The Interest Rate in a Monetary Economy

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27 July 2014

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Abstract

Major central banks have pointed out that basic economic models describe the monetary system inaccurately. In this context, the current paper presents a model of interest rate determination based on a sound description of the monetary system. Its novelty is providing an alternative credit supply function that represents planned savings. Further, the model is compared with three standard theories. The main conclusions are threefold. First, under certain assumptions, the viewpoint of loanable funds theory that the interest rate balances savings and investments can be reconciled with a monetary economy. However, the balancing process is not a market mechanism. Loanable funds theory must therefore be reinterpreted. Second, liquidity preference theory is insufficient to explain the interest rate level in a modern monetary economy. Third, endogenous money theory describes a monetary economy correctly in principle, but it is incomplete without the above-mentioned credit supply function.

Keywords: interest rate, money, loanable funds, liquidity preference, endogenous money

JEL codes: E40, E50, E51

This version: August 2020; the author is very thankful to Malte Welling, Sarah Schätti, Marina Georg and especially Daniel Kirslis for their great help and valuable comments.

1. Introduction

As major central banks, such as the Bank of England (2014) and Bundesbank (2017), have pointed out, there are widespread misconceptions in economics about the monetary system—even in undergraduate textbooks, unfortunately. The correct view is as follows. Banks do not 'lend out' existing money but rather create new money by providing credit. Banks do not 'multiply up' the amount of base money into the amount of broad money. The quantity of base money does not constrain the creation of broad money. Lending creates deposits, not vice versa. Finally, the central bank fixes the amounts of neither broad nor base money—it fixes the interest rate. To address these shortcomings, it is necessary to critically review existing models to analyze which insights are valid. Then, given that it is crucial to establish models that describe the monetary system accurately, researchers must decide which adjustments are necessary and which models must be abandoned.

Based on the above discussion, this paper reviews the validity of standard economic models. For that reason, a model of interest rate determination that is based on a correct description of the monetary sector is presented and compared to different economic theories.

The findings are as follows. Loanable funds theory must be reinterpreted. Although it is true that the interest rate balances planned savings and planned investment, this balancing process is not a market process. Instead, it is driven by central bank interventions. Liquidity preference theory alone is not sufficient to explain the interest rate level in the economy. Endogenous money theory describes monetary economies correctly in principle, but it lacks a central feature of money being not only created but also destroyed. A crucial insight for policymakers is that expansionary fiscal policy crowds out private investment in normal times but not when the interest rate is at its lower bound.

The remainder of the paper is structured as follows. Section 2 outlines the model of interest rate determination based on a sound understanding of monetary economies. Section 3 shows how the model is related to loanable funds theory, liquidity preference theory, and endogenous money theory. Section 4 introduces a detailed monetary system into the model to incorporate all the initially mentioned facts about monetary systems. Section 5 concludes.

2. The Basic Model

In this section, I present a simple approach to correctly model a monetary economy. In addition to its many standard and simplifying assumptions, the model has two important characteristics: a central bank that sets the interest rate endogenously depending on aggregate demand and an alternative credit supply function that is the amount that the *public*, as opposed to *banks*, is willing to lend.

Time is divided into periods of equal length. Banks are open only at the beginning of a period. Credit contracts can only be closed when banks are open with lending terms of one period. At the beginning of the following period, all credit contracts are renegotiated. No money remains in circulation from previous periods, and all money is cash. The model has four elements: credit demand, credit supply, private banks, and a central bank.

Credit demand: Cr^D is the amount that the public wishes to borrow from the banks. It depends negatively on the interest rate, i, charged for borrowing because more investment projects are profitable at a lower interest rate. The demanders borrow the preferred amount of money from the private banks at the beginning of the period and spend it. The money then circulates unless brought to a bank as funds to be placed.

