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The Validity of Keynes' Preference for Liquidity Principle in the Endogenous Money Supply Thesis among Post-Keynesians

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Abstract

This article seeks to redefine the place and role of Keynes' principle of preference for liquidity in the post-Keynesian theoretical system. To do this, it is a question of demonstrating the compatibility, often called into question, of the principle of preference for liquidity with that of effective demand and, consequently, with the post-Keynesian thesis of endogenous money. It turns out that this compatibility is possible, but at the cost of some revisions of Keynes' "General Theory", in particular, the generalization of the principle of preference for liquidity to all economic agents. Furthermore, we show the importance of the principle of preference for liquidity in explaining not only financial and economic fluctuations, but also their different amplitudes.

Keywords

Liquidity Preference, Endogenous Money, Post-Keynesian, Effective Demand

1. Introduction

The endogenous money thesis supported by post-Keynesians[1] is based on the idea that the supply of money is constrained by the demand for money. This thesis fits perfectly into the logic of the principle of "effective demand" of Keynes (1936). However, Keynes in his *General Theory* resorts to another principle based on the hypothesis considering the supply of money to be exogenous, that is to say that the quantity of money is fixed by the "monetary authority" independently of the demand for money, and the interest rate makes it possible to

[1]The post-Keynesian school is a school of thought born after Keynes and which is characterized by an attachment to Keynes' ideas. It is also an extension of Keynes' ideas.

balance the supply and demand of money: this is the principle of preference for liquidity. By considering Keynes' work as an inseparable whole, we are then forced to admit certain conceptual and functional inconsistencies. Indeed, if the principle of preference for liquidity is justified in the context of the market where the analysis in terms of stock is fundamental, the principle of effective demand, on the other hand, is part of a circuit framework in which the flow dimension of money is privileged. Thus, the continuity between these two principles in the same dynamic theoretical framework raises coordination problems. The problem posed by this article is therefore conceptual.

The interest of this article comes from the fact that it seeks to redefine the place and role of Keynes' concept of preference for liquidity in the post-Keynesian theoretical system. The ambiguity of this concept, in relation to the thesis of the endogenous money supply, often leads to its abandonment among post-Keynesians. However, Keynes's preference for liquidity is a crucial concept, in particular, in the understanding and justification of certain financial and economic crises. In this article, the aim will be to show, using a mathematical model of a fictitious economy, how the simulated level of preference for the liquidity of households, businesses or banks has an impact, at different degrees, economic growth. Also, we will demonstrate, from the generalization of the principle of preference for liquidity to all agents, the compatibility of it, often called into question, with the principle of *effective demand* and, consequently, with the post-Keynesian thesis of endogenous money.

The structure of this article is as follows: section 2 will pose the problem of the coherence between the principle of preference for liquidity and the thesis of endogenous money, section 3 will focus on the divergences within the post-Keynesian current on the nature of money, then, the principle of preference for liquidity will be generalized and tested from an SFC model with endogenous money (section 4), finally, section 5 will conclude this work.

2. Keynes' Preference for Liquidity and the Post-Keynesian Thesis of Endogenous Money: The Position of the Problem

With the rediscovery of Keynes's essential articles from 1936 as well as the publication in the 1970s of the *Collected Writings* (*CW*), in particular volumes XIII, XIV and especially in 1978 volume XXIX containing the drafts of the *General Theory*, knowledge of Keynes' work is renewed. Certain ambiguities can then be resolved. Despite Keynes's project of a "monetary economy of production" (Keynes, 1978, *CW*, vol. 14, pp. 410-411), his theory of money is sometimes contradictory and insufficient in his own words: "Speaking, with the preference for liquidity, of interest rate theory is, in fact, doing it too much honor (…). I am content to state the facts, significant theories on the subject are yet to come" (Keynes, 1936: p. 215). Indeed, money plays a complex and ambiguous role in Keynes' system. The latter develops in the *General Theory* two theories which appear largely contradictory. Firstly, it adopts the approach of an endogenous

currency to production with the principle of effective demand, refusing any constraint on financing in particular by *ex-ante savings* or loanable funds. This approach is forcefully affirmed in the 1936 articles through the production financing motive (EMP) where the flow dimension of money is privileged. Secondly, in 1936 he developed for the total demand for money, the principle of preference for liquidity which, meeting a supply of money then considered as exogenous, determines *ex-post,* on the money market, the interest rate. The stock dimension of money is then essential through portfolio arbitrage.

The problem of coherence between the flow and stock dimensions of money, that is to say between the approaches based on the financing motive and the preference for liquidity, cannot be hidden here. Should we favor the "Keynes of the 1936 articles" and retain *ex-ante* the demand and supply of endogenous money in the context of financing *effective demand*? But then what would be the theory for the *ex-ante* interest rate? A question that Keynes himself explicitly asked in 1936 (Keynes, 1936: pp. 663-699). Should we on the contrary retain *ex-post* an exogenous money supply and an endogenous interest rate, as in the IS-LM model? The principle of preference for liquidity appears, as such, to be inconsistent with the initial desire to endogenize money within the framework of an EMP. Here we will focus on the different trends within the post-Keynesian current on the nature of money.

3. Internal Divergences within the Post-Keynesian Current on the Status of Money

With his theory of preference for liquidity and his financing motive, Keynes then makes the choice of an endogenous demand for money and an exogenous supply of money, the interest rate is then an equilibrium variable on the money market, since, as he suggests, his theory of income had made it possible to "leave the interest rate in the air" (Keynes, 1936). But the desire to integrate money through its financing function raises the question of a possible monetary constraint, that is to say an insufficient financing of the economy, a refusal by the banks to finance the *demand anticipated* by entrepreneurs, which leads to the question of the endogenization of the money supply. Indeed, Keynes in the *General Theory* considered the money supply as exogenous, without giving more details on the behavior of private banks or "monetary authorities".

The post-Keynesians who thought a lot after 1975 about this question do not all give the same answer. We have, in fact, identified three major trends within the post-Keynesian current: the *strict horizontalist tendency, the structuralist* tendency, and a third tendency which we have described as "*flexible*" *horizontalist*.

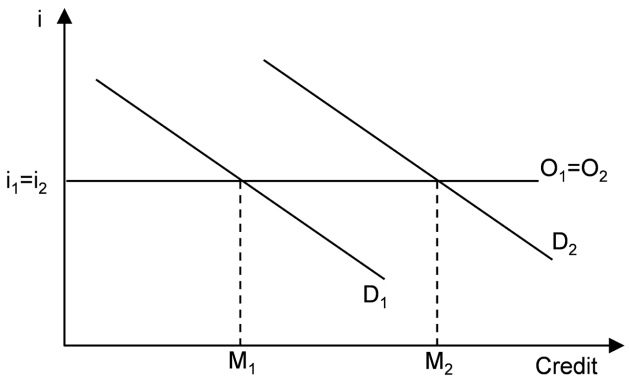
3.1. The *Strict Horizontalist Approach*: A Special Case of Endogenous Money

The *strict horizontalist approach* considers that the money supply is completely

endogenous and that banks are completely accommodative. This approach rejects Keynes' idea according to which the interest rate would be determined on the money market (Boyer, 2003) after comparing supply—exogenous—and demand—the preference for liquidity. Proponents of this approach favor the *flow dimension* of money, without giving details on its stock dimension.

Indeed, this approach does not integrate the Keynesian concept of preference for liquidity, that is to say it ignores questions linked to the liquidity constraint, the money supply *always being* equal to the demand for money (solvent demand). Consequently, "whether the elasticity of demand for money is high or low, the elasticity of supply of money, for a given interest rate, is infinite" (Kaldor, 1981: p. 106). Certainly, the *strict horizontalist analysis* (or the Kaldor-Moore model) is interested in the banking system, but it reveals a certain passivity of it as can be reflected in the writing of Marc Lavoie: "We can say that, under normal conditions, commercial banks are ready to grant all loans, and Central Banks all reserves or advances requested at the existing interest rate (…). Loans make deposits and deposits make reserves. The money supply is endogenous to the interest rate set by the Central Bank or the banking system. It can be represented by a horizontal curve at the given interest rate" (Lavoie, 1985: p. 71) (**Figure 1**).

