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# Some observations about the endogenous money theory.

*Giancarlo Bertocco*

## Introduction

The endogenous money theory constitutes the core element of the post-keynesian monetary theory. The first formulation of this theory can be found in the works of Kaldor published in the 1970s. Taking these studies as a starting point, the post-keynesians elaborated two versions of the endogenous money theory which differ in their assumptions about the behaviour of the monetary authorities and the banking system, and hence offer different conclusions about the slope of the money supply curve.

The aim of this paper is to evaluate the importance of the endogenous money theory using a criterion which can be defined on the basis of Keynes's 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 the presence of fiat money radically changes the nature of exchange and the characteristics of the production process. Keynes (1933a, p. 410) notes 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). The specification of the elements determining the non-neutrality of money is thus the key factor differentiating Keynes's theory from the classical one.<sup>1</sup>

The criterion used to evaluate the significance of the endogenous money theory is whether it enables us to elaborate on and to broaden the explanation of the justification the non-neutrality of money formulated by Keynes. In *The General Theory* the reasons for the non-

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<sup>1</sup> "Neither underemployment equilibrium nor policy effectiveness are sufficient to make an argument Keynesian. The salient contention that makes a thesis Keynesian is that the behaviour and structure of financial (and money) markets and of product (and labor) markets are integral to the determination of the path of the economy through time, i. e. an essential aspect of the economy being modelled is that monetary variables are integrated into the relations that enter into the model of the economy, which determines aggregate demand as well as relative prices and outputs." (Minsky, 1996, p. 73)

neutrality of money are grounded in the store of wealth function of money; the liquidity preference theory is the element on which the Keynesian explanation of income fluctuation is based. The importance of the money endogeneity theory can therefore be assessed in relation to its ability to specify determinant factors for the non-neutrality of money that have not been highlighted by the liquidity preference theory; in other words, the significance of the endogenous money theory depends on its capacity to bring out elements of a *monetary economy* that have been overlooked in the liquidity preference theory.

This paper presents the following results. First of all, it shows that the endogenous money theory makes it possible to extend the analysis of the factors accounting for the non-neutrality of money beyond what Keynes has done in *The General Theory*; in particular this paper argues that the theory of money endogeneity obtains this result by underlying the means of payment function of money. Second, the work shows that the money endogeneity theory gives credence to certain points developed by Keynes in some works published in 1933 and between 1937 and 1939. Third, the work emphasises that the novel aspects of the money endogeneity theory do not depend on the particular version of this theory, i.e. they do not depend on the slope of the credit supply curve. Finally, in the paper the most significant aspects of the money endogeneity theory are presented by means of a theoretical model that distinguishes clearly between the credit market and the money market. It is shown that an important element of the money endogeneity theory is that it elaborates an alternative credit theory to the neoclassical one.

The paper is divided into three parts. In the first one, the most relevant aspects of the money endogeneity theory are presented starting from Kaldor's work, and we bring out the consistency between that theory and the considerations formulated by Keynes in some writings which preceded and followed the publication of *The General Theory*. In the second part the two versions of the money endogeneity theory are analysed and it is noted that the debate between the supporters of these two versions risks overshadowing the innovative aspects of the money endogeneity theory that do not depend on the slope of the credit and money supply curves. Then in the third part, the aspects that distinguish a *monetary economy* from a *real-exchange economy* and that emerge because of the money endogeneity theory are described.

## 1. The endogenous money theory

### *1.1 Kaldor, the Post-Keynesians and Keynes.*

The most important aspects of the endogenous money theory are presented starting with the works of Kaldor.<sup>2</sup> He intended the endogenous money theory to be an instrument for resisting the spread of the monetarist counter-revolution. Friedman and the monetarists set out to reaffirm the validity of the quantitative theory of money, that is of a 'vision' of the working of the economic system based on three propositions. The first affirms that in the long term the levels of income, wealth and employment are independent of the quantity of money. The second proposition concerns the short-term effects of the quantity of money. Friedman claims that in the short-term, variations in the quantity of money have real effects due to unexpected inflation. This does not mean that the monetarists recognise the advisability of assigning the task of stabilizing the economy in the short-term to the monetary authorities, through the use of discretionary policies. On the contrary, they maintain, and this is the content of the third proposition, that the monetary authorities must not adopt any discretionary policy. Friedman justifies this conclusion by pointing out that: a) the monetary authorities do not know exactly what the natural employment rate is and therefore they have no reference point for intervening; b) even if they did, they shouldn't adopt a discretionary policy as they do not know precisely the delays with which the short-term real effects of monetary policy are manifested.

Friedman identifies an empirical criterion, namely the analysis of the relation between quantity of money and nominal income level, in order to falsify Keynesian or monetarist theory; the presence of a direct relation between these two variables would be consistent with the quantitative theory, and it would falsify the Keynesian one. The empirical evidence gathered by Friedman (Friedman, Schwartz, 1963; 1982) shows the existence, for a period of over 100 years in the United States and Great Britain, of a close relation between the quantity of money and nominal income.

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<sup>2</sup> Kaldor's analysis triggered an outpouring of comments and studies; see for example: Rousseas (1986); Arestis (1988); Moore (1988); Nell and Semmler (1991); Carvalho (1993); Lavoie (1992); Cottrell (1994); Musella and Panico (1993; 1995); Davidson (1994; 2002); Hewitson (1995); Howells (1995); Deleplace and Nell (1996); Dow (1997); Harcourt and Riach (1997); Rotheim (1998); Wray (1990, 1998, 2002); Rochon (1999; 2003); Fontana (2000; 2003); Smithin (2000); Bertocco (2001); Dalziel (2001); Rochon and Vernengo (2001); Palley (2002).

Kaldor formulates a twofold response to the monetarist conclusions. While the first seeks to demonstrate the inconsistency of the empirical proof gathered by Friedman (Kaldor 1980; 1982), the second is theoretical in nature and aims to render Keynes's theory consistent with the presence of a close relation between money and income. Kaldor recognises that the presence of a close relation between the quantity of money and income, and therefore of a constant speed of circulation, constituted important evidence against the validity of the liquidity preference theory; if the Keynesian theory was valid, there should be an unstable relation between quantity of money and income level as, according to the liquidity preference theory, the effects of a variation of the quantity of money are absorbed especially by alterations in its speed of circulation. His reply to monetarists is therefore based on two points: a) the liquidity preference theory is not an important element of Keynes's theory; b) the causal relation between the quantity of money and income goes in the opposition direction to that maintained by the monetarists. (Kaldor 1982, 1985; Kaldor and Trevithick 1981)

He underlines that the monetarist theory is valid only in the presence of three conditions: a) money supply and demand are independent variables and the supply of money is an exogenous variable; b) the variations in the supply of money, given the money demand, cause a corresponding variation in the aggregate demand; c) total production is independent of the aggregate demand, hence variations in expenditures will influence the price level (Kaldor and Trevithick 1981, p. 2; Kaldor 1982, p. 23). Kaldor asserts that these conditions exist only in a system in which a commodity money was used:

“... the original propositions of the quantity theory of money [must be] applied to situations in which money consisted of commodities, such as gold or silver, where the *total quantity in existence* could be regarded as exogenously given at any one time as a heritage of the past; and where sudden and unexpected increases in supply could occur (such as those following the Spanish conquest of Mexico) the absorption of which necessitated a fall in the value of the money commodity relative to other commodities” (Kaldor 1985, p. 7)

Kaldor asserts that the conditions on which the quantity theory is based are lacking in a world in which a fiat money such as bank money is used. In such a world, money is created by banks to meet the public's demand for liquidity, so an excess of money supply cannot occur:

“However, the same reasoning cannot be applied to cases where money was not a commodity like gold or silver, but a piece of paper (bank notes) or simply a bookkeeping entry in the accounts of banks. The rules relevant to the creation of credit money are not of the same kind as those relevant to the production of gold or silver. Credit money comes into existence, not as a result of mining but of the granting of bank credit to borrowers, who uses it... to finance expenditures...