Credit supply: Lindner (2015) shows that the usual definition of the credit supply, namely, the amount of credit that banks are willing to grant, is not useful for measuring the amount of planned savings. A bank's decision to provide credit is independent of the public's savings decisions in a monetary economy. To connect savings and investments through the credit market, the credit supply, Cr^S, is defined as the amount of money that the public is willing to lend to the banks for one period by depositing cash in exchange for longer-term claims.[1]

Cr^S depends positively on the interest rate since the public wants to save more money instead of spending it if the interest rate for savings is higher. The savers are paid at the beginning of the period with some of the initially created money in exchange for goods and services and lend the amount of money that they want to save to the private banks. Thus, this part of the originally created amount of money cannot be used for transactions during the period, and it is not included in the relevant amount of money.

Private banks: The private banks lend to and borrow from the public. They have to borrow the amount that they are lending to the public from the central bank because they cannot create cash themselves. Further, they lend the amount that the public places with them to the central bank. The private banks set the interest rate on credit in a perfectly competitive environment, and their only costs are the interest payments for refinancing credit. There is no possibility of default.

Central bank: The central bank undertakes refinancing operations with private banks at the beginning of a period. It gives any amount of credit to banks willing to pay a certain interest rate (full allotment). Each refinancing credit has to be paid back at the end of the period. The

[1] In the extended model outlined in Section 4, the credit supply function additionally includes deposits swapped into longer-term claims.

central bank's task is to achieve an exogenous inflation target. It is assumed that some amount of money, M, causes the inflation rate to reach its target.[2] Hence, the central bank achieves the target inflation rate by ensuring that this amount of money, M, circulates in the goods market.[3] In general, a lower (higher) amount of money leads to an inflation rate below (above) the target. To achieve this task, the central bank sets the interest rate, i^{CB}, that private banks must pay for refinancing credit and can obtain if they lend money to the central bank. The central bank has perfect information and foresight.

The timing is as follows:

(1) At the beginning of a period, the central bank sets the interest rate, i^{CB}.

(2) Directly after, the demanders of credit borrow the amount Cr^{D} from the private banks and spend it. At the same time, the private banks borrow that amount from the central bank.

(3) After some transactions, but still at the beginning of the period, the suppliers of credit lend the amount Cr^{S} to the private banks. The private banks lend it to the central bank afterward.

(4) During the period, the banks are closed, and the amount of money in circulation determines the inflation rate.

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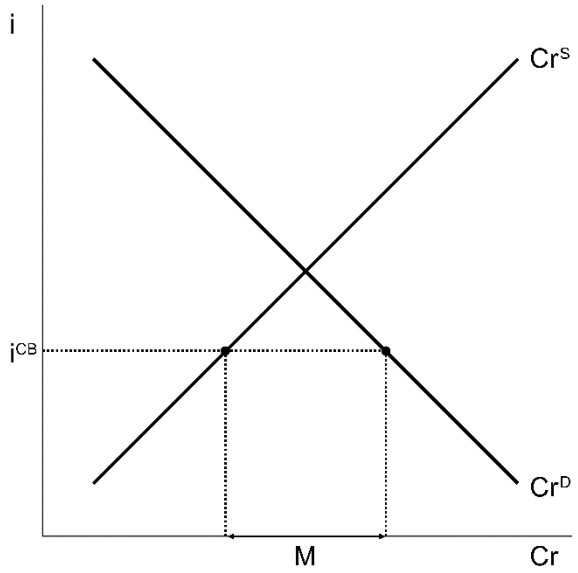
[2] The amount of money, M, can be derived from the previous period's price level, the inflation target, the potential output, and the velocity of money at the potential output. For simplicity, it is assumed that M is constant.

[3] The private banks' claims against the central bank (reserves) are not included in the amount of money since they do not circulate in the goods market.

To solve the model, note that the assumptions about the private banking sector cause the market interest rate to equal i^{CB}. Otherwise, banks would make losses or arbitrage opportunities would exist.

