

The controversial treatment of money and banks in macroeconomics*

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This paper offers a basic overview of the practical aspects of money creation. A brief presentation of the history of money and a critical summary of the commonly accepted theories highlight the current understanding of the emergence and operating characteristics of money in the modern economy. We follow the distinction between inside and outside money creation. Inside money is jointly determined by the private sector's need for money, together with the banking system's money creation potential. This paper focuses on inside money along the lines of the endogenous money theory. We demonstrate the main features of money flows and the money created by banks. Outside money is created by the state (not the private sector), and its creation can only be indirectly influenced by the money demand of the private sector. A brief overview of the historical process of the emergence of money provides a framework to assess and compare the main elements of the chartalist and metallist concepts of money. Concerning the current debates about the role of the banks in money creation, we compare three theories focusing on money creation. These three theories treat the role of banks in money creation differently. The endogenous money theory based on a convincing description of money flows offers a reliable interpretation of the current monetary policy. One striking conclusion of the endogenous money theory is that banks do not need savings in advance to lend, as lending in itself is considered money creation.

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1. Introduction

People's view of microeconomics based on their own observations is often far removed from what actually happens in the economy. Not because their world view is distorted, subjective or because their ideological or religious beliefs influence it, but because they cannot perceive the restrictions, forces and dynamics resulting from macroeconomic constraints. This problem is indicated by the fact that the same economic category often reflects a completely different content in the macro and the micro approach. For example, it is widely known that increasing savings at the level of individuals is a laudable virtue, while at the macro level it is often a hindrance to recovery because it dampens demand. At the individual level, indebtedness is associated with recklessness, while demand is boosted most through borrowing, since if we did not want to spend, people would not incur debt. Savings and debt are linked to money, so one might suspect that our view of money may be hampered by similar contradictions. This paper concentrates on certain contradictions of money theories. Among the theories aimed at clearing up the mysteries surrounding the origin of money, we will briefly touch upon those that are the most widely accepted. In describing the interpretations and formulating our doubts linked to them, we seek to gain a deeper understanding of the role banks play in money creation.

Since its inception more than two and a half thousand years ago, money has undergone several changes. The circumstances of its origin, however, may provide a basis for distinguishing between the misconceptions and the apparent facts about money. For the modern man, gaining an insight into the mechanism of money creation is even more important than learning about the origin of money. Even today, several conflicting theories of modern money creation are widely held. Identifying the correct and accurate mechanism of money creation among the competing misconceptions is also vital, because only a verified theory – or one that seems to be verified by the facts of the modern economy – can provide a useful tool for managing or at least understanding the understanding the current problems.

2. Is money an innovation to reduce transaction costs?

This chapter reaches a conclusion different from the commonly accepted economic thinking described in textbooks. Arguments against money theories hinging on the reduction of *transaction costs* are based on two unresolved questions. First, it should be clear *whose* transactions are examined, and it is also important to know *what types of transactions* of the participants are being analysed. Both questions remain unanswered in most money theories.

The direct exchange of goods (barter) is complicated and makes the exchange of goods very difficult. Many theories attributed the emergence of money to the fact that it facilitated the temporal and spatial separation of selling and buying goods and of the parties concerned. If goods are not exchanged directly for goods, the buyer of a good does not have to be a seller of another good at the same time, and they do not have to find an extremely rare occasion for the exchange when the buyer wishes to buy exactly the good offered by the seller, and vice versa. Not to mention the fact that the value of the goods sought to be sold and bought may be different, and the difference cannot be settled by dividing up the goods. This problem is solved if money acts as an intermediary in the exchange of goods.