This means that in *the sense required* by monetarist theory, an excess in the supply of money cannot come into existence.” (Kaldor 1985, pp. 7-8)

Kaldor stresses that the theory of endogenous money applies to a world that uses a fiat money consisting of bank money created by means of a credit contract through which the banks finance the expenditure decisions of some economic agents. The credit phenomenon therefore constitutes the core element of the endogeneity theory elaborated by Kaldor and the post-keynesians. As Palley notes (2002, p.154): “...the post-Keynesian innovation is not the distinction between exogenous and endogenous money, but rather the construction of endogenous money in terms of bank lending.” There are, in fact, versions of the endogenous money theories that have been elaborated without any reference to bank money and the phenomenon of credit. These versions can be formulated taking the model IS-LM as a reference point. The presence of an LM curve having a positive slope with respect to the interest rate determines a certain level of endogeneity of the quantity of money available for financing the transactions that might increase as a result of the rise in the demand for money triggered by a hike in the aggregate demand. Moreover, in the IS-LM model, the endogeneity of money could be explained by the decision of the central bank to fix as an intermediate objective a certain interest rate level and to create all the money that the public demands at that rate of interest.

The endogeneity theory developed by Kaldor and the post-keynesians applies to a world having a developed financial system in which banks are not simply intermediaries who merely lend legal tender obtained from depositors, but they are agents whose liabilities are used as a means of payment; this enables the banks to finance expenditure decisions of particular economic agents by creating new money.<sup>3</sup> Therefore we can observe that the first element characterising Kaldor’s and the post-keynesian’s theory is the assertion that the spread of a fiat money constituted of bank money radically changes the structure of the economic system; such change renders the quantity theory of money inapplicable and requires the elaboration of a new theory capable of explaining the process of bank money creation and its role.

This thesis coincides with what Keynes maintains in two 1933 works and in some works published between 1937 and 1939. In these writings Keynes maintains that the diffusion of

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<sup>3</sup> Chick (1986) described the various phases of the banking system development process and described the conditions that allowed banks to create money; see also: Hicks 1969; 1989; Kindleberger 1984; Moore 1996; Dow 1997.

fiat money radically changes the structure of the economy; he states that the use of a fiat money alters the characteristics of the production process and the nature of transactions with respect to a *real-exchange economy* (for a more in-depth analysis see: Bertocco 2005). In order to underline the fact that the use of a fiat money alters the law of production Keynes (1933b) uses the distinction introduced by Marx between the sequence: commodity-money-commodity that characterises a *real-exchange economy*, and the sequence: money-commodity-money that instead marks a *monetary economy*: the objective of an entrepreneur is not to produce goods, but to make a profit in monetary terms, i.e. a monetary return which is higher than the costs. Keynes gives two reasons why the presence of a fiat money influences the laws of production of an entrepreneur economy. The first is that an entrepreneur must have at his disposal a sufficient quantity of money to purchase the factors of production. (Keynes 1933b, p. 82) The second reason is that an entrepreneur economy is subject to fluctuations of effective demand, which prevents entrepreneurs from using the decision criterion defined on the basis of the classical theory. Keynes (1933b, p. 85) states that these fluctuations are made possible by fiat money: ‘the fluctuations of effective demand can be properly described as a *monetary* phenomenon.’

The other important structural change linked with the employment of fiat money regards the nature of the exchanges; Keynes affirms that the circulation of a fiat money changes the nature of the transactions with respect to a *real-exchange economy*:

“The distinction which is normally made between a barter economy and a monetary economy depends upon the employment of money as a convenient means of effecting exchanges – as an instrument of great convenience, but transitory and neutral in its effect. It is regarded as a mere link between cloth and wheat, or between the day’s labour spent on building the canoe and the day’s labour spent in harvesting the crop. *It is not supposed to affect the essential nature of the transaction from being, in the minds of those making it, one between real things, or to modify the motives and decisions of the parties to it.* Money, that is to say, is employed, but is treated as being in some sense *neutral*.”(Keynes 1933a, p. 408)

The modification of the nature of the exchanges can be explained by considering the characteristics of the fiat money creation mechanism. Fiat money is not a commodity that is produced through labour, hence it cannot be produced by just any individual by means of his work, as instead is the case for any given commodity. The production of fiat money is the prerogative of particular economic agents; in modern economies whose workings Keynes sought to explain, these agents are the banks. By creating new money within the credit market, the banks finance the spending decisions of operators who undertake to pay back the amount obtained at a future given date. The employment of a fiat money such as bank money

alters the nature of the exchanges compared with a *real-exchange economy* since the necessary condition to buy goods is not the availability of the goods, but the availability of money. When a fiat money like bank money is used it is not necessary to own goods in order to obtain money; rather, it is necessary to meet the criteria set by the banks for granting loans. In a world in which fiat money is used, you need to have money in order to purchase goods, but you don't need to have goods in order to get money.

Once bank money has been brought into the analysis, it becomes important to specify which agents are financed by the banks. Kaldor and the post-keynesians identify these agents as the firms that get into debt with the banks to finance their investment decisions; they observe that the presence of bank money is a necessary condition to be able to justify the particular causal relation between investment and saving that is a feature of the Keynesian theory of income. The inversion of the relation between investment and savings with respect to the tenets of the neoclassical theory makes it necessary to explain how the firms acquire the purchasing power necessary to finance the desired investments. The response of Kaldor and the post-keynesians is to assert that investments are financed by the bank money created by banks:

“The proposition that the volume of savings in an economy varies with the level of activity and employment ... is fundamental to an understanding of the Keynesian system... In Keynesians terms ... the elasticity of bank credit made it possible to increase the volume of productive investment and thereby generate the additional savings necessary to finance that investments. Without such facilities, new ventures, however promising, would be bound to lie fallow for lack of cash, and the savings to finance such ventures (their ultimate ‘funding’) would never come into existence since they only arise as a result of the additional incomes (mainly the additional profits) generated by the additional expenditure.”(Kaldor and Trevithick, 1981, pp. 8-10; see also: Trevithick, 1994; Chick 1986, 1997, 2000; Dalziel, 1996, 2001, Lavoie, 1992)

This reply is consistent with what Keynes has maintained in various works published between 1937 and 1939. In these studies, Keynes responds to the criticism of the *General Theory*, and in particular to the critical comments of Ohlin about the keynesian interest rate theory. Ohlin sets against the keynesian theory a version of the loanable funds theory according to which the interest rate is determined by the credit demand flow which depends on the *ex-ante* investments, and on the credit supply which depends on the *ex-ante* savings. Keynes (1937c, p.216) considered the concept of *ex-ante* investment important because it brings out the fact that firms who intend to carry out an investment project must obtain the necessary liquidity. While on the one hand Ohlin's criticism induces Keynes to pay more attention to the issue of investment decision financing, on the other hand he rejects the proposition that investments are financed by *ex-ante* savings. Keynes criticised Ohlin

asserting that the liquidity supply that allows the firms to realise their investment decisions cannot come from saving decisions as they depend on investment decisions, but that they depend on the bank decisions :

[T]he transition from a lower to a higher scale of activity involves an increased demand for liquid resources which cannot be met without a rise in the rate of interest, unless the banks are ready to lend more cash or the rest of the public to release more cash at the existing rate of interest. If there is no change in the liquidity position, the public can save *ex ante* and *ex post* and *ex* anything else until they are blue in the face, without alleviating the problem in the least.... This means that, in general, 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 purpose 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. This is the most fundamental of my conclusions within this field. (Keynes, 1937c, p. 222)

So a close link emerges between Kaldor's approach and that followed by Keynes in different works which preceded and followed the *General Theory*. It is a different approach from the one used in *General Theory* in which the store of wealth function of money and the concept of money demand are highlighted.

### *1.2 Endogenous money theory and liquidity preference theory: a preliminary analysis.*

The monetary theory developed in the *General Theory* is founded on the specification of the factors that induce wealth owners to demand money. Keynes states that the classical theory does not provide an adequate justification for the importance of the store of wealth function of money because this function has no significance in the world without uncertainty described in the classical theory; only the presence of uncertainty justifies the store of wealth function of money. The specification of the concept of speculative demand for money influences the definition of the money creation mechanism that is identified with the open market operation. With these operations, as is written in all macroeconomic textbooks, the monetary authorities vary the quantity of money by buying or selling bonds; the money authorities can vary the quantity of money only by creating the conditions that lead the public to change the composition of its wealth. In *The General Theory* Keynes completely overlooks the money creation process carried out by the banks to finance firms' investment decisions. The discrepancy between the analysis developed in *The General Theory* and that contained in the works of Kaldor or Keynes cited in the previous paragraph, leads us to verify whether the liquidity preference theory can be reconciled with the process of financing investment

decisions. For this purpose, we consider two solutions to the problem. The first solution was proposed by Keynes; the second was proposed by Kaldor.

