will be completed. This conclusion is coherent with Minsky's analysis (1975, 1980, 1982), which, following Kalecki's view, underlines that profits depend on the investment decisions.

We can conclude that in a monetary economy the role of banks is very different 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. In a *monetary economy* instead, the presence of banks changes the nature of the credit market as: i) the object of the credit is not the corn saved by corn producers, but the money created by the banking system; ii) the necessary conditions enabling the debtors to repay the loan change. In the case of the corn economy, the ability of debtors to repay the loans obtained depends on the productivity of the land. Instead, in the case of the *monetary economy*, the mere construction of the railway is not a sufficient condition to permit the repayment of debts. In fact, the activity of the entrepreneur does not end with the construction of the

railway but with the sale of train tickets. He will be able to repay his loans only if the railway is 'successful', which depends on the decisions of consumers and the decisions of the banking system.

These considerations allow us to conclude that the presence of bank money, and of a well-developed credit market, constitutes the necessary condition for the development of an economy in which investment decisions are relevant and in which the presence of uncertainty becomes an essential factor affecting the decision making process.

2.3 Money, wealth and speculation.

The specification of the relationship between money and uncertainty allows us to explain the importance of the process of wealth accumulation and of the phenomenon of speculation. Indeed, we can observe that the concept of wealth, becomes relevant in a world where a multiplicity of goods is produced. In a world in which just one good is produced, as in the case of a corn economy, it is difficult to define the concept of wealth since the presence of agents willing to accumulate unlimited amounts of corn, year after year, is an improbable hypothesis. Indeed we can reasonably assume that there is a limit to the amount of corn that an individual would wish to own and consume. However, this is not true in a world where innovations give rise to new goods and investments have the characteristics described by Keynes and Schumpeter. The relation between bank money and investments makes it possible to consider savers as wealth holders, that is to hypothesise the presence of individuals willing to accumulate an unlimited amount of purchasing power. Keynes 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). In other words, the presence of money allows us to assume that a corn producer, who would not be willing to accumulate wealth in the form of corn, would be willing to accumulate wealth in the form of money in a world in which he can use his own wealth at any future time to purchase any good. The presence of money transforms the savers into wealth owners. We can therefore, conclude that in the absence of a bank money the corn producers would not have accumulated wealth in the form of corn, but they are willing to accumulate wealth in the form of money.

Once the concept of wealth is defined it is possible to describe the phenomenon of speculation. Investments having the characteristics described by Keynes justify the presence of markets in which long term bonds and shares are traded. Keynes (1936, chapter 12) remarks that the spread of shares distinguishes a phase in the development of

the modern economy in which the ownership of the firm is divided among many owners who do not directly manage the firm. In this phase markets develop in which shares are continuously traded 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 objective of the speculator is to obtain capital gains by forecasting the future value of shares and bonds continuously traded on the financial markets. The relationship between bank money, investment decisions and uncertainty allows us to explain the importance of the process of wealth accumulation and of the phenomenon of speculation.

2.4 Bank money and Say’s Law.

The foregoing analysis allows us to highlight that in a *monetary economy* the presence of a bank money changes the nature of investment and saving decisions, and the causal relation between saving and investment decisions vis-à-vis a *real-exchange economy* in which Say’s law holds. The investments carried out in a *monetary economy* have different characteristics than those typically realised in a *corn economy*, and the presence of a bank money is a necessary condition to explain the importance of investment decisions that are taken in conditions of uncertainty. Moreover in a *monetary economy* also the nature of saving decisions changes. Indeed savings are not made up of the corn that corn producers decides not to consume, but they are made up of the monetary income that they decides to accumulate, thus becoming, as Keynes underlines, wealth-owner. The monetary income of the corn producers originates from the corn produced in order to meet the demand financed with the money created by banks in order to allow for the construction of the railway.