By refusing to address aspects of the behavior of different agents, the Kaldor-Moore model ended up making "the discussion of the financing motive and more generally the preference for liquidity" (Le Heron, 2008: pp. 23-24). However, "without a preference for liquidity, we find monetarist black boxes" (Wray, 1995: p. 279). In reality, this approach errs on the side of horizontalism, and there are at least two relevant criticisms that can be made of the latter: "on the one hand, the restrictive policy is not studied outside of limit situations major crisis and, on the other hand, credit rationing (i.e. the comparison of the effective demand of entrepreneurs and the point of view of the banks) is omitted. However, these two elements must fully be part of a possible theory of endogenous money if we want it not to be interpreted as a particular case of a more general theory (…)" (Ülgen, 1995: p. 45).



Source: Lavoie, 1996.

Figure 1. Endogenous money supply.

3.2. The *Structuralist* Approach: A Dual Status of Money

Structuralist approach refuses to reduce the post-Keynesian theory of money to the idea of a totally endogenous currency: "… as far as I know, there has never been anything in post-Keynesian monetary theory which requires a system of total accommodation" (Davidson, 1989: p. 489). Thus, the money supply can be, under certain conditions, both exogenous and endogenous. Indeed, there can be both a good dose of endogeneity and exogeneity in the actions of the monetary authority on the variation of the currency (Weintraub, 1978: p. 75). Also, the money supply can increase exogenously, that is to say following a deliberate action by the central bank, or endogenously when the banking system responds to an increased demand for money (Davidson, 1980: p. 303). From a certain point of view, the *structuralist approach* merges with the traditional vision (Le Heron, 2008: p. 23), in particular, when it considers that the money supply is exogenous and that the interest rate is endogenous like the IS-LM model.

In any case, if we must criticize the *structuralist approach* for its multi-faceted character which gives money a dual nature, we must, nevertheless, observe that this approach is in keeping with the spirit of work of Keynes all the more so since we can demonstrate the existence, in the latter, of an incompatibility between a fundamentally static analysis (principle of preference for liquidity) and certain propositions of a dynamic nature (principle *of effective demand*). Indeed, "on the one hand, the Keynesian introduction of the demand for speculation gives (…) to money a non-circulatory dimension that is difficult to reconcile with an exclusively endogenous conception of credit money; on the other hand, the principle of effective demand and the demand for money for financial reasons which accompanies it confirms on the contrary the existence of a circulatory dimension of money which purely exogenous conceptions tend to exclude" (Maricic, 1985: p. 426). There are probably two forms of money in the *structuralist approach*, just as in Keynes: flow money and stock money. In Keynes, in any case, the existence of these two forms of money does not express a contradiction in his thinking but his difficulty in integrating the flow dimension of money into his 1936 articles after having oriented his analysis on its other dimension. of stock in the *General Theory* (Renaud, 1994: p. 76).

3.3. The *Flexible Horizontalist Approach*: A More General Approach

Let us first point out that this third post-Keynesian trend which we have deliberately called *flexible horizontalist* is perfectly in line with the line of thought of Kregel (1998), Le Heron (1986, 2001), Messori (1985), Wray (1989, 1992) to name only these authors. It is sometimes referred to in the post-Keynesian literature as a "weak horizontalist" approach.

The *flexible horizontalist approach,* unlike the Kaldor-Moore model, considers that the supply of money is not *always* equal to the demand for money, since "no one disputes that a bank refuses credit to a company which appears to him

to be in a bad situation" (Lévy-Garboua & Lévy-Garboua, 1972: p. 257). While it is true that the supply of money cannot exceed the demand for money, the opposite is possible. It is still necessary to specify what request it is. Unlike the *strict horizontalist approach which only considers solvent* demand, the *flexible horizontalist approach* is interested in overall demand, that is to say *notional demand* in the sense of Wolfson (1996). Indeed, if we must only take into account the demand for credit devoid of any risk of non-repayment, then why should we continue to think in terms of supply and demand of money? Since the demand for money completely determines the supply of money, wouldn't the money market lose all its meaning? However, "there are in Keynesian and post-Keynesian theory all the elements which would promise to free ourselves from the supply/demand duality of money. (…) if we assume that the money supply is endogenous and determined by demand, then the very notion of money supply loses all its meaning (…) Any quantitative problem is eliminated and therefore the notion even a money market on which supply and demand confront each other" (Di Ruzza, 1984: pp. 8-9).

Like Minsky, the *flexible horizontalist approach* integrates the "lender's risk" into the analysis of the demand and supply of money, thus the possible quantitative gap between the demand and the supply of money finds a justification. When risk increases, the preference for liquidity also increases for all actors; it's true for Households[2], it's true for Businesses[3], it's also true for Banks[4]. Under these conditions, the concept of preference for liquidity must emerge from the reductive character to which it is subject in the *General Theory*[5] to be generalized to all poles of the economy (Le Heron, 1986).

The *flexible horizontalist approach* intends to account for an economic reality where banks are not forced to respond favorably to the desires of entrepreneurs. Bankers, like entrepreneurs, make anticipations. If their effective demand coincides with that of the entrepreneurs, then they will grant all the requested credits (the supply equals the demand), otherwise the entrepreneurs will be totally or partially refused the requested credits: this is rationing. This "underlines the freedom and independence of the different agents in the economy and allows the endogenous money approach not to present itself as a particular case of the elasticity of the money supply" (Ülgen, 1995: p. 48).

[2]The preference for liquidity, from the point of view of Households, reflects their behavior regarding the choice of portfolio. It is materialized by an increase in household monetary savings, which leads to greater monetary leakage from the income circuit.

[3]The preference for the liquidity of Companies is reflected in the latter's choice of financial structure. Companies favor, in the event of risk, financing by equity and therefore reduce financing by debt.

[4]What could be the Banks' preference for liquidity when we know that they have the power to create money? The terminology here can be ambiguous, but above all we must see in the preference for Bank liquidity, the fact that Banks may not respond favorably to credit requests. Thus, the preference for bank liquidity results in *crunch credits.* Due to the increase in lender risk, Banks reduce the volume of credits granted: bank rationing.

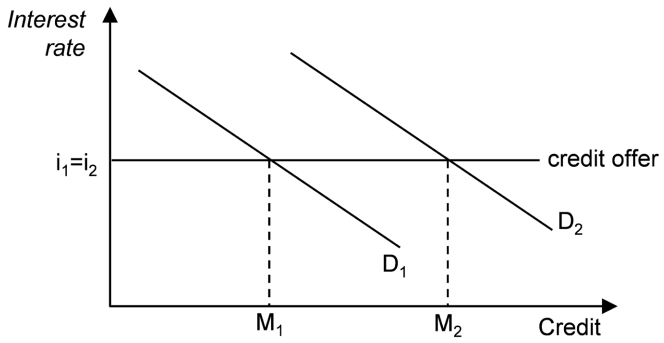
[5]Indeed, in the *General Theory*, the preference for liquidity only concerns Households and not Companies and Banks. Furthermore, in the *General Theory,* Keynes does not have a theory of the ex ante interest rate. To remove this indeterminacy and make the concept of liquidity preference compatible with the post-Keynesian thesis of endogenous money, it must be moved to the level of Banks.

The *flexible horizontalist approach* defends the idea that the supply of credit, despite the risk it entails, is constrained by demand, and if the interest rate is largely exogenous, its endogenous nature cannot be excluded, especially when it comes to long-term rates. As E. Le Heron (2008: pp. 28-29) points out, the interest rate can no longer have the same exaggerated importance given to it by both the IS-LM synthesis models and the Kaldor-type models. Moore. In fact, the interest rate requires to be analyzed in two stages: *ex-ante*, the interest rate is set by the banks exogenously, *ex-post*, it is the result of "the preference for liquidity banks" and that of households. We can thus say with E. Le Heron (2008: p. 31) that the fundamental error found in the *strict horizontalist* and *structuralist* approaches consisted of favoring the *ex-ante approach* for the former, and the *ex-post* for the latter.

Given the hypothesis that the money supply is totally endogenous to demand, the Central Bank has no other possibility of constraining liquidity than through the key rate which it sets independently. This key rate is the one from which banks offer a lending rate to their customers. The stability of the latter and its level (apart from speculation) will more or less reflect the state of confidence of the financial system. The general character of the *flexible horizontalist approach* comes from the fact that it completes the scenarios that cannot be found either in the *strict horizontalist approach* or in the *structuralist approach:*

1st case: we assume a period of strong growth, there reigns, consequently, a feeling of trust between the different agents, tranquility in the "Minskyan" sense. Bank risk premiums and their lending requirements are almost zero: rationing is almost non-existent. Banks satisfy almost all of the credits requested of them.