The solution put forward by Keynes is contained in his reply to Ohlin in which he tackled the problem of financing of spending decisions and acknowledged that he hadn't dealt with the issue of investment financing in *The General Theory*. Keynes filled this gap by specifying a further motive for demanding money: the 'finance motive'. Keynes (1938, p. 229) defines finance as 'the *cash* temporarily held by entrepreneurs to provide against the outgoings in respect of an impending new activity.' Keynes (1938, p. 230) distinguishes two components of money demand: "the inactive demand due to the state of confidence and expectation on the part of the owners of wealth, and the active demand due to the level of activity established by the decisions of the entrepreneurs."

Keynes's solution allows him to reply to Ohlin's criticisms without substantially altering the framework of *The General Theory*. This solution has some limitations. It overlooks the differences between the demand for liquidity on the part of firms that need to finance investments and the demand for liquidity on the part of wealth owners. The former involves the demand for liquidity from agents who do not have money and who incur debt to carry out a planned investment; the theory of liquidity preference described in *The General Theory* instead describes the factors which influence agents' choices regarding the composition of their wealth. The second limitation of Keynes's analysis concerns the specification of the temporal dimension of finance. Keynes argued that the demand for money justified by the ex-ante investment of firms is manifested only in the interval of time which separates the moment in which the firm obtains the necessary cash to carry out the ex-ante investment, and the moment in which the firm makes the investment by spending the liquidity obtained. Hence, the investment financing phenomenon disappears the moment firms use the money received from banks to buy investment goods. This framework overlooks the fact that when the firm uses the money received from banks, the debt with the banks still exists; moreover, it is not specified which agents will accumulate the new money created by banks. Keynes's specification of the finance motive seems not fully to describe the characteristics of a world in which bank money is used. In a world in which banks finance companies by granting them lines of credit, which firms use when they make the investment, the 'finance motive' is no longer relevant inasmuch as the decision to make an investment does not trigger any increase

in the demand for money before the investment is made.<sup>4</sup> In this type of economy, even if the finance motive were not present we would still need to investigate the relation between the bank and the firm, as the latter is able to make the investment only because of its indebtedness to the bank.

The third shortcoming concerns the conclusion that the ‘finance motive’ is manifested only when there is an increasing investment flow. Keynes (1937c) maintains that when firms acquire the desired investment goods, they release the liquidity received into the system; this liquidity may be used again to meet the demand from other firms that want to make new investments. Thus the demand for money generated by the finance motive is manifested only when there is an increasing investment flow. Keynes does not explain how the firms planning to buy new investment goods manage to obtain the money which has already been spent by firms that have bought investment goods. Moreover, if we note that in each period we have a saving flow which is equal to that of investment, and if we assume that at least a part of savings is used by agents to increase their money stock, then we must conclude that it is not possible that a constant investment flow is financed through a constant money stock in each period.

Kaldor’s solution is much different; it consists of abandoning the liquidity preference theory altogether. Kaldor (1982, p.21) states that the liquidity preference theory does not constitute a real break with the quantity theory of money as the specification of the speculative motive does not prevent Keynes from making the same mistake found in the quantitative theory. That is to say, considering money as an exogenous variable whose fluctuations, determined by the monetary authorities, influence the interest rate level. According to Kaldor, this analysis cannot be applied to a world in which bank money is used because in this case the variation of money supply does not precede spending decisions, but it is determined by these decisions; the liquidity preference theory thus becomes wholly irrelevant:

“... ‘liquidity preference’ was regarded as the essential factor that distinguished Keynesian from pre-Keynesian theories, since it loosened the tie between the level of effective demand and the level of expenditure as determined by monetary factors. All this, however, depended on the assumption of the quantity of money being determined irrespective of all other factors that determined the demand for goods and services. If we regard money as an endogenous factor, liquidity preference and the assumption of interest-elasticity of the demand for money cease to be of any importance.” (Kaldor 1985, p. 9)

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<sup>4</sup> See: Graziani (1984), Lavoie (1986), Bibow (1995) and Chick (1997). This point was also made by Keynes himself (1937c, p. 223).

The limit of Kaldor's solution is that it describes the process of bank money creation using exclusively the concepts of money demand and supply. These concepts are not ambiguous when used to describe the liquidity preference theory, but they become so when bank money is introduced. In a world where money is created by banks to finance firms' investment decisions, two distinct meanings must be attributed to the money demand function: on the one hand, in keeping with the liquidity preference theory, it should specify the factors that induce wealth owners to accumulate bank money, and on the other, this function should specify the factors that cause firms to get into debt with banks. When Kaldor criticises the liquidity preference theory, he attributes this second meaning to the money demand function; in so doing, however, he overlooks the fact that the money created by the banks to finance firms represents an asset that shall be accumulated by wealth owners, thus also the first meaning of the money demand function retains its relevance in a world where bank money is used. Therefore, a money demand function capable of describing both the wealth owners choices and firms' decisions to get into debt should be specified; a solution that presents many difficulties borne out by the limits concerning Keynes's 'finance motive' and Kaldor's decision not to consider the behaviour of wealth owners.

One solution which would make it possible to overcome these limits would be to specify two distinct markets: the money market and the credit market.<sup>5</sup> In order to specify a credit market separate from the money market it is convenient to adopt Tobin's (1982) distinction between capital account and income account. The capital account describes all the assets and the liabilities of the economy's sectors (households, firms, the public sector, financial intermediaries), and a capital account theory analyses the factors which determine the supply of and demand for different assets. The capital account is therefore composed of stock variables; the money market is a component of the capital account. The income account, on the other hand, describes income flows, and a theory of the income account analyses the factors which determine its level and use. The credit market and the income account are necessarily connected because the demand for credit is determined by the investment decisions of firms. The specification of the credit market allows us to emphasize that banks create money through a debt contract by which they finance the spending decisions of agents who do not have purchasing power. The credit demand function reflects the behaviour of

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<sup>5</sup> Many post Keynesians have underscored the utility of differentiating between the money market and the credit market; see for example: Dow (1997); Wray (1998, 2002); Lavoie (1996, 1999); Arestis and Howells (1996, 1999); Goodhart (1991); Rochon (1999).

firms; the firms which intend to carry out investment projects need to obtain liquidity; this demand for liquidity can be considered as a demand for credit since it is expressed by actors who: (a) do not have liquidity; and (b) who, when they obtain the cash, undertake to pay it back at a fixed future date. By specifying the credit demand function, we distinguish the firms' demand for liquidity to finance investment decisions from the demand for bank money which instead reflects the portfolio decisions of wealth owners. As for the credit supply function, the main conclusion which emerges from Keynes's analysis is that the supply of credit does not depend on saving decisions but depends on the decisions taken by banks and that it is independent of the savings flow.

There is a link between the flow variables that characterise the credit market and the stock variables that make up the money market; this link can be defined by distinguishing between two phases in the money creation process. In the first one banks finance firms by creating new money. Banks and firms are the main actors of this phase. The investments financed by the banks determine an increase in income according to what defined by the Keynesian income theory.<sup>6</sup> In the second phase, wealth owners step in; the new money created by banks is added to the existing money and the saving flow generated by investment decisions increases the public's wealth. The second phase is the one in which the conditions are created for the wealth owners to accept to hold the money created by the banks; it is in fact by no means certain that the rise in wealth corresponding to the new savings flow leads the wealth owners to increase their demand for money to a level such that the new money created by the banks is absorbed.

The specification of these two phases of the money production process is coherent with the distinction between 'finance' and 'funding' defined by Keynes. As is well known, Keynes (1937c p. 217; 1939) introduces this distinction when he criticises the mainstream theory of capital formation and elaborates an alternative theory which specifies two phases. In the first phase, firms get money necessary to carry out investments, while in the second one firms choose the liability structure they deem satisfactory by replacing short-term debts with long-term debts which are more consistent with the structure of their future incomes. In the second phase the portfolio choices of wealth owners and of firms come into play.

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<sup>6</sup> Dalziel (1996, 2001) describes the different phases of the income multiplication process which arises out of the expansion in the demand for investment goods financed by the creation of new bank money. The demand for investment goods and consumption goods are financed in different ways: the first is financed by new money created by the banks while the second is financed by income received by workers; this point was underlined also by Minsky 1980.