In a *monetary economy* investments and savings are determined in two separate logical steps. In the first step firms carry out their investments thanks to the money obtained from the banks, and at a different time, which is later than the first step from a logical point of view, an equivalent flow of saving caused by the variation of the income is determined. In fact, the construction of the railway is not the consequence of the saving decisions of corn producers who lend the unconsumed corn to the entrepreneur that decided to build the railway. On the contrary, the entrepreneur can build the railway because of the funding obtained from the banks that create money. This causes an increase in the demand for corn that leads the corn producers to expand their production in

exchange for money. The corn producers do not become savers at the moment when they decide to produce an amount of corn in excess of that which they wish to consume, but when they decide to accumulate the money created by the banks that they receive in exchange for the corn sold to the workers involved in building the railway. The interest rate can therefore not be determined by saving and investment decisions because there is no *ex-ante* saving to contrast with *ex-ante* investment (Gnos 2004). The interest rate is a monetary phenomenon determined by the banking system and characterizes a monetary economy in which credit is independent from saving decisions.

This analysis allows us to elaborate a sound explanation of the monetary nature of the fluctuations in aggregate demand underlined in Keynes's 1933 works, and to emphasise the limits of two explanation of the presence of involuntary unemployment which have been elaborated by Keynesian economists. The first one is based on the fact that the money used in a *monetary economy* is produced without using labour. This explanation can be summarised by the following words of Keynes:

“Unemployment develops, that is to say, because people want the moon; -men cannot be employed when the object of desire (i.e. money) is something which cannot be produced and the demand for which cannot be readily choked off. There is no remedy but to persuade the public that green cheese is practically the same thing and to have a green cheese factory (i.e. a central bank) under public control.” (Keynes 1936, p. 235)

Many Keynesians have pointed out on the basis of Keynes's words, that in a fiat money world an increase in the demand for money causes a drop in effective demand and thus a rise in unemployment.¹³ This explanation stresses that if a part of the monetary income saved by agents is accumulated rather than lent, effective demand will be unable to absorb all of the aggregate output. It is of course true that in a world in which wages are paid in money, workers' decisions to use part of their incomes to increase the money stock does not generate effective demand. Nevertheless, this statement is not a satisfactory explanation of why the presence of a fiat money eliminates the conditions on which Say's Law rests. This explanation overlooks the fact that the new money accumulated by those who decide not to spend all their income must have been created by some agent. It is therefore necessary to specify the mechanisms through which the new money accumulated by savers has been created. If we should find that the creation of new money results in an increase in aggregate demand capable of offsetting the lower demand for goods induced by agents' decisions to accumulate money, then this explanation for the presence of involuntary unemployment should be questioned. In fact, since in a *monetary economy*

investments and savings are determined in two different logical steps, it must be concluded that the money accumulated by savers was created by the banks to finance firms' investment decisions that led to an increase and to emergence of an equivalent saving flow.

The second explanation is based on the liquidity preference theory which states that, as we have recalled, the wealth owners' liquidity preference can drive the interest rate to a higher level than the one coherent with full employment. This approach is characterised by two limits. First, it tends to minimise the capacity of the monetary authorities to influence the interest rate which determines investment decisions. It has been argued that it is difficult to state that in a *monetary economy*, where the monetary authorities are able to influence the interest rate at which banks finance firms, unemployment is due to an overly high rate of interest determined by a high propensity for liquidity. Second, the liquidity preference theory assumes that there is an 'optimum' interest rate, that is a level of the interest rate at which entrepreneurs will make a flow of investments consistent with full employment and that the attaining of this level is a sufficient condition for achieving full employment.¹⁴ In par. 1.2 we have underlined that in a *monetary economy* the monetary authorities can determine the rate of interest that influences investment decisions. In this case if we assume that there is an 'optimum' rate, we have to conclude that there are no obstacles to the realisation of the full employment. Indeed, let us assume that the monetary authorities do not know the value of the rate of interest consistent with full employment and so, for example, they set it at a higher value than the optimum one. This will cause a level of involuntary unemployment leading the monetary authorities to reduce the rate of interest until full employment is reached. In the case of a monetary rate of interest which is lower than the optimal rate, there will be an excess of aggregate demand which triggers inflation; this will lead the monetary authorities to increase the rate of interest.