This hypothesis effectively confirms the *strict horizontalist model* (**Figure 2**). However, it does not explain everything, in which case monetary policy would be totally ineffective and pointless, the financial fragility thesis and, consequently, Minsky's (1985) tranquility paradox would be unfounded. Minsky's paradox of tranquility explains that a euphoric period always ends up weakening financial balance sheets (Brossard, 2001). And this trend towards fragility which begins during the very period of strong growth is likely to suddenly or gradually modify the behavior of banks, hence the following two cases.



Source: Lavoie, 1996.

Figure 2. The supply of money totally constrained by demand.

2nd case: we assume here that the period of euphoria is over. For an interest rate ($i_1 = i_2 = i_3$), the banks grant all the credits requested, but up to a limit level (C*), subjective moreover, where the bankers estimate that there would be an immediate increase in the solvency risk of borrowers.

In this case, however, it must be remembered that the credit is not quantitatively limited (**Figure 3**). The credit supply remains endogenous, but for any reason[6], not necessarily objective, the banking system may have to refuse all credit requests beyond the limit C* regardless of the level of the interest rate. All this is not totally incompatible with the Kaldor-Moore model[7], however the *strict horizontalist approach* insists on a currency intimately linked to the productive economy, and obscures the more realistic behavior of the banking system which admits that the supply of money may possibly be lower than the demand for money. Indeed, if we must admit that the request for credit accepted by the bank is necessarily equal to the supply, we believe, nevertheless, that the demand for credit expressed (total demand) does not necessarily create an equivalent supply: bank rationing clearly constitutes the limit of this proposal. Just as theses of Keynesian inspiration reject Say's law on supply which creates its own demand, we cannot retain for money, this form of inverted Say's law, that is to say, a demand of money which creates its own supply.

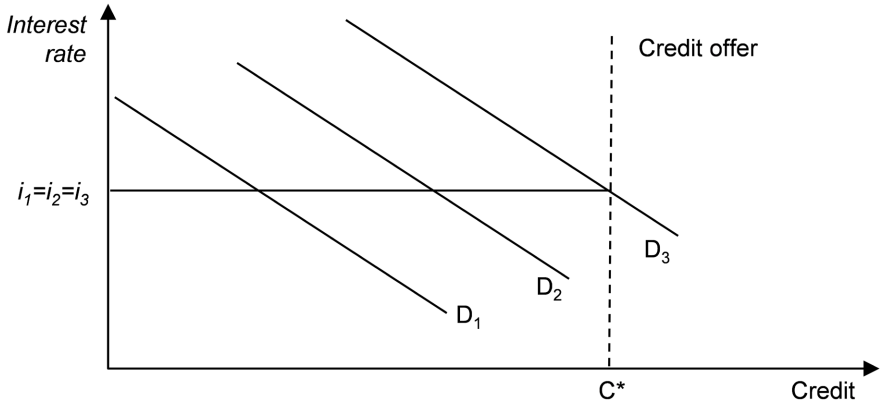
3rd case: we assume a gradual reaction of the banks by increasing the interest rate, taking into account the solvency risk. Note that even in this case where the interest rate could serve as a variable for adjusting demands and supplies of money, there is a limit level (C*) where banks could decide to no longer grant requested credits (**Figure 4**).

The interpretation of the limit (C*) is the same as that in the 2nd case, this point corresponds to the upper limit of the lender risk à la Minsky (1985: pp. 324-325). It must nevertheless be specified here that the analysis is rather microeconomic, because it involves setting, at the individual level of the borrower, a loan limit level in order to avoid any undesirable increase in the lender's risk. We can observe here that when risk increases the preference for liquidity increases. It's true for Households, it's true for Businesses, and it's also true for Banks.

However, this third case does not exclude the "perverse selection effect" (Stiglitz & Weiss, 1981), that is to say that " following an increase in the interest rate in reaction to an excess of demand relative to supply, the "good borrowers" leave, only the "bad borrowers" remain whose probability of not repaying is high" (Moureau & Rivaud-Danset, 2004: p. 26). We can also mention here the "moral hazard effect" which manifests itself when borrowers are encouraged to opt for more profitable and therefore riskier projects (Piegay, 1999: p. 163).

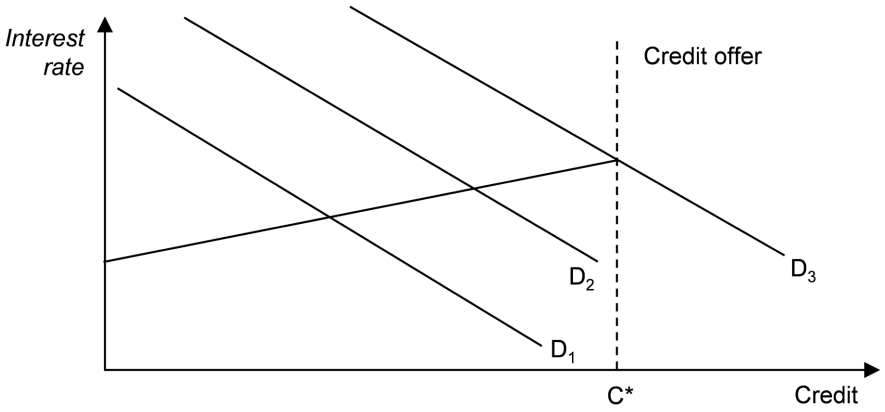
[6]The lack of information for Philippe Rochon (2001) or "commonly accepted standards, (…), an increase in the degree of uncertainty or turbulence in the economy" for François Goux (1996: pp. 88-89).

[7]"The differences between horizontalists and other post-Keynesians reflect more a problem of emphasis than substantial differences of opinion," Lavoie (1996: p. 275).



Source: Le Heron, 2008.

Figure 3. The money supply taking into account solvency risk.



Source: Le Heron, 2008.

Figure 4. The money supply taking into account the interest rate and solvency risk.

In short, the *flexible horizontalist approach,* compared to the two other approaches identified here, appears to be the most rigorous and the most complete. In any case, if the first two approaches may appear to be complementary, the *flexible horizontalist approach* integrates the detailed behavior of the different economic actors and it is for this reason that it could be considered as a "good" alternative theory in the sense of Niggle[8].

4. The Preference for Generalized Liquidity Tested by a Consistent Stock-Flow Model with Endogenous Money

The generalization of the principle of preference for liquidity to all poles of the economy (Le Heron, 1986; Dow & Dow, 1989) is of capital importance, in particular, in understanding certain sources of economic crises and their magnitude. The SFC methodology provides an analysis framework particularly suited to the integration of a multitude of socio-economic categories, according to their behavior and the composition of their income and wealth. It will therefore be

[8]"The "good" theory is the one that best corresponds to the actual behavior of the monetary and financial system considered." Niggle (1991: p. 562).

possible, using this methodology, to measure the impact, on economic dynamics, of the change in behavior of an agent or of all agents with regard to liquidity.

After a brief presentation of the SFC methodology, we will proceed directly to the analysis of the properties of the model using computer simulations. Thus we will simulate preference shocks for the liquidity associated with each of the agents, then with all the agents in order to measure the consequences on the economy. Regarding the writing of accounting matrices and the counting of accounting variables and identities as well as the behavioral equations, taking into account the constraints linked to the length of the article, we can refer to Bakala (2015: pp. 283-306).

4.1. Theoretical Aspects and Fundamental Assumptions of the SFC Model

The management of flows and stocks within the same framework is a concern as old as economics itself[9]. However, according to Kalecki, it also seems that economics has often confused flows and stocks[10]. In recent years, we have seen the development among post-Keynesians of a methodology that successfully integrates stock-flow accounting.

The SFC methodology is initially based on a very simple principle according to which "every flow comes from somewhere and must go somewhere" (Lavoie, 2003: p. 147). If this principle is respected, we can be assured, like Godley (1996: p. 7), that the model, even if it is large-scale, will not suffer from any "black hole". Just as in the Godley and Lavoie (2007) model, we retain the hypothesis that agents make decisions in a context of radical uncertainty. We place our model in historical time and the agents respond to procedural or reasonable rationality (Godley & Lavoie, 2007: p. 16), their capacities for disposing and processing information being limited. To do this, we replace the logic of the search for maximization with the search for satisfaction. We therefore consider that agents do not anticipate the future, but still react to imbalances based on the desired fixed ratios between flows and stocks (savings rate, debt rate, etc.). Aggregate supply follows aggregate demand, in accordance with the principle of effective demand. It is an economy of underemployment, and adjustments, except on the financial market, are made by quantities and not by prices. The coherence of the model is due to respecting budgetary constraints and the impact of the decisions of each sector on the others. The decisions of each sector are also constrained by the possibilities of access to credit, stocks at the beginning of the period, and flows during the period.