In conclusion, we can state that to describe the process of bank money creation it is necessary to elaborate a theoretical model specifying a credit market which is separated from the money market; a model that describes the behaviour of the central bank, of the banking system, of firms and wealth owners. The features of this model shall be described in the second part of the paper in which the two versions of the endogenous theory elaborated by the post Keynesians are analysed.

## **2. The debate between horizontalists and structuralists.**

### *2.1 Kaldor, the horizontalist version and the structuralist version.*

The post-keynesians have formulated two versions of the endogeneity theory; the first one can be defined as accommodationist or horizontalist, and the second as structuralist. These two versions differ in their assumptions about the behaviour of the central bank and banks. (See for example: Pollin 1991; Palley 1996, 2002; Fontana 2003, 2004).

The characteristics of the horizontalist and structuralist approaches shall be described taking as a reference the model elaborated by Palley (1996) and taken up again by Fontana (2003). This model has two characteristics. In the first place, it distinguishes between money and credit and determines the amount of money constituted by bank deposits, as a function of the amount of credit; the relation between these two variables is defined by the banks' budget constraint on which basis: "... is derived the level of ... deposits associated with any given level of bank lending. This captures the fundamental Post Keynesian claim that loans create deposits." (Palley 1996, p. 588). The second important aspect is the fact that the model considers only the credit market; no money demand function is specified. In other words, the model does not specify the factors that induce wealth owners to accumulate the deposits created by banks to meet the credit demand from firms.

The model highlights two fundamental features of the horizontalist approach. The first is the presence of a credit supply function that is perfectly elastic in correspondence with the rate on loans fixed by banks by applying a markup over the official discount rate exogenously set by the monetary authority. The second feature regards the behaviour of the monetary authority; it is assumed that, once the target value of the official discount rate is fixed, the monetary authority is willing to create all the money base demanded by banks in order to build up the required reserves. The horizontalist approach can be described by the following system of equations:

- 1)  $r_l = (1 + m)r_f^*$
- 2)  $L = L(r_l)$
- 3)  $L + R = D$
- 4)  $R = q_k D$
- 5)  $R = BM$

Equation 1) defines the rate on loans  $r_l$  as a function of the official discount rate  $r_b^*$  exogenously set by the monetary authority. Equation 2) determines the amount of credit demanded by firms  $L$  as a function of the interest rate fixed by the banks; it is assumed that the banks fully meet the demand for credit expressed by firms. Equation 3) expresses the budget constraint of the banks and determines the amount of bank deposits  $D$  as a function of bank loans, while equation 4) determines the amount of the reserve requirements  $R$  as a function of the amount of deposits. Finally, equation 5) determines the amount of monetary base which must be created by the monetary authorities to allow the banks to create the required reserves. The model determines the five unknowns:  $r_l$ ;  $L$ ;  $D$ ;  $R$ ;  $BM$ , and assumes that wealth owners are always willing to accumulate all the money created by banks in correspondence with the credit granted. The assumptions about the behaviour of the monetary authorities and the banks leads us to conclude that banks are able to adjust the supply of credit to the demand that firms express in correspondence with the rate fixed by the banks.

The structuralist version instead, states that because of the non accommodating behaviour of the monetary authority or of the banks, the supply of credit is an increasing function of the interest rate. This result may be obtained in two ways. First, it can be assumed that the monetary authority is not prepared to meet the banks' demand for monetary base at an unchanged rate, but that it decides to increase the value of the official discount rate as the amount of the monetary base demanded by the banks rises. We can take this hypothesis into account by adding a new equation to the model:

$$6) r_f = f(BM); \quad f' > 0$$

The official discount rate is no longer an exogenous variable, but a direct function of the amount of the monetary base demanded by the banks; in this case an expansion of the credit demand from firms shall lead to an increase in the official discount rate and therefore of the loans rate applied by the banks; the expansion of credit supplied by banks shall therefore be accompanied by an increase in the loans rate. Secondly, it can be assumed that it is the banks

that do not behave in an accommodating manner; we can assume, for example, with reference to the concept of borrower's risk used by Keynes (see for example: Minsky 1975, 1982; Dow 1996, 1997), that the banks are willing to satisfy the higher demand for credit by firms only in return for increasing rates. We can take this hypothesis into account by assuming that the mark-up applied by the banks is an increasing function of the credit supplied and therefore we can write the following equation in place of 6):

$$6.1) m = g(L); \quad g' > 0$$

Also in this case the expansion of the credit supply shall be accompanied by an increase in the loan rate.

We can evaluate the importance of this debate by considering the criticism that the supporters of one version level against the other one. Lavoie, one of the most well-known supporters of the horizontalist version, claims that the presence of the credit supply curve with a positive slope with respect to the interest rate eliminates all new elements contained in the endogenous money theory and renders perfectly valid those propositions of the neoclassical theory that are re-proposed in the IS-LM model:

“It is obvious that the IS/LM model remains intact when endogenous money with an upward-sloping curve is introduced in the model. Whether the money supply is fully exogenous, or whether the money supply is endogenous but its curve of an upward-sloping shape makes no difference whatsoever. This sort of money endogeneity offers nothing new to differentiate neoclassical from post-Keynesian economics. In particular, the main result of the IS/LM model still holds: an increase in the level of output, following a shift of the investment schedule, *necessarily* leads to an increase in the rate of interest... If the link between the interest rate and the level of output is not broken, some of the standard beliefs imbedded in the neoclassical paradigm are recovered: an increase in investment leads to an increase in the rate of interest as the loanable funds theory would predict. We are back to the neoclassical world of scarcity, with crowding out effects and like.” (Lavoie 1996, pp. 276-7)

The supporters of the structuralist version instead accuse the horizontalist version to have neglected the liquidity preference theory. For example, Dow maintains that the liquidity preference theory constitutes the central nucleus of the Keynesian monetary theory and that this is coherent with the structuralist version but incompatible with the horizontalist version. Dow asserts that in order to show the influence of the liquidity preference theory on the interest rate, the credit supply function must be independent of the demand function:

“The essentials of Keynes's monetary theory revolve around the concept of liquidity preference. As long as the supply of credit is not fully demand-determined, that is, as long as supply is independent of demand to any extent, then Keynes's monetary theory retains its

essentials. Liquidity preference changes with changes in interest rate expectations and with changes in confidence in predictions of interest rate changes. An increase in liquidity preference puts upward pressure on interest rates, which in turn puts downward pressure on output and employment, as long as the money supply is constrained to some degree. Keynes put this theory in starkest focus by talking in terms of a given supply of money. But it would apply as long as the money supply function had an upward slope with respect to the interest rate; it only loses force as the function approaches the horizontal position of the modern endogenous money theorist.” (Dow 1997, pp. 64-65)

It is my view that the importance of this debate should be reconsidered because the novel elements contained in the endogenous money theory do not depend on the slope of the credit supply curve. In the first part an aspect shared by the analysis of endogeneity carried out by Kaldor and the theory of Keynes was pointed out, namely the claim that the use of fiat money as bank money radically changes the structure of the economic system with respect to a *real-exchange economy*. The argument put forward in this paper is that these considerations have important implications for the specification of the characteristics of a monetary economy and therefore for the definition of the factors determining the non-neutrality of money; implications that are independent of the slope of the credit supply curve with respect to the interest rate. Before analysing these implications, I propose a comment on the Lavoie’s and Dow’s thesis.

Lavoie believes that the presence of a credit supply curve having a positive slope with respect to the interest rate re-introduces the conclusions of the neoclassical theory according to which the credit supply is conditioned by saving decisions. The logic of Keynes and Kaldor is completely different and I believe that it has not been called into question by the slope of the credit supply curve. The object of credit is still constituted by the money created by banks, even if it is assumed that an increase in credit demand from firms to finance a higher investments flow might lead the banks to raise the interest rate. Keynes is very explicit in acknowledging that the presence of a direct relation between investment decisions and the interest rate does not rehabilitate the classical interest theory and credit theory:

“When decisions are made which will lead to an increase in activity, the effect is first felt in the demand for more cash for ‘finance’.... The fact that *any* increase in employment tends to increase the demand for liquid resources, and hence, if other factors are kept unchanged, raises the rate of interest, has always played an important part in my theory. ... But there is nothing in that to rehabilitate the theory that the rate of interest is fixed by the interaction of the supply of

*saving* with the demand for investment as determined by the marginal efficiency of capital.” (Keynes, 1938, pp. 230–231)<sup>7</sup>

As far as Dow’s criticism is concerned, I believe that the endogenous money theory, in both the horizontalist and structuralist versions, inevitably weakens the argument that the rate of interest depends on the preference for liquidity. This thesis is illustrated in the following section using a model that presents the endogeneity theory by differentiating clearly between the credit market and the money market.