It can be shown that this conclusion does not necessary apply in a *monetary economy*. In a *monetary economy* the amount of investments depends primarily, on the *animal spirits*; given the *animal spirits*, we can distinguish two situations. Firstly, we can assume that there is no interest rate higher than zero at which entrepreneur-innovators are willing to realise a flow of investment consistent with full employment. In this case there will be involuntary unemployment even at a interest rate equal to zero. Secondly, we can suppose that there exists a value of the interest rate so low to cause a flow of demand for investment goods consistent with the full employment income level. In the world described by the classical theory, where the rate of interest is the price of the saved resources, the attaining

of this level of the interest rate is a sufficient condition for achieving full employment. As we have seen earlier, the same conclusion is reached if we assume that the monetary authorities are able to control the interest rate and to set the level in correspondence with the 'optimal' rate of interest compatible with full employment. However, this conclusion is based on a weak hypothesis which assumes that investment decisions depend on saving decisions and that the interest rate is the instrument that leads entrepreneurs to make that level of investments that guarantees full use of all saved resources. This conclusion is certainly valid in a corn economy, or if one accepts Wicksell's analysis which postulates that the rate of interest on money equals the natural rate of interest, the presence of bank money does not alter the structure of the economic system. This means that banks always create the flow of money necessary to finance the investments desired by firms. But in a *monetary economy* the flow of investments does not depend on saving decisions, rather it depends on the *animal spirits* and on banks' decisions. Banks also take decisions in conditions of uncertainty; not even the banks can predict in probabilistic terms the future results related to the construction of the railway. This means that once they have fixed the interest rate, the banks are not necessarily willing to satisfy the whole credit demand from firms; banks only meet the credit demand of firms they deem creditworthy.¹⁵

They could, for example, decide not to finance the railway, that is, to ration credit because they may view the prospects of a given investment project in a less optimistic light than the entrepreneurs. Therefore, not only do the banks fix the interest rate, but they also determine the quantity of credit to be granted to entrepreneurs. In this case Say's law cannot be applied; the workers who could have built the railway will not be employed and there will not be sufficient demand for corn to absorb all the production. In a *monetary economy* the Keynesian principle of effective demand works.

Conclusions

Keynes opens the *General Theory* by stating that his objective is to elaborate an alternative theory to the classical one as the latter can be applied only to a *real exchange economy*. The basic question to be addressed is the specification of the characteristics that distinguish a *monetary economy* from a *real exchange economy*. In his 1933 works Keynes argues that the elements that distinguishes a *monetary economy* are the presence of crises and fluctuations in income and employment. He considers these phenomena as monetary phenomena as they depend on the particular characteristics of the kind of money used in a

monetary economy and he emphasises the need to develop a *monetary theory of production* in order to specify the relationship between money and crises.

In the *General Theory* Keynes states that the inability of the classical theory to explain the fluctuations in income is due to the way in which it describes the phenomenon of the interest rate and he developed the liquidity preference theory to illustrate its monetary nature. In this paper the limits of the liquidity preference theory have been highlighted. In particular, it has been shown that this theory is not able to explain the presence of uncertainty. In fact, it has been shown that in his 1933 works Keynes considers the presence of uncertainty as an outcome of the use of money. It was therefore concluded that in order to develop a monetary theory of production it is necessary: i) to define the characteristics of the money used in a *monetary economy*; ii) to specify the relationship between money and uncertainty; iii) to use the elements characterizing this relationship to explain the monetary nature of the fluctuations in income and employment.

This work has shown, on the basis of Keynes's works published between 1937 and 1939, that the kind of money used in a *monetary economy* is bank money. Furthermore, we have specified the causal relation between bank money and uncertainty which is based on two points. The first regards the relationship between investment decisions and uncertainty; the second concerns the relationship between bank money and investment decisions. We also pointed out that the presence of bank money changes the nature of credit with respect to a *real-exchange economy*: banks are not mere intermediaries lending the resources that savers choose not to consume, but they offer credit by creating money. Therefore the interest rate is not determined by saving decisions; it is a monetary phenomenon explained by the use of a bank money and whose level depends on the decisions of the central bank and of the banking system.