We describe a closed economy comprising five sectors: Businesses, Households, Commercial Banks, the Central Bank and Public Administrations (State).

[9]Aristotle studied the life of the domain through entry and exit flows, in interaction with initial stocks. Quesnay sought to restore the interactions between stocks and flows in an economic picture. Léontief's work on input-output tables, taken up within the framework of national accounting, is an attempt to reconcile stocks and flows, inspired by the work of Quesnay.

[10]"I discovered what economics is; it is science that confuses stocks and flows". Verbal statement attributed to Michal Kalecki, as noted by Joan Robinson (see, Harcourt, 1986).

The supply of money is endogenous to demand, since it obeys the corporate financing motive (Keynes, 1936). However, the introduction of lender and borrower risks à la Minsky makes sense of the notion of generalized liquidity preference, and it is therefore possible that the supply of money is less than the demand. The flow of demand for money is satisfied by banks, either through credit or through financial markets. Households derive their income from salaries, distributed profits as well as interest on bank deposits. Banks do not finance Households and they have no production costs. The profits made by the Central Bank are entirely returned to the State. This collects taxes paid only by Households, and pays interest to commercial banks on the Treasury Bonds it issues. Banks finance the State without rationing.

Given the simplified nature of our model, we assume that companies only issue shares and we therefore ignore the issuance of bonds or other financial assets. Businesses borrow money from banks to finance investment, but do not hold liquid cash balances. They have excess capacity to cope with the uncertainty of future events (see Bakala, 2015 for more details).

4.2. Simulations of Preference for Liquidity Shocks under an Endogenous Currency SFC Model

The SFC model responds to certain properties which must be analyzed starting from a "steady state", that is to say a situation where the growth rate of the economy is constant and where flows and stocks are coherent. Then, we modify the most significant parameters for each sector in relation to our problem. We can see that an increase in the preference for liquidity, whether at the level of Banks, Businesses or Households, depresses the economic situation, that is to say gives rise to a new *trend* of more growth. Thus, the generalization of the preference for liquidity in a post-Keynesian model with endogenous money makes it possible to show that an increase in the preference for liquidity gives rise to what Le Heron (1986: p. 75) calls, " generalized curse."

Furthermore, it should be noted that the construction of SFC models poses some calibration problems. The value of certain parameters is, in certain cases, defined not for the sake of restoring reality, but by the need to stabilize the model (Lavoie, 2004: p. 12). Thus, we are sometimes led to emphasize certain characteristics specific to this or that regime of accumulation. Given that the convergence of the model is not assured, we sometimes proceed in a hazardous manner to find values which will allow the model to have solutions. Certain variables turn out to be very sensitive for the stability of the system and cannot be significantly impacted without blowing up the model.

Despite all these weaknesses, macroeconomic stock-flow modeling, when it is based on simulations, is a source of relevant qualitative information, in addition to retaining a very important educational scope. Given the fictitious nature of our economy, the quantitative values will therefore not have a great explanatory significance, this is not the objective of the model. On the other hand, the trends that they will indicate will allow us to make connections with our theoretical ap-

proach. This work corresponds to an effort at economic mathematization and not to statistical or econometric work. However, the calibration of the model respects the orders of magnitude (the most important ratios) that can be considered for a developed economy.

Consider a fictitious steady-state economy with the following ratios (the data comes from the author's propositions based on his representation of a stable economy):

Rate of growth	**5.2%**	Stock price	**1**
Desired capital growth rate	**5.4%**	Lender's risk	**20%**
Investment/GDP	**17%**	Borrower risk	**3%**
Consumption/GDP	**63%**	Capital utilization rate	**96%**
Public spending/GDP	**20%**	Share of investment financing by credit	**12%**
Public deficit/GDP	**≈ 0%**	Share of profits	**25%**

Even if this may seem a weakness from a methodological point of view, it should be noted that these ratios were retained with the aim, not only, of presenting a viable economic situation in a steady state, but also, of having a stabilized mathematical model.

4.2.1. Model Properties: Simulation of Preference for Liquidity Shocks

We reiterate here that the supply of money, as long as it is endogenous, is not *always* equal to the demand. It is, in fact, likely to be affected by the banks' preference for liquidity, itself sensitive to the lender's risk (equation [34] in the appendix). In theory, if the lender's risk is equal to 1, the rationing of new credits is total and the preference for liquidity of bank is then the highest possible. On the other hand, if the lender's risk is equal to 0, credit rationing and the preference for liquidity of bank are assumed to be zero and therefore, the Kaldor-Moore model is fully justified.

4.2.2. The Effects of an Increase in the Preference for Liquidity of Bank (PL_B) on the Dynamics of the Economy

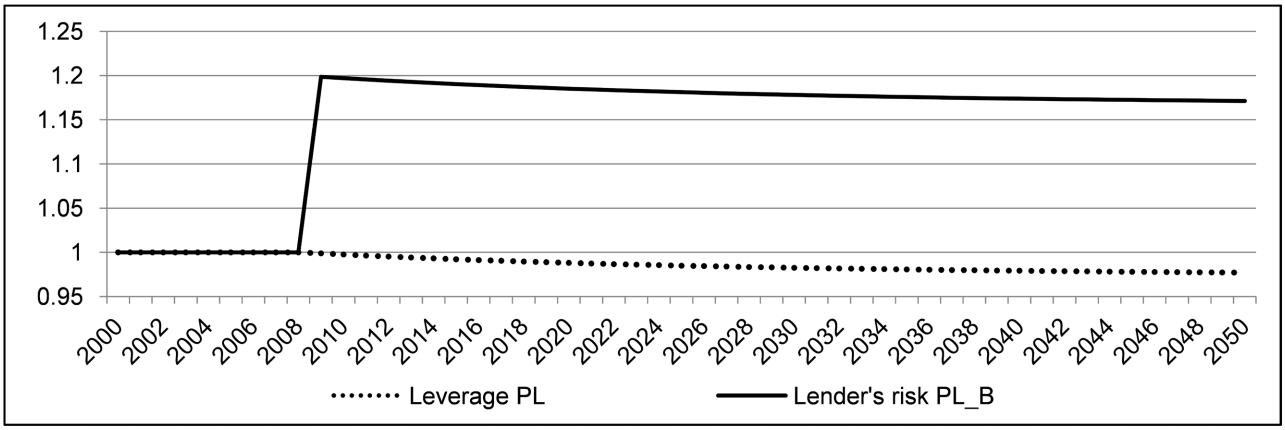
From the outset, it should be noted that the results of preference for liquidity can be affected by counter-cyclical public policies. To avoid this bias, we have retained the hypothesis of a constant public deficit close to zero, which therefore assumes that the public debt is close to zero.

To simulate an increase in banks' preference for liquidity, we lower the level of conventional leverage (equation [35] in the appendix) that they consider acceptable (i.e. the steady state level). As banks become more demanding of businesses, the lender's risk will, *ceteris paribus*, increase, which will lead to an increase in rationing.