It is important to determine the circumstances when barter can be substituted by money in the exchange. Money is only accepted by the seller if it carries value. But what lends value to money? Let us assume that gold represents this value. The metallist commodity money theory flourished and became widespread based on such assumptions. It seems an obvious hypothesis, but surprisingly gold nuggets have basically never been used as a means of payment (with the exception of the California Gold Rush). *Goodhart (1998:411)* considered this exchange a form of barter, since he believed that gold nuggets were not suitable for fulfilling the role of money, as both the seller and the buyer knew little about its value, while both of them knew the precise value of beans.¹ Determining the value of a gold nugget required an expert, which added to both the duration and the costs of the transaction. *Gierson (1977)* confirmed that precious metals emerged as means of payment in parallel with minting. This suggests that the sign put on the metal during minting solved the problem of assessing the value of precious metals. The imprint indicated the value, and therefore people did not have to weigh the metal and analyse its composition every time. Thus the coinage, with the minted imprint solved the problem of identification. However, together with the imprint, another element was also introduced, namely the authority that was legally allowed to engage in minting. This leads us from the concept of metallist commodity money to chartalism. According to the chartalist theory, the “value and utility” of money is not linked to its inner metal content, but to the power of the state. As the imprint identifies, it only takes one more step to disregard the significance of metal content, and to replace gold with a paper print. Thus, the value of money does not arise from its metal content.

¹ *Goodhart (1998)* presents a detailed overview of the origin and nature of money. His article had a marked influence on the present study. The history of money is presented from another aspect, the safe asset function, by *Gorton (2016)*, who gives a detailed account of the events in today’s global financial crisis, which confirm the essential nature of precisely this function.

The involvement of the state authority had a beneficial effect of reducing transaction costs, which fostered the spread of money. Several events in history suggest that the origin of money is not linked to the exchange between individuals.² *Quiggin (1949)* gives a more detailed account of this while providing an overview of the “primitive” forms of money in ancient societies. In such societies, money did not serve commercial purposes, its power or status aspects were more important. In other words, status and authority was more central in the inception of money than the transaction element. From this perspective, the reduction of transaction costs was a collateral benefit of the emergence of money, but not its underlying goal or reason. Readers familiar with the accounting of economic transactions know that money creation is the same as incurring debt. Money is recognised on the assets side of the balance sheet, while the debt incurred is entered on the liabilities side. When a king builds a castle from the money, his money on the assets side turns into a pile of stones, but his debt on the liabilities side is retained. The debt is an obligation to accept the money minted by him from his subjects when they pay their obligations. This is similar to the situation when a state institution charged with printing banknotes does so. This process is regulated by strict laws, but the same strict laws stipulate that taxes, duties and consideration for all state services may only be paid in domestic currency. One of the most important innovative features of money is that it improves the efficiency of tax collection. As long as the fiscal function of the person in power was constrained by the physical necessity to visit all his subjects with his entourage during the year and eat all their products deemed appropriate by him as a form of taxation, no vast empires could be established, not even when the entourage expanded over time.

According to chartalists, facilitating taxation is the key function leading to the emergence of money. Chartalists dispute the core assumption of the metallist theory that the value of money is derived from its metal content or gold backing. This theory does not view money as a kind of good with exchange value and does not stress its function as a means of exchange, but emphasises its function as a means of payment and record-keeping. In the metallist approach, the market functions as the dominant element, and the state does not play a special role in either the creation of money or its functions. By contrast, the chartalist theory maintains that all “means of payment” emerge as generally accepted money only because the authority declares that people and organisations are required to pay and keep records of certain obligations against the state in that currency. For example, the king may finance a war by giving his soldiers coins, and levy a tax on his subjects, demanding that everyone pay one coin to the treasury. This makes these coins instantly fit for circulation, as taxpayers seek to obtain them in exchange for goods.

² *Clower (1984)* listed several problems with attributing the existence of money to some form of transaction cost reduction. Divisibility, durability and transportability are clearly beneficial features, but the existence of money itself cannot be derived from these.

The mark minted on one side of the metal is used for determining its value. *Graeber (2011)* and *Gierson (1977)* both convincingly argued in support of this hypothesis. According to *Graeber (2011)*, the metallist monetary systems using money with an inherent value and the chartalist monetary systems using money without an inherent value have alternated cyclically over the course of history. Money with an inherent value became widely used in periods characterised by widespread conflicts or wars, as trust in the weakening central authority was undermined.