## *2.2 Money, credit and the liquidity preference theory.*

In the first part of the paper mention was made of the reasons why it was useful to specify the money endogeneity theory by distinguishing between the money market and the credit market. Also Dow stresses the need to separate these markets: “The key is to separate the two sides of the banks’ balance sheet. The finance motive demand for money is shown as a demand for credit in the credit market while the preference to hold assets in liquid form (liquidity preference) is shown in the money market.” (Dow 1997, p. 72)

The credit market describes the bank-firm relation; let us introduce the typical assumption of the horizontalist version according to which banks set the interest rate on loans  $r_1$  by applying a markup on the official discount rate exogenously set by the monetary authority. We can represent the credit market and the goods market using the following equations:

$$1) r_1 = (1+q)r_1^*$$

$$2) I = I(\pi_f^e, r_1)$$

$$3) \Delta L = I$$

$$4) Y = Y(I, G, s)$$

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<sup>7</sup> We note, however, that Lavoie acknowledges that it is possible to have a positively-sloped credit supply curve with respect to the interest rate in the case in which the central bank’s behaviour is not accommodating: “Rather than making use of a set of vertical supply curves, horizontalists would capture this upward-sloping curve by positing the existence of a set of *horizontal* supply curves. In the specific case where the central bank is leaning against the wind, there will be a set of temporally-ordered horizontal lines which, *when money demand is taken into consideration*, will constitute a positively-sloped money supply curve. *The upward-sloping curve is thus a special case, based on a particular feedback rule, of the more general horizontal depiction.*” (Lavoie 1996, p. 280)

Equation (1) defines the rate on loans  $r_l$  as a function of the official discount rate  $r_f^*$  set by the monetary authorities. Firms determine the desired amount of investment spending  $I$  according to their expectations of profits ( $\pi_f^e$ ) and the loan rate. We assume that once the interest rate on loans has been set, the banks meet firms' demand for credit to finance the desired investments (eq. 3). Equation (4) determines the level of income  $Y$  as a function of investment, public spending  $G$ , and the propensity to save  $s$ . This first block of four equations determine  $r_l$ ,  $I$ ,  $\Delta L$  and  $Y$ . The level of investment spending depends on the decisions of the monetary authorities and of the banks which determine interest rates and the supply of credit.

The specification of the money market allows us to define under which conditions the wealth owners are willing to accumulate the money created by the banks:

$$5) \Delta D = \Delta R + \Delta L$$

$$6) \Delta R = q_k \Delta D$$

$$7) \Delta R = \Delta BM$$

$$8) M = M_{t-1} + \Delta D$$

$$9) M = f(W; r_D; r_b)$$

$$10) W = W_{t-1} + S(Y)$$

Equation 5) determines the deposit flow  $\Delta D$  on the base of the banks' budget constraint.  $\Delta R$  represents the amount of the required reserves (eq. 6); equation 7) determines the monetary base flow  $\Delta BM$  created by the monetary authorities to meet the demand from banks. Equation 8) determines the stock of money that corresponds to the stock existing at the beginning of the period  $M_{t-1}$  to which is added the flow of deposits created in the current period. Equation 9) describes the money demand function that depends on the stock of wealth  $W$ , the rate on deposits  $r_D$  which is assumed given, and the rate on bonds  $r_b$ . Finally, equation 10) determines the value of the stock of wealth as a sum of the stock existing at the beginning of the period  $W_{t-1}$  and the saving flow  $S(Y)$  that is registered in the course of the period.<sup>8</sup> The equations 5-10 determine the unknowns:  $\Delta D$ ,  $\Delta R$ ,  $\Delta BM$ ,  $r_b$ ,  $M$ ,  $W$ .

This model has two important features. Firstly, as opposed to Palley's model described in the previous paragraph, this model specifies the money demand function. This makes it possible to describe the two phases of the money creation process to which reference was

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<sup>8</sup> This model does not specify the interest flows and envisages a small number of assets and liability; for a more detailed model see: Godley (1999).

made in the first part of the paper: in the first phase banks finance investment decisions of firms by creating new money, while in the second phase the conditions that drive wealth owners to absorb the quantity of money created by the banks is specified. Secondly, the model shows that the acceptance of the hypotheses regarding the credit supply function that characterises the horizontalist version does not necessarily imply, contrary to what Dow claims, the cancellation of the effects of the preference for liquidity on the interest rate structure. As a matter of fact, equations 5), 6) and 8) determine the money stock as a function of the credit granted by banks: the money supply is thus an independent variable with respect to the money demand represented by equation 9) that, given the money stock, determines the level of the bond rate  $r_b$  as a function of the liquidity preference of wealth owners. (See: Lavoie 1996; Arestis and Howells 1996; Howells 1995). The model shows in fact, that the presence of a credit supply curve perfectly elastic in correspondence of the rate on loans fixed by banks, does not imply the presence of a money supply curve perfectly elastic; so it is incorrect to maintain that the presence of a supply of credit fully demand-determined is incompatible with the liquidity preference theory.

In this version of the model the propensity for liquidity influences the rate on bonds but it has no effect on firms' investment decisions that depend only on the rate on loans fixed by banks by applying a mark-up to the base rate determined by the central bank. Dow assumes instead that the central bank fixes the official discount rate level as a function of the bond rate;<sup>9</sup> this allows Dow to consider the liquidity preference theory as the essential element of the keynesian monetary theory. According to this interpretation, the endogenous money theory instead has a secondary role in that it only makes it possible to define the correct meaning of the assumption of the exogeneity of money used by Keynes: the money supply depends on decisions of the monetary authority and the banking system and it is therefore endogenous to the banks and exogenous to the private sector:

“... Keynes was very conscious that the money supply is not exogenous in the sense of helicopter money; it only changes as part of a larger process. For the money supply to be regarded as exogenous to the private sector, there must be a belief in the capacity of the monetary authorities to control it....it is clear that Keynes saw the money supply as being determined by the authorities in conjunction with the banking system.”(Dow 1997, pp. 63-64)

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<sup>9</sup> “In Keynes' day it would be the rate on borrowed reserves which had the most direct influence on the base rate; now the rate will also reflect rates in wholesale markets, which the authorities also seek to influence through the short-term securities market.... There is a direct feedback to the credit market through the wholesale rate, since the latter enters into the determination of the base rate, which in turn influences the supply of credit.” Dow (1997, p. 74)

I think that Dow's interpretation has two limits. The first one concerns the conclusions about the determination of the interest rates. Following the approach of *The General Theory*, she asserts that the interest rate that influences firms' investment decisions is conditioned by the portfolio choices of wealth owners, and tends to minimize the capacity of the monetary authorities to influence the interest rate level independently of the public's propensity for liquidity.<sup>10</sup> This proposition can be justified if you consider a financial structure such as the one described in *The General Theory*, constituted by the money market and the bond market which includes all the assets other than money. The endogenous money theory prompts us to consider a different financial structure characterised in particular by the presence of the credit market within which money is created; the presence of this market allows us to highlight an element that enhances the ability of the monetary authorities to control the interest rates. In a world where bank money is used, the monetary authorities 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. This affirmation is coherent with the decisions made in recent years by the monetary authorities of the industrialised countries. They have abandoned the control of monetary aggregates and instead target short-term interest rates.<sup>11</sup>

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<sup>10</sup> Dow asserts that even if the monetary authority set a target value of the interest rate, they would not be able to maintain it without taking account of the public's portfolio choices: "Suppose Keynes had chosen instead to assume a given interest rate rather than a given money supply. Would this have implied an unlimited willingness on the part of the banks and the monetary authorities to meet the increased demand for liquidity? Clearly, from the statement that the public do not determine the money supply, Keynes would not have taken that view. What would make more sense in relation to Keynes's view of the banking system is that the jointly determined interest rate would not necessarily stay constant, but would be increased in response to the increase in liquidity preference..." (Dow 1997, pp. 64-65)

<sup>11</sup> The Bank of England (1999, p. 4), for example, describes its behaviour as follows: "A central bank derives the power to determine a specific rate in the wholesale money markets from the fact that it is the monopoly supplier of 'high-powered' money, which is also known as 'base money'. The operating procedure of the Bank of England is similar to that of many other central banks... The key point is that the Bank chooses the price at which it will lend high-powered money to private sector institutions... A change in the official rate is immediately transmitted to other short-term sterling wholesale money-markets rates, both to money-market instruments of different maturity... and to other short-term rates, such as interbank deposits... long-term interest rates are influenced by an average of current and expected future short-term rates, so the outcome depends upon the direction and the extent of the impact of the official rate change on expectations of the future path of interest rates." Romer (2000) proposes to rewrite the IS-LM model, eliminating the LM curve. For a description of the

We can maintain that the fact that the monetary authorities can set the short-term interest rate at any level desired, even at a rate close to zero, affects households' liquidity preference and the long-term interest rates and makes it more difficult to assume that unemployment can be attributed to the effects of liquidity preference on long-term interest rates.