What interest rate does the central bank set? If it set the market-clearing interest rate at which Cr^{D} and Cr^{S} are equal, all the money borrowed by the public at the beginning of the period would return to the banking sector immediately. No money would be available for transactions during the period, and prices would fall. For this reason, the central bank sets a *lower* interest rate. In particular, it sets the interest rate, i^{CB}, such that the credit demand *exceeds* the credit supply by the preferred amount of money in circulation, M (Figure 1). This amount of money is the horizontal difference between Cr^{D} and Cr^{S} at i^{CB}. This result does not imply that the credit market is in disequilibrium since the central bank creates and lends the amount of money to satisfy the credit demand not covered by the credit supply.

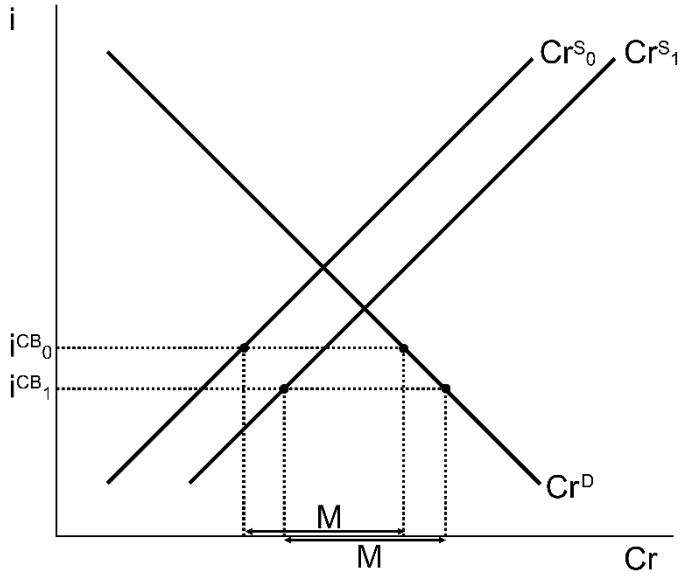
Figure 1)



The model explains how a different situation in the credit market changes the interest rate. Consider an economy in equilibrium in the previous period (period 0); in other words, the interest rate i_{0}^{CB} caused the amount of money M—the horizontal difference between Cr_{0}^{S}

and Cr^{D} at interest rate i_{0}^{CB}. Then, imagine, for example, that the credit supply increases because people want to save more at a given interest rate, all other things being equal. The Cr^{S} curve shifts to the right from Cr_{0}^{S} to Cr_{1}^{S} (Figure 2). With an unchanged interest rate, this shift leads to a decline in the amount of money (to the horizontal difference between Cr_{1}^{S} and Cr^{D} at i_{0}^{CB}). To keep the amount of money constant at quantity *M*, the central bank has to *lower* the interest rate from i_{0}^{CB} to i_{1}^{CB}. In this way, the new amount of money—the horizontal difference between Cr_{1}^{S} and Cr^{D} at interest rate i_{1}^{CB}—is equal to the old amount of money. With a constant amount of money, the inflation target will be achieved. The shift results in an equilibrium with a lower interest rate and an increased amount of credit.

Figure 2)



Analogous to an increase in the credit supply, a decline in credit demand with no central bank intervention also reduces the amount of money and, hence, triggers an interest rate reduction by the central bank. In that case, however, the overall amount of credit declines. On the contrary, a decrease in the credit supply or an increase in the credit demand could potentially raise inflation through an increased amount of money, and therefore, it causes the central bank to raise the interest rate.

The model's basic logic goes back to Wicksell (1907). He argues that if the banks kept the interest rate below a 'normal' level, there would be high inflation, whereas if they raised it above that level, there would be deflation. Therefore, to keep inflation in check, the interest rate has to be kept at its 'normal' level.

Note that the model is formulated as a medium-term model that abstracts from the short-term adjustment process to the new equilibrium. Therefore, output is assumed to stay at its potential. Short-term changes in output and inflation, such as a temporary downturn with low inflation in the example of an increase in planned savings, are not modeled explicitly.

Finally, note that central banks cannot observe any of the curves and cannot respond to them directly in practice. The assumption of perfect information is not crucial for the model's conclusions, however. It is sufficient that the central bank has enough information to hit the inflation target in the medium term. This assumption is reasonable given the successful inflation targeting over recent decades.