Moreover it has been shown that the specification of the relationship between bank money and uncertainty allows us to explain the phenomena of wealth accumulation and speculation. We pointed out that the concept of wealth becomes relevant in a monetary economy characterised by a significant amount of investment decisions through which innovations that generate new goods are obtained. Money is not only the tool that allows the entrepreneur-innovator to realize his investments, but it is also the ultimate objective of economic decisions. Finally, it has been shown that the presence of bank money changes the nature of investment and saving decisions compared with a *real-exchange economy* and allows us, to elaborate a sound explanation of the effective demand principle and of the fluctuations in income and employment which characterise a *monetary economy*

¹ “There is, I am convinced, a fatal flaw in that part of the orthodox reasoning which deals with the theory of what determines the level of effective demand and the volume of aggregate employment; the flaw being largely due to the failure of the classical doctrine to develop a satisfactory theory of the rate of interest.” (Keynes, 1934, p. 489)

² ““There is ...a necessary condition failing which the existence of a liquidity-preference for money as a means of holding wealth could not exist. This necessary condition is the existence of *uncertainty* as to the future of the rate of interest, i.e. as to the complex of rates of interest for varying maturities which will rule at future dates.” (Keynes, 1936, p. 168)

³ “Money, it is well known, serves two principal purposes. By acting as a money of account it facilitates exchanges... In the second place, it is a store of wealth. So we are told, without a smile on the face. But in the world of the classical economy, what an insane use to which to put it. For it is a recognised characteristic of money as a store of wealth that it is barren... Why should anyone outside a lunatic asylum wish to use money as a store of wealth?” (Keynes 1937a, pp. 115-6)

⁴ “[...] it is impossible for the actual amount of hoarding to change as a result of decisions on the part of the public, so long as we mean by ‘hoarding’ the actual holding of cash. For the amount of hoarding must be equal to the quantity of money [...] and the quantity of money is not determined by the public. All that the propensity of the public towards hoarding can achieve is to determine the rate of interest at which the aggregate desire to hoard becomes equal to the available cash.” (Keynes 1936, p. 174)

⁵ Many Keynesians consider uncertainty as a starting point for the justification of the store of wealth function of money. See, for example, Fontana (2006, 2009)

⁶ This point has been developed by the endogenous money theory which constitutes the fundamental element of the Post Keynesian monetary theory; see for example: Bertocco 2010.

⁷ “...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 1933a, 410-11)

⁸ “In a real-wage and co-operative economy there is no obstacle in the way of the employment of an additional unit of labor if this unit will add to the social product output expected to have an exchange value equal of 10 bushel of wheat, which is sufficient to balance the disutility of the additional employment.” (Keynes 1933b, p. 78)

⁹ “... *ex ante* investment is an important, genuine phenomenon, inasmuch as decisions have to be taken and credit or ‘finance’ provided well in advance of the actual process of investment... In what follows I use the term ‘finance’ to mean the credit required in the interval between planning and execution” (Keynes 1937c, p. 216)

¹⁰ “The *ex ante* saver has no cash, but it is cash which the *ex ante* investor requires. On the contrary, the finance required during the interregnum between the intention to invest and its achievement is mainly supplied by specialists, in particular by banks, which organize and manage a revolving fund of liquid finance.” (Keynes 1937c, p. 219)

¹¹ Several economists have emphasised the desirability of integrating the Keynesian theory of income determination with Schumpeter's theory of economic development; see for example: Minsky (1986, 1993) Goodwin (1993), Morishima (1992); Vercelli (1997); for a more detailed analysis see: Bertocco (2007).

¹² Some years earlier Schumpeter (1912) noted that the introduction of innovations required very different capabilities from those required to run existing firms and he describes the decisions of the innovating entrepreneur using similar terms to those used by Keynes (see: Bertocco 2007).