Dow asserts that liquidity preference affects what we have defined in our model, as the bond rate. This is the case described in our model which assumes that the monetary authorities are not able to control the bond rate  $r_b$  whose value, given the money supply determined as a function of the credit supplied by the banks, depends on the liquidity preference of the public. But this is not the only possibility; the conclusion of our model depends on the banks' particular budget constraint pursuant to which the money supply is determined unequivocally as a function of the credit supply from banks. It can be shown that in the presence of different assumptions about the banks' budget constraint, the monetary authorities are able to control also  $r_b$ . We can imagine different situations in which banks' deposits and banks' loans do not coincide. We can assume, for example, that banks issue two types of liabilities: deposits and certificates of deposit CD; alternatively, we can hypothesize that banks store up two assets: loans L and bonds B. In these cases the budget constraint of the banks would become:

a)  $D + CD = L + R$

or:

b)  $D = L + B + R$

or in the case in which both hypotheses are introduced:

c)  $D + CD = L + B + R$ <sup>12</sup>

In these case we can show that banks can vary deposits and loans independently of each other, and that the monetary authorities can control also the rate on bonds  $r_b$ . These results can be illustrated by modifying the model described in the previous pages. Let us substitute equation 5) with equation 5.1) which describes the new budget constraint of the banks expressed in terms of flow:

5.1)  $\Delta D + \Delta CD = \Delta R + \Delta L$

Banks issue two types of liabilities: deposits  $\Delta D$  and certificates of deposit  $\Delta CD$ . Let us suppose that the CD are considered perfect substitutes for government bonds by wealth

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strategies of the contemporary monetary authorities see Leiderman and Svensson (1995), Mishkin (1999), Meltzer (2001).

<sup>12</sup> We can associate these different budget constraints with different states in the evolution of the banking system; on this point see: Chick (1986); Dow (1997); De Carvalho (1997).

owners. The banks' assets are made up of loans and reserves which are proportional to deposits (eq. 6). In this case, banks can vary the credit supply and deposit supply independently, and the monetary authorities can fix the official base rate  $r_f$  and also a target value of the rate on bonds  $r_b$  according to equation 6.1):

$$6.1) r_b = r_f(1 + n) \quad n > 0$$

In order to obtain this result the monetary authorities have to create the monetary base required to fulfil the wealth owners' demand for money. The money stock demanded by wealth owners is determined by equation 9); equation 10) determines the value of the stock of wealth. Given the amount of the money stock, it is possible to determine the flow of new deposits which must be created by the banks to meet the money demand expressed by wealth owners; this flow is determined by equation 8):

$$8) \Delta D = M - M_{t-1}$$

Given  $\Delta D$ , equation 6) determines the flow of the reserves and equation 7) the flow of monetary base that must be created by the central bank to allow banks to meet the reserve requirement. Finally equation 5.1) determines the flow of CD which the banks must create to meet their budgetary constraints. Through the creation of CD the banks are able to satisfy, on the one hand, the demand for money by the wealth owners and, on the other, firms' demand for credit. In other words, the possibility of altering the flow of CD allows the banks to vary the deposits and loans independently of each other. Let us consider, for example, an equilibrium situation with an official rate of interest  $r_f^*$ , a bond rate  $r_b^*$ , a loan rate  $r_l^*$ , a flow of investments  $I^*$  and of income  $Y^*$ . At these rates let us suppose that wealth owners demand a flow of money equal to  $\Delta D^*$ , and that the monetary authorities create a monetary base flow equal to  $\Delta BM^*$ . Equation 5.1) determines the value  $\Delta CD^*$  which allows the banks' budgetary constraint to be met. Let us assume that the public's preference for liquidity changes: given the same level of income  $Y^*$ , the public now desires to hold a greater quantity of money. In this case the banks can satisfy the public's demand by creating deposits and correspondingly reducing their CD; a new equilibrium will be reached in which the credit flow  $\Delta L^*$  will remain unchanged, while there will be an increase in the flow of money. This example shows how the structure of interest rates may be controlled by the monetary authorities independently of the propensity for liquidity.

The second limitation of Dow's analysis is the claim that the specification of the money creation process that takes place in the credit market does not substantially add anything new to what was specified by the liquidity preference theory about the characteristics of a *monetary economy*, since the concept of liquidity preference continues to represent the core

nucleus of Keynes's theory. This thesis, at first glance, seem corroborated by the structure of the model described in the previous paragraph. This model, which specifies two distinct markets, the money market and the credit market, does not seem very different from the IS-LM model. In both models two conditions hold: a) investment decisions depend on an interest rate controlled by monetary authorities; b) it is assumed that firms always obtain the financing required to realize the desired investments. The thesis advanced in this paper is that the endogenous money theory enables us to highlight aspects of the non-neutrality of money that do not emerge from a theoretical scheme based solely on the liquidity preference concept; elements that are coherent with Keynes's arguments mentioned in the first part. The last part deals with the description of these features.

### **3. The money endogeneity theory and the characteristics of a monetary economy.**

The specification of the money creation mechanism that occurs in the credit market allows us to identify four elements that characterize a monetary economy which do not depend on the slope of the credit supply curve with respect to the interest rate. In the first place, as we recalled in the previous pages, the specification of the credit market allows us to complete the keynesian theory that, inverting the causal relation between saving and investment with respect to the classical theory, leaves the problem of specifying how investment decisions are financed unresolved. The specification of the credit market makes it possible to state that investment decisions are financed through the creation of new money. Moreover, we can observe that the specification of the credit and debt linkages involving firms, banks and wealth owners allows us to criticise the thesis that downward wage and price flexibility would guarantee that the full employment equilibrium could be reached. Many keynesian economists have emphasised that a reduction of the price level causes a transfer of resources from debtors to creditors and increases the risk of bankruptcy for firms (see, for example, Tobin, 1980; Minsky, 1980, 1982; Palley, 2002; Stiglitz, 2002).

The other three elements characterizing a monetary economy concern: a) the relation between money and uncertainty; b) the monetary nature of capital, profits and interest rates; c) the social role of banks. These elements will be analyzed in the following sections.

### 3.1 *The relation between money and uncertainty.*

The money endogeneity theory allow us to justify the importance given to the phenomenon of uncertainty in Keynes analysis. As is widely known, Keynes (1937a) states that the basic difference between his own theory and the classical one is the hypothesis introduced about the way expectations regarding future results of economic decisions are specified. The classical theory assumes that it is possible to objectively represent these results by using tools of financial mathematics and probability theory. In contrast, Keynes assumes that there are no objective methods that allow the future results of investment decisions to be represented; these decisions are taken in conditions of uncertainty. In *The General Theory* the presence of uncertainty is the necessary condition for attributing importance to the store of wealth function of money and for defining the interest rate as: ‘... the premium which has to be offered to induce people to hold wealth in some form other than hoarded money.’ (Keynes 1937a, p. 116). This definition of the interest rate allows Keynes to state that the economic system is subject to strong fluctuations caused by the instability of investments. In fact, Keynes (1937a, p. 119) states that, in the presence of uncertainty, the liquidity preference curve assumes such features in terms of stability and interest rate elasticity that it causes investment fluctuations to generate strong income variations. In conclusion, in *The General Theory* uncertainty is an exogenous factor whose presence does not depend on the existence of money.