The sensitivity of the lender's risk to the leverage deemed acceptable by the

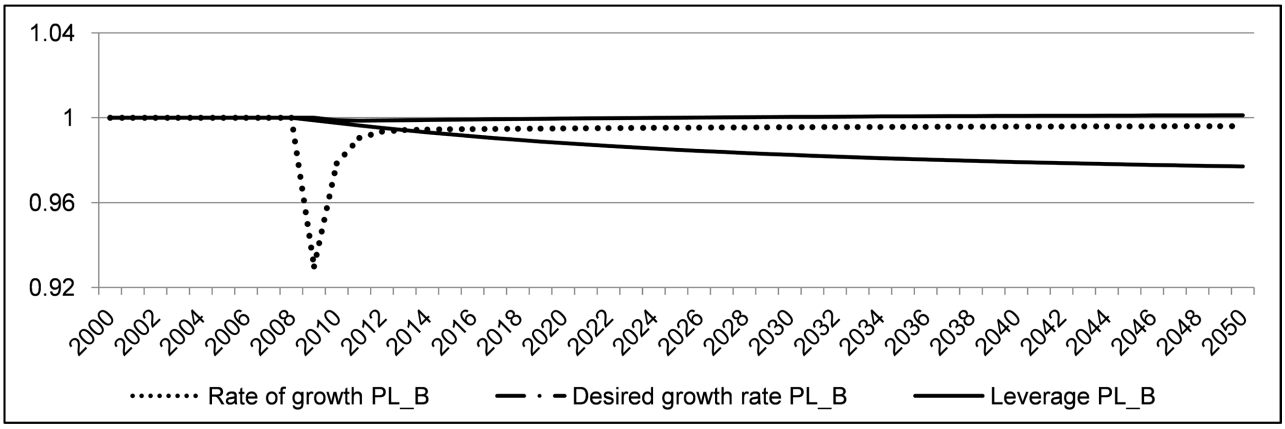
banks is important. What was considered normal debt ceases to be so and appears risky. The lender's risk rises very quickly with the decline in conventional leverage before stabilizing. Therefore, as companies are more rationed, their debt leverage will fall, which will gradually reduce the lender's risk, but without being able to return to the initial situation (see Figure 5). The increase in the preference for liquidity of bank implied by the reduction in conventional leverage will have damaging consequences on economic growth.

In accordance with the *flexible horizontalist approach*, the increase in banks' preference for liquidity negatively impacts the rate of economic growth (Figure 6). Indeed, following the increase in lender risk, banks no longer satisfy all credit requests. Corporate debt leverage falls, and with it, a decline in the growth rate which ends up stabilizing on a *trend* weaker than that of the steady state. If the growth desired by companies (net investment or effective demand) is practically not impacted, they cannot ensure the same pace of growth since external financing is rationed to them. It is the increase in banks' preference for liquidity that is causing the economic slowdown.



Source: Author, from a computer simulation of the ratios.

Figure 5. The effect of the reduction in conventional leverage on the lender's risk.



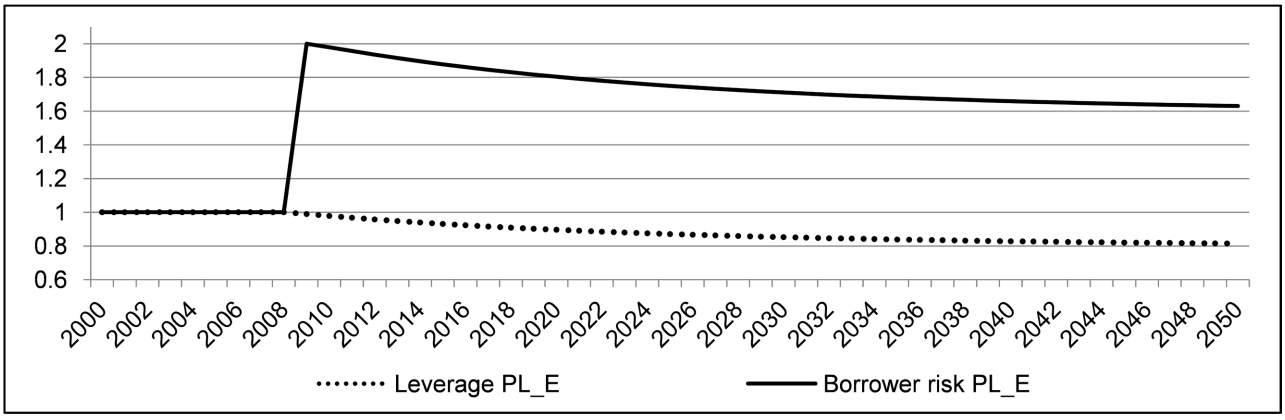
Source: Author, from a computer simulation of the ratios.

Figure 6. Decrease in actual and desired growth rates following the increase in Bank liquidity preference.

4.2.3. The Effects of the Increase in the Preference for Liquidity of Companies (PL_E)

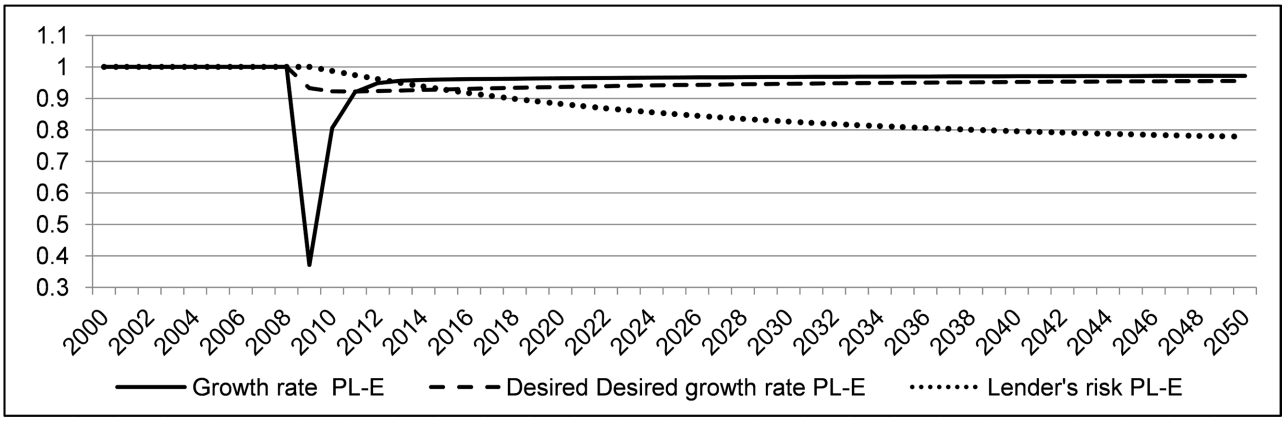
Note that the preference for liquidity of companies is linked to their financing structure and, more particularly, to the sensitivity of entrepreneurs to the level of their debt and the interest rate. This preference for liquidity of companies influences the financial structure that they will choose. Thus, the greater the preference for liquidity of companies, the more they favor self-financing compared to financing by bank debt. This borrower risk is integrated into their investment function which it negatively impacts. To simulate the increase in the preference for liquidity of companies, we increase their sensitivity to financial risk (equation [28] in the appendix). They will lower their debt ratio and this will, consequently, lead to a reduction in their leverage (**Figure 7**).

We also observe (**Figure 8**) a negative impact on growth significantly greater than that caused by the increase in the preference for liquidity of bank (**Figure 6**). Contrary to the preference for liquidity of bank, we observe a fall in desired growth. Knowing that companies will subsequently resort less and less to debt financing, we can notice that the banks' lender risk is decreasing.



Source: Author, from a computer simulation of the ratios.

Figure 7. The drop in leverage following the financial risk anticipated by entrepreneurs.

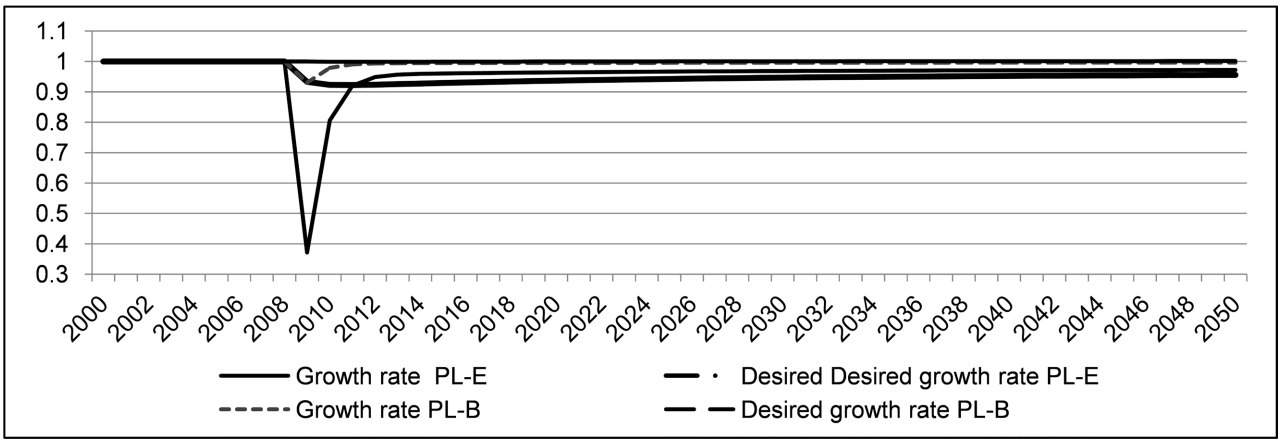


Source: Author, from a computer simulation of the ratios.