¹³ See, for example: Kregel (1980, p. 43); Davidson (1994, p. 95).

¹⁴ "In equilibrium the production of capital goods is determined by equality between the marginal efficiency of capital and the normal rate of interest but this need does not imply full employment unless the normal rate of interest happens to coincide with the optimum rate; the optimum rate being the rate consistent with full employment." (Rogers 1997, 21).

¹⁵ See for example: Tobin (1980), Lavoie (1992, 2006), Wolfson (1996), Bertocco (2005). The credit rationing described in these works has different characteristics from the one defined on the basis of the presence of asymmetric information; on this point see: Bertocco 2009.

References

- Bank of England, The Monetary Policy Committee, 1999. The transmission mechanism of monetary policy.
- Bertocco, G. 2005. The role of credit in a Keynesian monetary economy, *Review of Political Economy*, vol. 17, 4, 489-512.
- Bertocco, G. 2007. The characteristics of a monetary economy: a Keynes-Schumpeter approach, *Cambridge Journal of Economics*, vol. 31, 1, pp.101-122.
- Bertocco, G. 2009 The economics of financing firms: two different approaches, *History of Economic Ideas*, vol. XVII, 1, pp.85-123.
- Bertocco, G. 2010., The endogenous money theory and the characteristics of a *monetary economy*, *Rivista Italiana degli Economisti*, vol. XV, 3, pp.365-401.
- Bindseil, U. 2004. *Monetary Policy Implementation*. Oxford, Oxford University Press.
- Davidson, P. 1994. *Post Keynesian Macroeconomic Theory*, Aldershot, Edward Elgar.
- Docherty, P. 2011. Keynes's analysis of economic crises and monetary policy in the General Theory: its relevance after 75 years, *Review of Political Economy*, vol. 23, 4, pp. 521-535.
- Fontana, G. 2006. Keynesian uncertainty and money, in: Arestis, P. and Sawyer, M. (eds.): *A Handbook of Alternative Monetary Economics*. Cheltenham, Edward Elgar.
- Fontana, G. 2009. *Money, Uncertainty and Time*. London, Routledge.
- Fullwiler, S. 2006. Setting interest rates in the modern era, *Journal of Post Keynesian Economics*, spring, vol. 28, 3, pp.495-525.
- Goodwin, R. 1993. *Schumpeter and Keynes*, in: Biasco S., Roncaglia A., Salvati M. (eds.): *Markets and Institutions in Economic Development*, London, Macmillan Press (pp. 83-86).
- Gnos, C. 2004. Is ex-ante, ex-post analysis irrelevant to Keynes's theory of employment?, *Review of Political Economy*, vol. 16, 3, pp. 335-345.
- Keynes, J.M. 1973a (1933a). A monetary theory of production, in: J.M. Keynes, *The Collected Writings*, London, Macmillan Press, vol. XIII, 408-411