The money endogeneity theory which underlines the role of bank money and of the credit market allow us to invert the relation between money and uncertainty and show that the employment of bank money is the necessary condition enabling us to highlight the importance of the uncertainty element. The causal sequence that links bank money and uncertainty is based on two points. The first one is the relation between bank money and investment decisions. As we have seen in the first part, Keynes asserts that the diffusion of fiat money radically changes the structure of the economic system. Keynes states, as we have recalled, that the diffusion of bank money alters the nature of the exchanges. When fiat money as bank money is used, it is not necessary to own goods in order to obtain money, but it is necessary to satisfy the banks’ criteria in granting credit. The agents who obtain money are the firms that seek liquidity in order to realise their investment decisions. The second point of the sequence that links bank money and uncertainty is the relation between investment decisions and uncertainty. Keynes underlines this relation when he accuses the classical theory of being able to describe just an economy without uncertainty based on consumption decisions, and of not being able to explain the workings of an economy in which investment

decisions have a substantial bearing. Keynes associates the presence of uncertainty to the existence of a high proportion of investment decisions:

“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).

Perhaps the most effective way to illustrate the relation between investment decisions and uncertainty is in the use of the concept of innovation that is at the centre of Schumpeter’s analysis. As is well known, Schumpeter 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 investment decisions as the tool through which innovations are introduced; so the Keynesian entrepreneur who takes the investment decisions coincides with the Schumpeterian entrepreneur who introduces innovations.<sup>13</sup> This point is emphasized by Davidson (2000) who describes the differences between mainstream and Keynesian theory by distinguishing between *ergodic systems* (or immutable-reality models) and *non-ergodic systems* (or transmutable-reality systems). With the first term, Davidson refers to economic systems that replicate themselves unchangingly, or that are subject to alterations predictable in probabilistic terms. With the second term, Davidson refers to systems characterised by a process of continuous transformation triggered by investment decisions; he declares that the presence of the Schumpeterian entrepreneur is a necessary element of a *non-ergodic system*:

“If entrepreneurs have any important function in the real world, it is to make crucial decisions. Entrepreneurship ... by its very nature, involves cruciality. To restrict entrepreneurship to robot decision-making through ergodic calculations in a stochastic world... ignores the role of the Schumpeterian entrepreneur – the creator of technological revolutions bringing about future changes that are often inconceivable to the innovative entrepreneur. Entrepreneurs do not merely discover the future, they create it... Probability models are a beguiling representation of decision-

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<sup>13</sup> 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 (2006).

making only in a world where only routine decisions are made... these models cannot explain the essential creative function of entrepreneurial behaviour in a Keynes-Schumpeter world where the reality is transmutable.” (Davidson, 2000, p. 113)

Investment decisions do not consist merely of adding to the existing stock of capital goods new units of capital goods identical to the existing ones, but we can consider them as the tool through which firms launch new products on the market, or modify the productive process through which the existing goods are realized, or even open new markets. The introduction of innovations determines the continuous evolution that characterises a monetary economy, a process which prevents us from considering the past and present as a base on which to formulate forecasts in probabilistic terms about the future results of economic decisions; in such a system the firms and wealth owners act in conditions of uncertainty.<sup>14</sup>

Thus, we can conclude that the presence of a fiat money constituted by 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. In conclusion, 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 The monetary nature of capital, profits and of interest rates.*

In the first part, we observed that the point that Keynes has in common with the post-keynesians such as Kaldor who subscribe to the endogenous money theory, is in deeming that the circulation of bank money has profoundly altered the structure of the economic system. In a monetary economy banks are not simply intermediaries who transfer the saved resources to firms, but rather they finance firms by creating new money; as Schumpeter points out (1934, pp. 73-74) the phenomenon that characterises the credit market of a monetary economy:

“...is the creation of purchasing power by banks. The form it takes is immaterial. ... It is always a question, not of transforming purchasing power which already exists in someone’s possession, but of the creation of new purchasing power out of nothing... The banker, therefore, is not so much primarily a middleman in the commodity ‘purchasing power’ as a *producer* of this commodity... He makes possible the carrying out of new combinations, authorises people, in the name of society as it were, to form them.”

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<sup>14</sup> It can be observed that when Schumpeter describes the behaviour of the innovator-entrepreneur, the views he expresses are similar to those of Keynes on the impossibility of predicting the future effects of economic decisions on the basis of observations on the past. (see: Schumpeter 1912, pp. 84-85).

This conception of the credit market on which the endogenous money theory is founded, and which Keynes and Schumpeter share, has an important consequence that regards the definition of variables such as: capital, profit and interest. These variables have a very different meaning in a monetary economy than in a *real-exchange economy*. A theoretical framework that underlines the principle of the neutrality of money and that holds that the credit market coincides with the goods market tends to define these variables in real terms, that is as variables whose nature is independent of the presence of fiat money. The capital is therefore defined as a stock of goods employed as a means of production, the profits are expressions of the productivity of capital goods, while the interest corresponds to compensation for saving.

The endogenous money theory, instead, leads us to consider these variables as monetary variables, i.e. variables whose nature can be explained only starting with the presence of bank money. Schumpeter (1912, p. 123) affirms that the definition of capital as a set of goods used as means of production cannot be applied to a capitalist system because it is a definition that can be adapted to any economic system. Schumpeter's definition reflects the importance that he assigns to bank money in the development process; in fact, he identifies capital with the purchasing power made available to entrepreneurs so that they can carry out their innovations: "We shall define capital... as that sum of means of payments which is available at any moment for transference to entrepreneurs." (Schumpeter, 1912, p. 122) Also Keynes (1939) highlights the monetary nature of capital by criticising the traditional theory which considers capital as a stock of means of production generated by the accumulation of saving flows. Keynes's critique is based on the considerations contained in the reply to Ohlin: the source that finances firms' investments is not savings, i.e. the supply of resources not consumed by savers, but the money created by banks. The endogenous money theory shows the important intuition of Keynes and Schumpeter about the monetary nature of capital and therefore highlights the role of credit and bank money in the process of change that characterises a capitalist economy.

The specification of the monetary nature of capital has an important consequence regarding the definition of the monetary nature of profits which cannot be considered as an expression of the productivity of capital, but as a variable whose nature can be explained only by the presence of a fiat money. Schumpeter (1939, p. 80) affirms that profits cannot be considered as the result of the productivity of a particular productive factor; he (Schumpeter 1912, p.154) considers profits as a phenomenon present only in a monetary economy in

which innovations, financed by money created by the banks, attribute to the entrepreneurs a monopolistic power that allows them to get a monetary surplus over costs. He (Schumpeter 1912, p. 128) defines profits: "... as a surplus over costs. From the standpoint of the entrepreneur, it is the difference between receipts and outlays in a business..”

While Schumpeter defines the monetary nature of profits by emphasizing the process of change in a capitalist economy, for his part, Keynes only defines the monetary nature of profits after having stressed that the presence of a fiat money constitutes the essential characteristic of an economy in which Say’s Law does not apply, and the level of income is subject to fluctuations that depend on oscillations in aggregate demand. Keynes, as we recalled in the first part, states that these fluctuations are made possible by the presence of a fiat money, and he asserts that the fluctuations in the aggregate demand triggered by the presence of a fiat money alters the law of production followed by firms. The law defined by the classical theory according to which a firm takes on a new worker on condition that his marginal productivity is higher than his marginal cost does not hold, because firms are not sure that they will be able to sell everything they produce; Keynes underlines that the aim of an entrepreneur is not to produce goods, but to obtain a profit in monetary terms.<sup>15</sup>

Finally, the money endogeneity theory leads us to highlight the monetary nature of the interest rate. The arguments put forward by Schumpeter and Keynes can also be used to describe this point. Schumpeter derives the monetary nature of interest rate from the monetary nature of capital. He criticises the theories that consider the interest rate as a reward for abstinence from consumption or as the compensation for a production factor (Schumpeter, 1912, p. 183; Schumpeter, 1939, p. 100), and emphasises (Schumpeter 1912, p. 195) that the transaction that generates interest is not the exchange of goods between savers and firms, but the exchange of money taking place on the credit market between banks and firms. Schumpeter (1939, p. 101) criticises the distinction introduced by Wicksell between the monetary interest which is fixed by banks, and the natural interest rate which corresponds to the rate that would arise on the credit market if capital goods were directly traded. In

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<sup>15</sup> “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, p. 82)

criticising Wicksell, Schumpeter reiterates that the circulation of a fiat money constituted by bank money changes the structure of the economic system compared with a pure exchange economy. Hence, it is not possible to consider the economy without bank money as the point of arrival towards which converges, in the long term, an economy in constant evolution owing to the innovations introduced by means of the investment decisions financed through the creation of new money. Keynes's analysis too leads us to not consider as valid the distinction made by Wicksell between the monetary interest which is fixed by banks, and the natural interest which corresponds to the rate that would arise on the credit market if capital goods were directly traded. Indeed, when introducing the distinction between *real-exchange economy* and *monetary economy*, Keynes (1933a, p. 410) states that it is not possible to apply to a *monetary economy* the laws that hold for a *real-exchange economy*. The concept of a natural rate of interest can be applied in a world in which the object of credit is real goods but not in a world in which the object of credit is bank money.