3. Comparison with Existing Theories

This section outlines how the new model is related to three existing theories: loanable funds theory, endogenous money theory, and liquidity preference theory.

Loanable Funds Theory

Neoclassical loanable funds theory is the basis of many models in economics and is therefore of fundamental importance. In its basic version, it is assumed that the demand for

investments, I, depends negatively on the interest rate, i.[4] This assumption is because more investment projects are profitable as the interest rate lowers. Further, the supply of savings, S, depends positively on the interest rate. The higher the interest rate is, the more people want to shift consumption to the future and consume less today.

Both planned investments and planned savings meet in a market in which the equilibrium amount of investments, I^*, and the equilibrium amount of savings, S^*, are found by the equilibrium interest rate i^*.

This theory was derived from models without money. The idea was that savers lend goods to banks, which subsequently lend out those goods to investors. Since it is impossible to lend out more goods to investors than the amount offered by savers, the market interest rate has to equilibrate savings and investments.[5] However, as mentioned at the beginning of this paper, that logic is not applicable to a monetary economy since banks can provide credit and create money without pre-existing deposits.

Bibow (2001) and Lindner (2015), following this logic, both show that in a monetary economy, an increase in planned savings, for example, has an ambiguous effect on the interest rate through market mechanisms. They conclude that loanable funds theory must be abandoned.

However, is there no way to reinterpret loanable funds theory to make it compatible with a monetary economy? After all, it is similar to the previously introduced model that

[4] For simplicity, there is no distinction between the nominal and real interest rates in this section. I assume, therefore, that the inflation target is zero.

[5] In this model, the credit supplied by the banks is equal to the credit supplied by the public.

describes a monetary economy correctly. To show this similarity, loanable funds theory's measures are introduced into the new model.

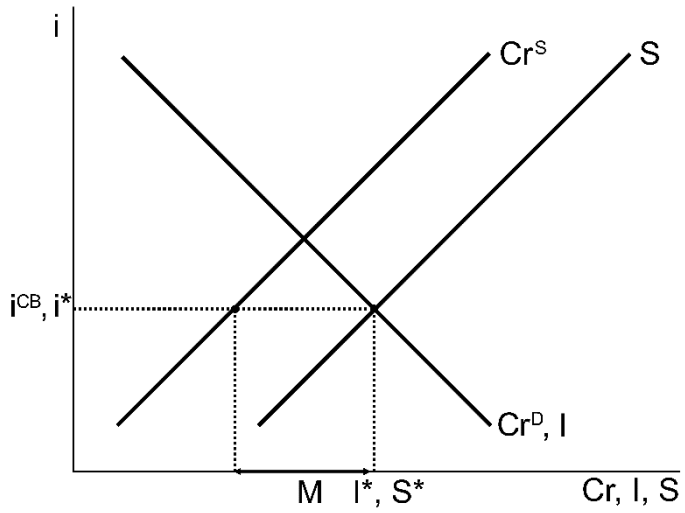
Assume that all investments are financed with credit and that all credit finances investments. Then, investment demand is equal to credit demand—loanable funds theory's I curve is identical to the new model's Cr^D curve.

Introducing savings is slightly more difficult since there are two kinds of saving. First, there is 'conscious' saving when credit is provided to banks, as described by the Cr^S curve. Second, there is 'unconscious' saving, namely, the possession of money. If a certain amount of money is being passed around every few days to pay for goods and services, everyone involved has been saving from the time he or she received the money until the time he or she purchased something with it. Hence, unconscious saving is equal to the amount of money in the economy because every coin or bank note is owned by someone who is unconsciously saving that amount for the time that he or she has it. The character of money as a means of saving is even clearer in the case of bank deposits. As bank deposits are used to conduct transactions, they are included in the amount of money; in addition, they bear interest—the reward for saving.