Figure 8. Effect of corporate preference for liquidity on growth rates.

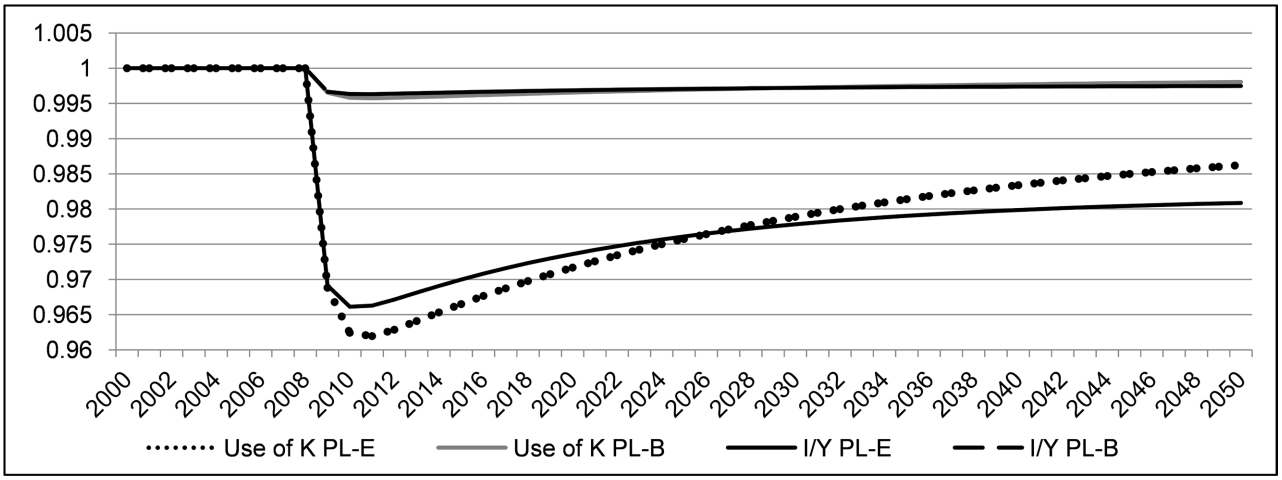
As the intensity of the shocks is not identical, the differences should not be overinterpreted. However, even on a theoretical level, the magnitude of the impact of the preference for liquidity of bank on economic growth and on desired growth is significantly less significant than that of the preference for liquidity of companies on these same variables. The main reason for this difference is that businesses are at the heart of growth with the determination of effective demand and investment. Banks can marginally slow down investment, but not totally oppose the expectations of entrepreneurs. Additionally, companies can always resort to internal financing or issuing shares to support growth (Figure 9).

In accordance with the theory, the decline in the growth rate implies, on the one hand, the decline in the rate of capital utilization, and on the other hand, the decline in the share of investment in the overall product. The results of the simulations confirm this state of affairs. Once again, the shock is greater when it concerns the preference for liquidity of companies than that of banks (Figure 10).



Source: Author, from a computer simulation of the ratios.

Figure 9. Comparative effects of the impact of preference shocks for the liquidity of banks and companies on the actual and desired growth rates.



Source: Author, from a computer simulation of the ratios.

Figure 10. Evolution of capital utilization and investment rates after preference for liquidity shocks.

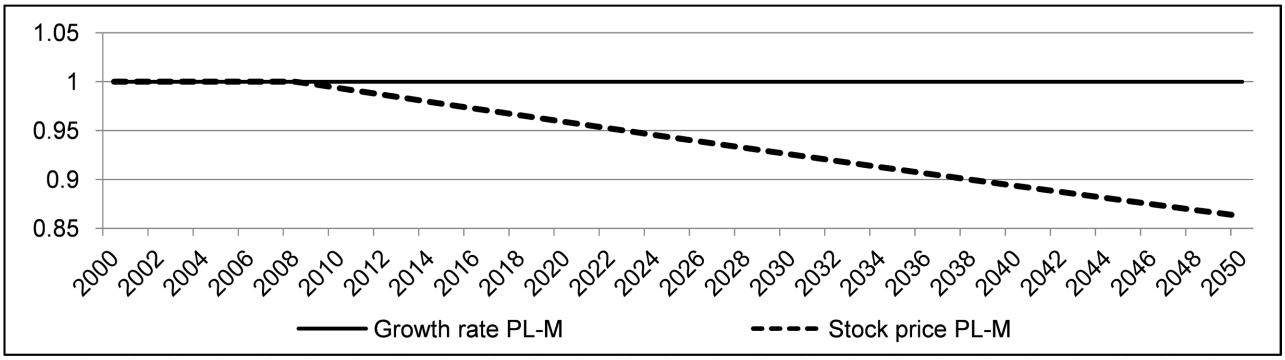
4.2.4. The Increase in Preference for Liquidity of Households and Its Effects on the Rate of Economic Growth

The increase in the preference for household liquidity corresponds to an anticipation of a fall in the return on financial assets (here stocks) or, which amounts to the same thing, the demand for a better return. For our simulations, we assume an increase in the risk premium required to buy stocks. Therefore, *ceteris paribus*, their demand for shares will fall, also lowering their price.

If the preference for liquidity of bank and that of companies influence economic growth, the preference for household liquidity, on the other hand, has no direct impact on the real economy, which is in accordance with Keynes' theory: the preference for household liquidity only affects the distribution and not the flow of savings. The amount of savings is a function of income and the marginal propensity to consume, in accordance with Keynes' theory. If the real economy does not directly experience the impact of the increase in household liquidity preference, the financial economy, on the other hand, experiences imbalances due to this new distribution.

The demand for shares falls, and knowing that the supply is constant, the price falls to adjust the demand and supply of shares (**Figure 11**). The preference for liquidity of households shock therefore only has effects on the financial market. The stability of this normally depends on the balance of supply and demand for shares. However, the equilibrium price of shares is based on expectations which cannot find any real anchoring. In any case, in a world of uncertainty, the stability of financial markets is difficult to envisage, especially since the opinion of the market players on whom this stability depends, is prey to brutal, largely mimetic and therefore auto-directors.

Our analysis shows that the increase in preference for liquidity of households is not a *deus ex machina.* It results from the fact that in financial systems where financing growth can imply a reduction in balance sheet liquidity, the stability of asset price expectations can deteriorate endogenously (Brossard, 2001: p. 323). It must nevertheless be emphasized that asset price expectations are largely influenced by the level of the interest rate. We are therefore rightly going to now simulate an interest rate shock.



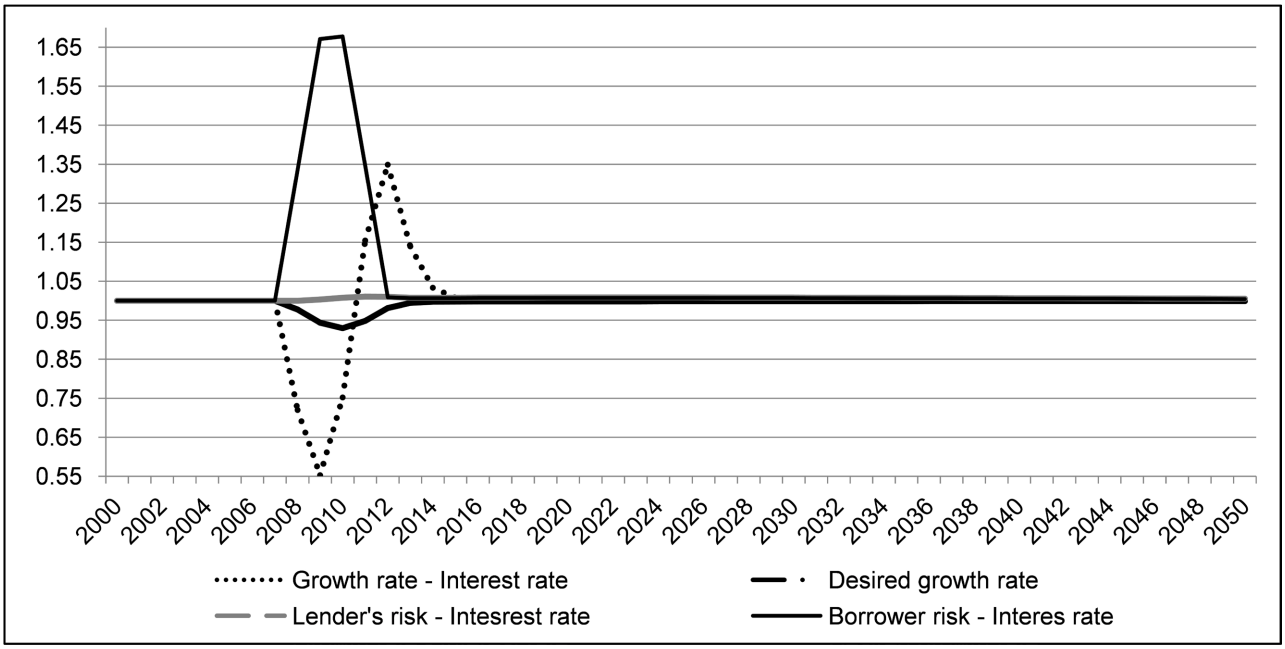
Source: Author, from a computer simulation of the ratios.