### 3.3 *The social role of banks.*

The theory of money endogeneity leads us to define the role of banks in a completely different way from the neoclassical theory. According to this theory, the function of banks is simply to facilitate the transfer of resources from savers to firms, thus overcoming the imperfections which are present in the real world and absent in a theoretical world without frictions in which savers directly finance firms. A substantially similar view emerges from the analysis of the New Keynesians (NKs) according to which the existence of banks is justified by the presence of asymmetric information that hinders the direct financing of firms by savers (For a critical analysis of this approach see: Bertocco, 2004). The NKs maintain that the credit market works like Akerlof's used car market. Akerlof (1970) observed that the presence of asymmetric information stimulates the creation of institutions whose aim is to reduce information costs; in particular, Akerlof drew attention to the activity of merchants who specialise in evaluating the quality of goods. The banks play the same role in the capital market as the merchants play in Akerlof's used car market. The function of banks is to acquire information, thereby eliminating the problems connected with the presence of asymmetric information.

The NK's analysis of the role of banks does not coincide with that emerging from the theory of money endogeneity; this is due to the fact that this theory underlines that the credit market has different characteristics from the market described by the neoclassical theory. The money endogeneity theory maintains that the object of the credit is not constituted by the

savings but by the money created by banks; in the previous pages we have seen that the specification of the process of money creation that takes place in the credit market enables us to highlight the dimension of uncertainty. These considerations influence also the specification of role of the banks. The credit market analysed earlier in this paper has different characteristics from Akerlof's used car market: it is one thing to assess the quality of used cars, quite another thing to evaluate the future returns of an investment project for the manufacture, for example, of a new type of car. In the presence of uncertainty there are no objective criteria that allow the future returns of investment projects to be evaluated; even the banks act in conditions of uncertainty. They evaluate the applications for financing presented by firms on the basis of subjective, discretionary criteria; therefore the banks share with the entrepreneurs the responsibility of deciding which investments are carried out; by their decisions they influence the development of the economic system.

If we consider the Keynesian income theory, we can note that the role of banks clearly emerges when it is specified that the presence of bank money is important in explaining the inversion of the investment-saving relationship with respect to what the classical theory holds, and when it is emphasised the relevance of uncertainty in an economic system in which investment decisions assume significant dimensions. Moreover, the function of banks emerges when the consequences of the decisions of banks on the evolution process of the capitalist system are considered; this evolution process is generated by investment decisions financed via creation of bank money. This point is effectively emphasised by Morishima (1992, p. 20):

“...the vision that the financial sectors play a crucial role in the economy is common between Schumpeter and Keynes. It then follows that the path the economy will trace out depends on the attitudes of the financial organizations. It is obvious that the capital goods accumulated when they support, say, the electronics industry would be completely different from those accumulated when they support the ship buildings industry. In the long run the economy will turn out to be of a greatly different kind according to which of these options is taken.”

Morishima's statement could seem coherent with the analysis of the NK's. The supporters of this approach also acknowledge that banks take on the responsibility of selecting the investment projects that the firms intend to carry out, and they further recognise that the banks' choices are different from those that the savers would have made if they themselves had directly financed the firms. We should add, however, that the New Keynesians' approach leads to the conclusion that the banks make the same choices that the savers would make if they had the same information as the banks. In general, this thesis would be correct if it were

assumed that the credit market worked in the same way as Akerlof's used car market; if banks were actually able to obtain the same information possessed by the debtors, the condition of perfect information would be created under which the creditors would directly finance the debtors and the intermediaries would have no *raison d'être*. If we assume that it is possible to acquire information to assess the quality of an investment project in the same way in which we gather the information necessary for evaluating the quality of a used car, then we could conclude that the banks allocate savings among firms by making the same decisions that savers would make if they had access to the same information.

This conclusion is not coherent with the money endogeneity theory. In fact this approach states that the credit market is based on the relation between banks and firms; banks cannot make the same decisions that savers would make as the object of the credit is the money that banks create. Moreover, we must observe that banks act in conditions of uncertainty; in a world characterised by the presence of uncertainty it is not possible to assert that bank decisions reproduce the results that characterise the ideal world, without imperfections, in which savers directly finance firms; in the world described by the money endogeneity theory, by creating new money, the banks finance investment decisions through which the firms introduce their innovations. They are crucial decisions, which alter the structure of the economic system and whose results cannot be predicted in probabilistic terms.

We can highlight the differences between the two views by stating that the money endogeneity theory underlines the 'social role' of banks. We can underline this function by citing Schumpeter (1912) who notes that they have the same function as the central planning authority in a socialist economy. In a socialist economy the means of production are publicly owned and so it is the planning authority that decides how to use the available productive factors. When such authority decides to produce a new good, it orders a certain quantity of productive factors from a given sector to be collected and used in the new activity. In a capitalist economy in which the means of production are privately owned the role of the planning authority is carried out by the banks which offer the entrepreneur innovators the purchasing power enabling them to use the productive factors, diverting them away from the uses to which they were previously destined. Moreover, Schumpeter underlines the social role of the banks by noting that in a capitalist economy the principle of the consumers' sovereignty in accordance to which the tastes and the preferences of the consumers drive the decisions of production of the enterprises, is not valid. The specification of the role of the credit in the process of realization of innovations allows us to conclude that the consumers'

choices are conditioned by the decisions of the entrepreneurs and of the banks; Schumpeter (1939, p. 47) illustrates very effectively this point:

“Railroads have not emerged because any consumers took the initiative in displaying an effective demand for their service in preference to the services of mail coaches. Nor did the consumers display any such initiative wish to have electronic lamps or rayon stocking, or to travel by motorcar or airplane, or to listen to radios, or to chew gum. The great majority of changes in commodities consumed has been forced by producers on consumers who, more often than not, have resisted the change and have had to be educated up by elaborate psychotechnics of advertising.”

The evolution of the production system is conditioned by the innovations introduced by entrepreneurs and not by the desires of consumers (Schumpeter 1912, p. 65). We can therefore conclude that the money endogeneity theory attributes to the banks a very different role to the one defined by the neo-classical theory; a role whose characteristics do not seem to depend on the slope of the credit supply curve with respect to the interest rate.

## **Conclusions**

This paper sets out to evaluate the significance and relevance of the endogenous money theory. It has been shown that the money endogeneity theory highlights the money creation process that takes place in the credit market; a phenomenon which is completely overlooked by the keynesian monetary theory based on the liquidity preference theory. And it has been noted that the money endogeneity theory allows us to highlight elements that justify the non-neutrality of money and that do not emerge when just the liquidity preference theory on its own is considered.

In the first part of the paper it is shown that the endogenous money theory elaborated by Kaldor to criticise the monetarist theory represents an important point in common with Keynes's analysis as developed in works which precede and follow *The General Theory*. In these works Keynes maintains that the circulation of a fiat money constituted by bank money radically changes the structure of the economy; it changes the nature of the exchanges and the law of production making it impossible to apply to a monetary economy the classical theory which is apt to describe a *real-exchange economy*.

In the second part, the money endogeneity theory has been presented by means of a theoretical model that distinguishes clearly between the money market and the credit market; in this way it is possible to describe the two phases of the money creation process by giving

prominence to the bank-firm relation and the portfolio choices of wealth owners. This model allowed us to analyse the debate between horizontalists and structuralists, reaching two conclusions: a) the horizontalists' critique according to which the presence of a credit supply having a positive slope with respect to the interest rate reintroduces the conclusions of the neoclassical theory, is not valid. The Kaldor's and Keynes's conclusions about the nature of the credit market in a world in which a bank money is used, are very different from those specified by the neoclassical theory, and are independent from the slope of the credit supply curve ; b) the endogeneity theory, independently of the slope of the credit supply curve, weakens the thesis that the interest rate level is determined by the liquidity preference. Finally, in the third part, the characteristics of a monetary economy on which the money endogeneity theory sheds light are described; these characteristics are independent from the slope of the credit supply curve.

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