To obtain the overall amount of savings, one has to add conscious and unconscious savings, namely, the credit supply and the amount of money. Loanable funds theory's S curve is equal to the horizontal sum of the Cr^S curve and the amount of money, M. Figure 3 shows the new model, including loanable funds theory's measures.

The interest rate that the central bank sets is equal to the interest rate that balances planned savings and planned investments. Hence, loanable funds theory's central conclusion is valid in a monetary economy.

Figure 3)



However, the logic behind that balancing process is more complex than that suggested by loanable funds theory's original interpretation. Market forces do not directly drive the interest rate toward the equilibrium. A change in planned savings or planned investments causes a deviation of the inflation rate from the target if the central bank does not adjust the interest rate. Hence, the central bank is forced to change the interest rate to the equilibrium level to achieve the inflation target. A rise in planned savings, for example, leads to an inflation rate below the target if the interest rate is not lowered. The central bank must therefore intervene, and there are more investments at a lower interest rate in the new equilibrium.

To conclude, loanable funds theory can be reconciled with a monetary economy if one includes the presence of a central bank in the process of interest rate determination. This result means that the existence of a central bank that adjusts the interest rate to hit a given inflation target is a necessary condition for loanable funds theory to hold. The interpretation of loanable funds theory as a pure market theory, however, is flawed and must be discarded.

As an addendum to this section, I discuss loanable funds theory's most famous critic, J. M. Keynes, who once called it a 'nonsense theory' (1936, p. 179). Keynes insists that investments are not constrained by savings—his 'most fundamental' conclusion within the

field of interest theory (1937b, p. 669). The previous analysis shows that this conclusion is true only in a narrow sense. Yes, investments are not constrained directly by savings, as loanable funds theory's original interpretation would suggest. However, investments are constrained by savings *indirectly*; a reduction in planned savings causes inflationary pressure, which makes the central bank raise the interest rate. A higher interest rate, in turn, reduces investments.

Liquidity Preference Theory

Liquidity preference theory was introduced in Keynes' *General Theory* (1936) and labeled 'radically opposed' to loanable funds theory by Keynes (1937a, p. 241) in his reply to Ohlin's criticism (1937a, 1937b). It is argued that there is a trade-off between holding money and holding bonds. The advantage of money is that it can be used for transactions (i.e., that it is liquid). On the contrary, money does not bear interest. Bonds have the opposite properties; they bear interest but are not liquid.

Therefore, the demand for money that the public wishes to hold—liquidity demand—is a decreasing function of the interest rate on bonds. If the interest rate on bonds, which is the opportunity cost of holding money, rises, people want to lower the amounts of money in their portfolios and shift to bonds instead. In the equilibrium, the interest rate on bonds must take the value that balances demand for liquidity and the money supply set by the central bank. In other words, Keynes interpreted the interest rate as a *liquidity premium*.

As Stiglitz and Greenwald (2003, pp. 11ff.) show, this view is not accurate for the monetary systems of modern economies. Today, shares of interest-bearing government bonds can be used to conduct transactions, implying that they are perfectly liquid and can be

regarded as 'money.' Therefore, the trade-off between having either an interest-bearing bond or money no longer exists. Hence, it cannot be the determinant of the interest rate on liquid bonds.[6] The previously introduced model also shows that other factors determine the interest rate. That the interest rate is not a trade-off between having a liquid asset and receiving interest becomes even clearer in the extension of the model in Section 4 with the existence of interest-bearing deposits. This result does not mean that liquidity premia do not exist for certain assets. However, as a theory to determine *the* interest rate (i.e., the overall level of interest rates), liquidity preference theory is not useful.[7]

Endogenous Money Theory

Endogenous money theory is a post-Keynesian monetary theory with two specifications: the original 'horizontalist' approach and more advanced 'structuralist' approach. For simplicity, the horizontalist approach, supported by Moore (1988) and Lavoie (1984, 1996, 2006), is described and compared with the new model. The derived conclusions apply equally to the structuralist approach.