-
- Keynes, J. M. 1973b (1933b). The distinction between a co-operative economy and an entrepreneur economy, in: J.M. Keynes, *The Collected Writings*, Macmillan, London, vol. XXIX, pp.76-106.
- Keynes, J.M. 1973c (1934). Poverty in plenty: is the economic system self-adjusting?, in: J.M. Keynes, *The Collected Writings*, London, Macmillan Press, vol. XIII, 485-92.
- Keynes, J.M. 1973d (1936). *The General Theory of Employment, Interest, and Money*, in: J.M. Keynes, *The Collected Writings*, London, Macmillan Press, vol. VII
- Keynes, J.M. 1973e (1937a). The general theory of employment, *The Quarterly Journal of Economics*, in: J.M. Keynes, *The Collected Writings*, London, Macmillan Press, vol. XIV, 109-123.
- Keynes, J.M. 1973f (1937b) Alternative theories of the rate of interest, *The Economic Journal*, in: J.M. Keynes, *The Collected Writings*, London, Macmillan Press, vol. XIV, 201-215.
- Keynes, J.M. 1973g (1937c). The 'ex ante' theory of the rate of interest, *The Economic Journal*, in: J.M. Keynes, *The Collected Writings*, London, Macmillan Press, vol. XIV, 215-223
- Kregel, J. 1980 Markets and institutions as features of a capitalistic production system, *Journal of Post Keynesian Economics*, vol. 3, 32-48.
- Lavoie, M. 1992. *Foundations of Post Keynesian Economic Analysis*, E.Elgar, Aldeshot.
- Lavoie, M. 2006. Endogenous money: accommodationist, in Arestis, P. and Sawyer, M. (eds.) *A Handbook of Alternative Monetary Economics*, Cheltenham, Edward Elgar.
- Minsky H. 1975. *John Maynard Keynes*, Columbia University Press.
- Minsky, H. 1980. Money, financial markets and the coherence of a market economy, *Journal of Post Keynesian Economics*, vol. 3, 21-31
- Minsky H. 1982. *Can 'It' Happen Again? Essays on Instability and Finance*, M.E.Sharpe, New York.
- Minsky, H. 1986. Money and crisis in Schumpeter and Keynes, in: Wagener, H. and Drukker, J. (eds.), *The Economic Law of Motion of Modern Society*, Cambridge, Cambridge University press
- Minsky, H. 1993. Schumpeter and finance, in: Biasco, S., Roncaglia, A. and Salvati, M. (eds.): *Markets and Institutions in Economic Development*, London, Macmillan Press
- Mishkin, F. 1999. International experiences with different monetary policy regimes, *NBER Working Paper*, n. 7044, March.
- Morishima, M. 1992. *Capital and Credit. A New Formulation of General Equilibrium Theory*, Cambridge, Cambridge University Press
- Nishiyama, Y. 2007. Monetary transmission- federal funds rate and CD rates, *Journal of Post Keynesian Economics*, spring, vol. 29, 3, pp. 409-426.
- Rogers, C. 1997. Post Keynesian monetary theory and the principle of effective demand, in: Cohen, A., Hagemann, H. and Smithin, J. (eds.) *Money, financial Institutions and Macroeconomics*, Dordrecht, Kluwer Academic Publishers.
- Romer, D. 2000. Keynesian macroeconomics without the LM curve, *Journal of Economic Perspectives*, 14, pp.149-169.
- Schumpeter, J. 1912 (1934) *The Theory of Economic Development*, Harvard University Press, Cambridge, Mass.
- Schumpeter, J. 1939 (1939). *Business Cycle. A Theoretical, Historical and Statistical Analysis of the Capitalist Process*, abridged edition, New York, McGraw Hill.
- Smithin, J. 2003. *Controversies in Monetary Economics: Revised Edition*, Cheltenham, Edward Elgar.

-
- Smithin, J. 2009. *Money, Enterprise and Income Distribution: Towards a Macroeconomic Theory of Capitalism*, Routledge, London & New York.
- Tily, G. 2007. *Keynes's General Theory, the Rate of Interest and 'Keynesian' Economics*, Houndmills, Palgrave Macmillan.
- Tobin, J. 1980. *Asset Accumulation an Economic Activity*, Oxford, Basic Blackwell.
- Vercelli, A. 1997. Keynes, Schumpeter and beyond, in: Harcourt, G. and Riach, P. (eds.): A 'Second Edition' of *The General Theory*, vol. 2, London, Routledge.
- Wicksell, K. 1898. The influence of the rate of interest on commodity prices, in: Wicksell, K. *Selected Papers on Economic Activity*, Augustus M. Kelley Publishers, New York, 1969.
- Wolfson, M. 1996. A post Keynesian theory of credit rationing, *Journal of Post Keynesian Economics*, 18, 443-470.
- Woodford, M. 2003. *Interest and Prices*, Princeton University Press, Princeton.
- Wray, R. 2006. When are interest rates exogenous? in: Setterfield, M. (ed.): *Complexity, Endogenous Money and Macroeconomic Theory*, Cheltenham, Edward Elgar.