Figure 11. Growth and stock prices after a preference for liquidity of household (PL-M) shock.

4.2.5. The Effects of a Transitory Increase in the Interest Rate on the Economy

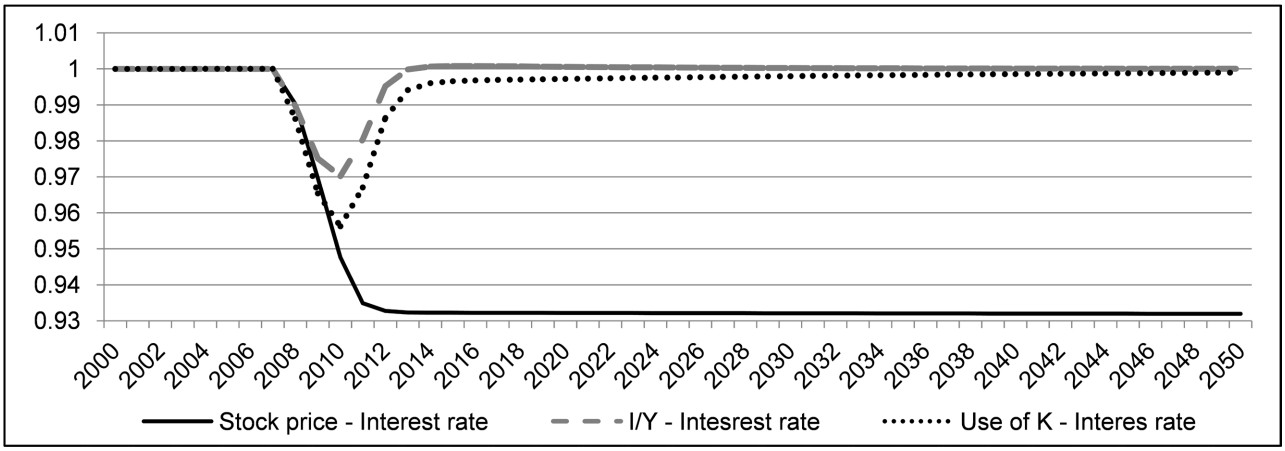
We have previously pointed out that there is an inverse relationship between stock price and interest rate, i.e. rising interest rate causes stock price to fall and vice versa. It turns out that the interest rate is related to investment through the cost of capital. Thus, the increase in the interest rate can be interpreted as an increase in the preference for liquidity since it increases the risk of the borrower, and at the same time leads to an "aversion to debt" of companies. This leads to a decline in investment, and consequently, a slowdown in growth. We simulate an increase in the central bank's key rate which is reflected in the rate of loans and Treasury bills. Unlike previous shocks which were permanent, here it is transient. We went from 3 to 4% in 2008 then to 5% in 2009 and 2010 before falling back to 4% in 2011 and then stabilizing again at 3% and therefore returning to the initial steady state.

The increase in the interest rate on loans leads to a sharp increase in the borrower's risk (Figure 12). This is explained by the fact that bank margins are increasing, and at the same time reducing corporate profits, since corporate expenses are increasing faster than revenues. While the lender's risk remains stable, the high cost of credit slows down the use of external debt through credit, and consequently lowers the growth rate. Several other factors can explain this decline in the growth rate: declines in the rate of internal financing through share prices (Figure 13) and in the use of capital. The recovery in growth that begins in the second phase can be explained by the transitional shock and therefore the downward decline in the key interest rate. We see that this stops the fall in stock prices, but does not trigger their rise.



Source: Author, from a computer simulation of the ratios.

Figure 12. The transitional increase in the interest rate and its consequences on growth rates, lender and borrower risks.



Source: Author, from a computer simulation of the ratios.

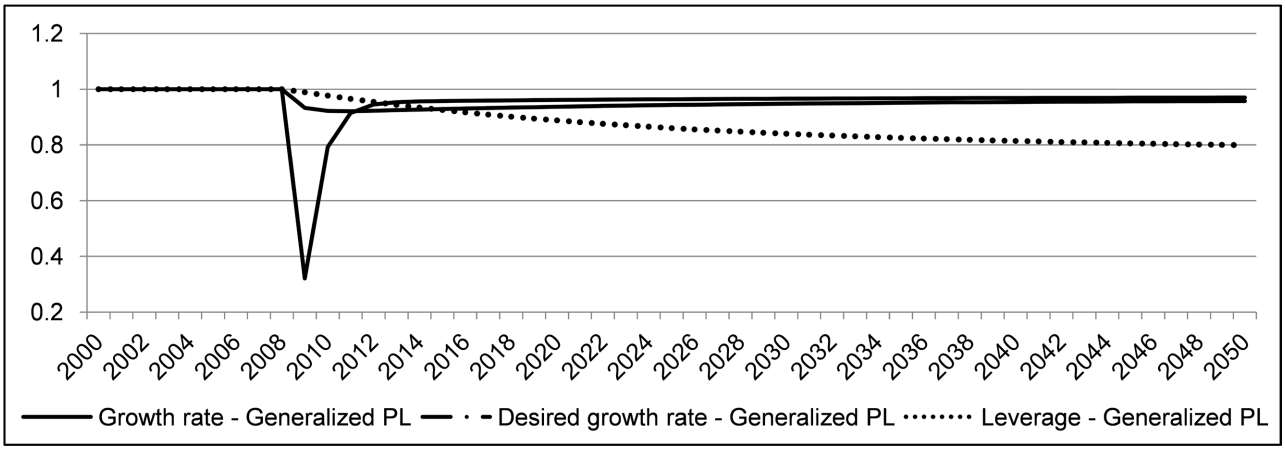
Figure 13. Evolution of stock prices, the share of investment and the use of capital following the interest rate shock.

Having noted that the increase in the preference for liquidity associated with each pole of the economy causes the decline or, at least, the slowdown of economic growth, we can examine the impact of a generalized liquidity preference (**Figure 13**). It is the expression of generalized pessimism where all actors display a clear preference for liquidity as during major economic crises.