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[6] Of course, there still exist illiquid bonds with liquidity premia. However, central banks generally conduct monetary policy through the interest rate on highly liquid bonds (e.g., T-bills) and therefore leave liquidity premia unchanged.

[7] In contrast to this view, there have been several attempts to reconcile liquidity preference theory with loanable funds theory, such as those of Ohlin, Robertson, and Hawtrey (1937), Robertson (1938), Lerner (1938), Fellner and Somers (1941), Johnson (1951), Tsiang (1956, 1980), Ackley (1957), Patinkin (1958), Foley (1975), and Snippe (1985). However, none of these analyses uses a reasonable model of a modern monetary system with endogenous money.

It is assumed that the credit demand of the public, Cr^D, depends negatively on the interest rate, as before. Further, the credit supply function is defined in the usual way, namely, as the amount of credit that the *banks* are willing to grant at a given interest rate. This amount is denoted by Cr^{S*} (in contrast to the fundamentally different credit supply by the *public*, Cr^S). The credit supply is perfectly elastic at an interest rate that exceeds the central bank rate by an exogenous mark-up, m.

The intersection of Cr^D and Cr^{S*} defines the credit market equilibrium, which is the equilibrium interest rate and equilibrium amount of credit. The amount of credit is equal to the amount of money (net of reserves). This amount is denoted by M^*, in contrast to the new model's amount of money, M.

In many respects, the horizontalist model is similar to the new model. They both stress the crucial role of bank credit in money creation and, thus, the endogenous nature of money; they incorporate the fact that bank credit creates deposits rather than vice versa; and they illustrate the insight that investments are necessary for people to be able to save.[8]

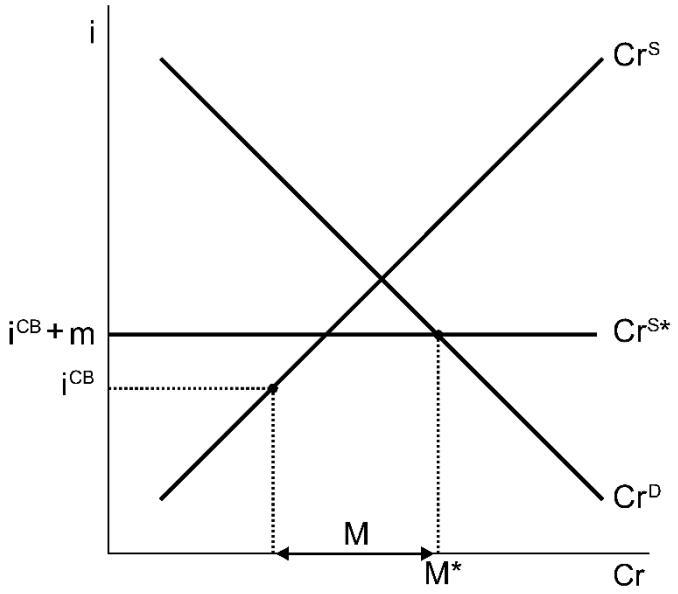
Nevertheless, there are differences. The new model incorporates no interest rate mark-up since it is assumed that (1) no costs are associated with banking, (2) there are no default risks, and (3) the banking sector is perfectly competitive. Relaxing any of these assumptions leads to a lending rate above the central bank rate and, hence, a mark-up. Thus, it is a useful extension to the new model to introduce a mark-up, m, that the banks charge on top of the

[8] Another popular approach that stresses these facts is so-called modern monetary theory. As Palley (2015) shows, however, that set of ideas is overly simplistic and neglects some of the important problems faced by monetary economies, such as controlling inflation.

central bank rate for providing credit. The public can borrow at a rate of $i^{CB} + m$ from the banks and can lend to the banks at an interest rate of i^{CB}.

Figure 4 depicts the new model with a mark-up. Further, the horizontalist model's curves are plotted (similar to the first quadrant in Palley 2013, p. 12). The central difference between the two models is that in the horizontalist model, the amount of money, *M**, is equal to the full demand for credit. In the new model, instead, the amount of money, *M*, is equal to the credit demand *minus the amount that the public transforms into longer-term claims*.