4.2.6. The Effects of the Preference for Generalized Liquidity on the Economy

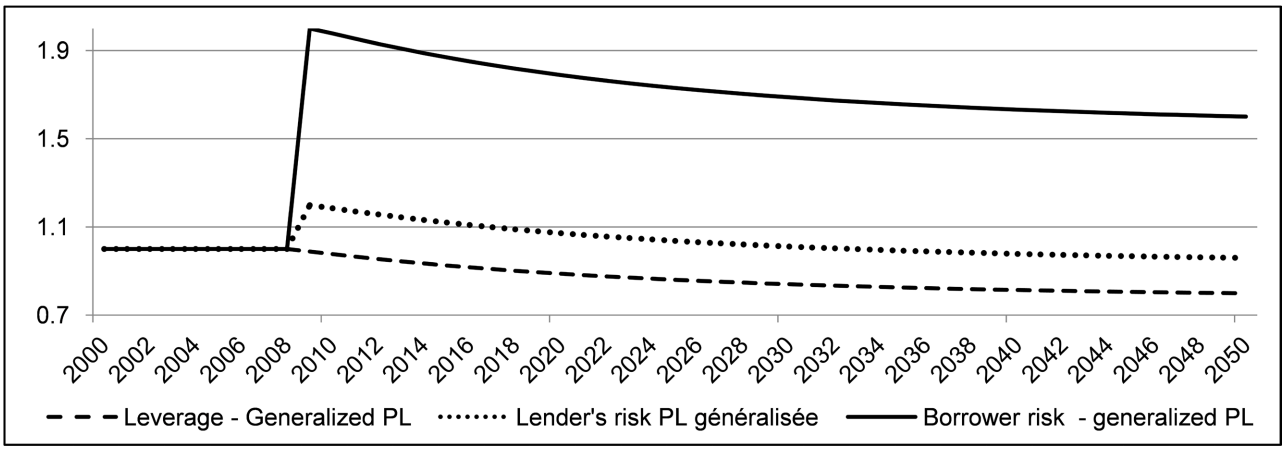
The preference for generalized liquidity assumes that all poles of the economy (Banks, Businesses and Households) together experience an increase in their preference for liquidity. Such a situation corresponds to what Marc Lavoie (2003) calls "the point of maximum entropy", that is to say that banks would no longer lend, businesses would no longer produce and households would no longer consume. Certainly, this extreme case is a purely theoretical conception, nevertheless, we can simulate (**Figure 14**) the impact of a generalized increase in the preference for liquidity on the economy.

As in the analysis of previous shocks, the increase in the preference for generalized liquidity, *ceteris paribus,* leads to a decline in both the effective growth rate and the desired growth rate. However, the impact of the shock is greater here. Which is entirely consistent with theory, since the preference for the combined liquidity of the different agents supposes, on the one hand, a generalized fall in expectations, and on the other hand, an acceleration of the fall in effective demand: drop in consumption following a preference for deposits, and a drop in investment relating to the drop in debt financing (decrease in leverage) of companies. Also, the increase in lender risk leads to credit rationing. In fact, the increase in lender risk causes banks to demand a substantial risk premium. However, this decision leads to an increase in the risk of default for companies (**Figure 15**). Banks are thus led to refuse all or part of the credit request, which obviously affects economic growth. Finally, stock prices fall because of increasing household liquidity preference, adding a financial crisis to the real crisis.



Source: Author, from a computer simulation of the ratios.

Figure 14. The effects of the increase in the preference for generalized liquidity on the growth rate and the evolution of debt leverage.



Source: Author, from a computer simulation of the ratios.

Figure 15. Lender and borrower risks, and the reduction in debt leverage.

Considering our results, we can observe like Edwin Le Heron (1986: p. 75) that the preference for generalized liquidity at all poles of the economy is in fact a "general principle for a curse widespread." The generalized increase in the preference for liquidity is the very expression of an amplified crisis. If pessimism in one sector of the economy is likely to lead to slowing growth, generalized pessimism inevitably leads to both real and financial crisis.

5. Conclusion

This article made it possible to measure the importance of Keynes' concept of preference for liquidity in the post-Keynesian theoretical system. This concept, as it was presented in Keynes' *General Theory*, as we have seen, just makes it possible to explain household portfolio adjustments through currency/securities trade-offs. It turns out that these arbitrages concern the *ex post stock* of money, not necessarily compatible with the thesis of endogenous money which favors

the *ex ante flow dimension* of money. For this reason, the concept of preference for liquidity had been more or less abandoned by most post-Keynesians[11]. We were able to show that this incompatibility can be removed by generalizing the principle of preference for liquidity to all poles. Thus, we explained that, as behavior of agents, the preference for liquidity could be translated, first among bankers, therefore *ex ante* as the *validation or not* of entrepreneurs' bets, then, among entrepreneurs as the choice of the optimal financial structure (self-financing and/or bank financing), and finally, *ex post* among households, as a portfolio choice influencing the price of financial assets. The preference for liquidity of companies and that of banks directly influence, to different degrees, economic growth. From a post-Keynesian model called stock-flow-consistent, we were able to justify the coherence of the stock and flow dimensions associated respectively with the concepts of preference for liquidity and endogenous money. Our mathematical approach based on fictitious data from any economy in a steady state gave results consistent with post-Keynesian theory: the increase in the preference for liquidity, whatever its origin (households, banks or companies), is harmful to economic growth.

Finally, the preference for liquidity is not unrelated to economic policy, or at least to monetary policy through the determination of the short-term interest rate by the monetary authority. Indeed, we believe that the optimism or pessimism of economic agents can be an essential indicator for setting the key rate, knowing that the economic crisis can come from the pessimism of a single economic agent, while economic growth requires the optimism of all economic agents.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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[11]Kaldor in this case considered that "Keynes' use of the liquidity preference function was a tactical error, in the sense that it opened the way for its integration into the neoclassical synthesis as being a stable demand for money, with the interest rate as one of the arguments." Dow & Dow (1989: p. 147).

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Appendix

Writing the model (on Eviews9)

```
' Overall production            : Y = Cons + I + G                              [1]
' Growth                        : gr_y = d(Y)/ Y( -1)                           [2]
' Consumption                   : Cons =alph1*Y_w+alph2*Y_v+alph3*Dep(-1)       [3]
' Labor income available        : Y_w = W – T                                   [4]
' Salary                        : W = Y/rho                                     [5]
' Capital income                : Y_v = Pd + ir_d * Dep                         [6]
' Profit distributed            : Pd = (1 - s_ f )* P                           [7]
' Undistributed profit          : Pnd = P – Pd                                  [8]
' Capital gains                 : CG_ e = d( p_e )*e(-1)                        [9]
' Volume of actions requested   : EV = (EV(-1)*(ß+(ß1 *re a)-ib+ 0.01)          [10]
' Yield anticipated titles      : _r_ea = (s_f*r_profa)+( CG_ea /EV(-1))        [11]
' Prof distributed anticipated  : r_profa = r_prof(-1)+v1*(r_prof(-1)-
                                  r_profa (-1))                                 [12]
' Anticipated capital gains     : CG_ea =CG_e(-1)+v1*(CG_e(-1)-CG_ea(-1))       [13]
' Offer of new shares           : e = (1+gr_ yes)* e(-1)                        [14]
' Savings net Households        : d(S_m)= W + Pd + ir_d *Dep-Cons–T+CG_e        [15]
' Household Deposits            : Dep = Dep(-1) + d( S_m )-(d(e* p_e)           [16]
' Stock prices                  : p_e = EV/e                                    [17]
' Volume of Capital             : K = K( -1) + I                                [18]
' Level investment              : I = phi + Pnd + d(e) * p_e - CG_e             [19]
' Financing banking             : phi = phi_d * (1 - RP)                        [20]
' Financing banking longed for  : phi_d = I_d - Pnd - d(e) * p_e + CG_e         [21]
' Level debt banking            : L = L(-1) + phi                               [22]
' Investment longed for         : I_ d = gr_kd * K(-1)                          [23]
' Usage rate . production cap.  : u = Y / Y_fc                                  [24]
' Full capacity GDP             : Y_ fc = K(-1) * sigm                          [25]
' Growth desire . of capital    : gr_kd = g0+g1*r_prof-g2*r_end+g3*u(-1)        [26]
' Profitrate                    : r_prof = P(- 1)/ Y(-1)                        [27]
' Borrower risk                 : r_end = ir_b * lev( -1)                       [28]
' Actual profit                 : P = Y - W - ( ir_b * L)                       [29]
' Treasury bond                 : B = B(-1) + DG                                [30]
' Expenses public               : G = + T - ( ir_b * B) + P_cb +DG              [31]
' Publicdeficit                 : DG = DG(- 1)* (1+gr_yes)                      [32]
' Tax revenue (Taxes)           : T = tau1*W(-1) + tau2* Y_v (-1)               [33]
' Lender 's risk                : RP = a1*( lev( -1) - lev_c )                  [34]
' Debt leverage                 : lev = L / K                                   [35]
' Profit of banks               : P_b = ir_b*B+ir_b*L-ir_d*Dep-ir_cb*REF        [36]
' Reserves obligatory           : H = beth *Dep                                 [37]
' Profit of the Central Bank    : P_ cb = ir_cb *REF                            [38]
' Bank refinancing _            : REF = REF(-1)+d(H)+d(B)+d(L)-P_b-d(Dep)       [39]
'Control variable for missing equation: Hthq = REF                              [40]
```