Figure 4)



Since longer-term claims against banks cannot be used to conduct transactions, they should not be included in the amount of money. Therefore, the horizontalist model misses a central point of the nature of money; the amount of money is not equal to the full amount of originally created money but rather to the difference between money created and money destroyed.

To conclude, post-Keynesian endogenous money models are a good starting point for modeling a modern monetary system. It is, however, necessary to include the fact that money is not only created but also destroyed.

4. Introduction of a Modern Monetary System

The basic model already captured two of the initially mentioned facts about monetary systems that are misrepresented frequently: banks create new money by lending and the central bank does not set the amount of money—it sets the interest rate. To show that the other facts can also be incorporated into the framework without altering the model's insights, a more detailed monetary system is now introduced.

For that reason, the assumption that all money is cash is relaxed. From now on, only the share, c, of the money in circulation is cash, with $0 \leq c \leq 1$. The other share, $1 - c$, is bank deposits bearing interest. The private banks create money by providing credit to the public. Further, there is a minimum reserve requirement for the deposits that banks have during the period; each private bank has to lend an amount θ times the deposits it receives to the central bank, with $0 < \theta \leq 1$. The central bank pays the interest rate, i^{CB}, for the minimum reserve.

The new timing illustrates how the extensions affect the model:

(1) At the beginning of the period, the central bank sets the interest rate, i^{CB}, on base money, which it can create.

(2) The amount Cr^{D} is created by the banking sector and lent out to the public. The private banks have to borrow the amount of demanded cash, $c\,M$, from the central bank since only the central bank can create cash. The remaining amount, $Cr^{D} - c\,M$, is created as deposits by the private banks themselves in the process of providing credit.

(3) Also at the beginning of the period, the public uses the amount Cr^{S} to provide credit to the private banks. Therefore, cash is placed with the private banks, and deposits are

swapped into longer-term claims with lending terms of one period.[9] Longer-term claims are not considered to be money. The remaining amount of deposits, $(1 - c)\,M$, is used to conduct transactions during the period. The private banks' minimum reserve requirement becomes $\theta\,(1 - c)\,M$, which they have to borrow from the central bank in addition to the amount of cash, $c\,M$. The banks lend the necessary minimum reserve to the central bank.

(4) During the period, the inflation rate is determined by the amount of money in circulation, M, consisting of the amount of cash, $c\,M$, that circulates physically and the amount of deposits, $(1 - c)\,M$, that circulates from one account to another.

This setup incorporates the remaining facts about the monetary system that contradict the view offered in standard undergraduate textbooks, such as that of Blanchard and Illing (2009, pp. 130-139). Banks do not 'multiply up' the amount of base money into the amount of broad money. Instead, the amount of broad money is determined *first* and affects the amount of base money. Therefore, broad money creation is not limited by the amount of base money. Lastly, deposits are not necessary for banks to provide credit. Deposits are created during the act of providing credit.

In the following, it is shown that the process of interest rate determination in this setup is similar to that in the previous section. Therefore, it is argued that the equilibrium interest rate for credit and deposits is equal to the interest rate that the central bank sets.

First, consider the market for deposits. If the market interest rate for deposits is lower than i^{CB}, it is profitable for a bank to pay a little more than the market interest rate on

[9] It is assumed that the savers choose the longer-term claim over deposits if the interest rate is the same for both assets.

deposits. In that way, the bank could attract deposits from other banks, which have to compensate it for the shift of deposits with base money. Since banks receive i^{CB} when they provide base money to the market, the bank could make a profit. Every other bank would also have that incentive; hence, the interest rate on the market for deposits rises if it is lower than i^{CB}. However, it is not profitable for the banks to raise the interest rate for deposits above i^{CB} because they can obtain base money from the central bank at that interest rate. Therefore, the interest rate for deposits is i^{CB} in equilibrium. The same logic applies to the interest rate that banks charge for credit since the banks can try to attract credit instead of deposits. Hence, the market interest rate for credit from the public is also i^{CB} in the equilibrium. Since the banks have capital costs of i^{CB} when they provide credit, they cannot lend for less than i^{CB}. They also cannot charge more since perfect competition drives down the interest rate for credit lent by the banks to i^{CB}. To sum up, the central bank rate determines all market interest rates perfectly.

The adjustment mechanism is analogous to the one described in Section 2. Take again an increase in the credit supply (see Figure 2).[10] With an unchanged central bank rate i_0^{CB}, an amount of deposits Cr^D is created by the private banks at the beginning of period 1 by serving credit demand as in period 0; however, an increased amount Cr_1^S of initially created deposits is swapped into longer-term claims. This process might reduce the amount of money to the horizontal difference between Cr_1^S and Cr^D at i_0^{CB} and cause below-target inflation. Therefore, the central bank sets a lower interest rate in period 1, which has the following effects. A lower interest rate on base money lowers the private banks' capital costs. Therefore, they are willing to provide credit at a lower interest rate. At a lower interest rate,

[10] For simplicity, the adjustment process is described for the case without cash ($c = 0$).

more credit is demanded by the public, and, thus, more money is created by the private banks. In addition, the credit supply declines as the interest rate lowers. The credit supply is the amount of the initially created money transformed into longer-term claims and, hence, 'destroyed.' Owing to these two effects of a reduced central bank rate, the amount of money in circulation and, hence, inflation can be kept constant. Specifically, the central bank lowers the interest rate to i_1^{CB} in Figure 2. To round off this section, Table 1 presents the aggregate balance sheets during the period.

Table 1)

Assets	Central bank		Liabilities
Refinancing credit	$[c + \theta (1 - c)] M$	Reserves	$\theta (1 - c) M$
		Cash	$c M$

Assets	Private banks		Liabilities
Credit to the public	Cr^D	Refinancing credit	$[c + \theta (1 - c)] M$
Reserves	$\theta (1 - c) M$	Credit from the public	Cr^S
		Deposits	$(1 - c) M$

Assets	The public		Liabilities
Credit to the banks	Cr^S	Credit from the banks	Cr^D
Deposits	$(1 - c) M$		
Cash	$c M$		

5. Conclusions

It is important to formulate an interest theory that incorporates the insights about the monetary system pointed out by the Bank of England and Bundesbank. This paper introduces a suitable model. Its novelty is to include a credit supply function *by the public* that measures the public's planned savings for any interest rate. This measure represents the amount of money 'destroyed' by being swapped into longer-term claims. Further, the interest rate determination process in the model includes decisions by the central bank. The model thus shows that the credit supply and the credit demand determine the interest rate *indirectly*. Shifts in either the credit supply or the credit demand would change inflation. The central bank adjusts the interest rate to offset these changes.

The model's insights are the missing piece to reconcile loanable funds theory's view that the interest rate balances planned investments and planned savings with a correct understanding of monetary economies. This reconciliation is only possible, however, if one accepts that the balancing process is not a simple market mechanism but includes a central bank that adjusts the interest rate endogenously to hit an inflation target.

Although endogenous money theory describes the monetary system correctly in principle, it does not consider the fact that money is not only created but also destroyed. The introduction of an alternative credit supply function, as presented in this paper, would therefore enhance this approach. Liquidity preference theory is not useful for explaining the level of interest rates in a modern monetary economy, as previously shown by Stiglitz and Greenwald (2003).

A straightforward policy conclusion of this paper is that there is no mechanism for austerity (i.e., reducing credit demand through lower budget deficits) to increase private investment when interest rates are at their lower bound. Similarly, expansionary fiscal policy

does not crowd out private investment when interest rates are at their lower bound. In normal times, however, expansionary fiscal policy does crowd out private investments, not because the additional government debt absorbs ‘savings funds’ that would have been available for financing private investments, but rather because increased budget deficits trigger interest rate increases by the central bank. Higher interest rates then depress private investment.

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