The chartalist approach to money appears in the works of several well-known economists. For example in a book by Adam Smith: “A prince, who should enact that a certain proportion of his taxes should be paid in a paper money of a certain kind, might thereby give a certain value to this paper money, even though the term of its final discharge and redemption should depend altogether upon the will of the prince” (*Smith 1952 [1776]: 160, quoted in Bell 2001:154*). The general description of the chartalist theory of money was published by *Knapp (1924)*. *Bell (2001)* summarises the gist of Knapp’s complex argumentation as follows: when the money used for paying taxes and for the services carried out in state offices is stipulated by law, no metal-related feature of the money plays a role in the decision; therefore, this theory basically refutes the metallist theory of money. Money becomes a generally accepted means of payment because it enables people to pay their obligations to the state. The “tokens”³ declared by the state to be accepted as a means of payment are the banknotes.

In economic settlements (bookkeeping), it is self-evident that every transaction is reflected as a mirror image on the side where an asset or liability concerned is recorded. When the state creates money, it incurs debt. When it pays wages or buys goods, it finances this expenditure by issuing debt. And it can only incur debt when there is someone who is willing to accept its debt securities (government bonds, paper money). This means that these must carry value, which is derived from the obligation to pay taxes in the given currency. Those tokens are regarded by individuals as money that can be used for paying the obligations toward the state. Such tokens can be used by anyone for this purpose, which also makes them a generally accepted means of payment. The private sector accepts the state’s debt certificate and treats it as an asset in its books that can be used to pay taxes (debt). In the books of the state, the same money is debt, as an obligation to take back the money that was issued, for example to accept it when people pay taxes.

The money created is the debt of the issuer, and the creation of money represents the creation of a means for income centralisation. In order to make the security embodying the issued debt widely acceptable as a means of payment with

³ The word “chartalist” originates from the Latin “charta”, which basically means paper. *Bell (2001:155)* cites *Knapp’s (1924:31)* argument that the value of the token received in a cloakroom is derived from the fact that it embodies the promise that we will get our coats back.

value, the state only has to proclaim that obligations toward the state need to be paid in the same currency. This basically means that the state accepts its own debt. Therefore, the value of money is not related to any kind of “coverage” or any inherent monetary value: it can be simply derived from the fact that it was officially proclaimed to be accepted for paying obligations vis-à-vis the state. It is an important feature of the chartalist theory of money that, in addition to the payment function, money can also fulfil an accounting function by appearing on both sides of the balance sheet. In this sense, money represents one party’s agreement to hold the debt of another party in their portfolio. My money is the state’s debt (Wray 1998).

The state may play a central role in money becoming money, but this is not an inevitable part of the process. Foley (1987) pointed out that anybody can create money by incurring debt, but this requires that recipients accept the money thus created in payment transactions as well. The debt issued by someone only qualifies as money creation only if the debt is accepted by others. When it issues stamps, the post office incurs debt, a liability to be met later, namely to deliver the packages bearing its stamps to the recipients. These stamps have a value from then on, as whoever has them can use them as a means of payment, albeit only for fulfilling their payment obligations for the postal services. The fact that stamps cannot be used for paying taxes is a crucial limitation, and that is why such stamps cannot become a widespread means of payment.

Banks also can create generally accepted money, since people can pay taxes from bank loans. We would note, however, that the banking system’s potential for money creation is limited by credit demand. Credit demand hinges on factors that may be influenced by the government’s decisions, but are driven by economic considerations. The money transferred to a bank account can be used for paying taxes. Therefore, banks also have a money creation function. This becomes especially clear when one examines the process of banks’ money creation itself. Whether banks act as intermediaries between savers and borrowers in transferring already existing money or they create money themselves during their operations is a question equally important from the perspective of macroeconomics, finance and banking as well. This has significant consequences for micro and macroprudential regulation and for the tasks of banking supervision.

2.1. Three theories of money creation: Intermediation, money multiplier, endogenous money theory

There are three important and widely accepted theories discussing the macroeconomic role of banks and money.⁴ All three are in conflict with each other in explaining even the basic facts, and yet still they live in peaceful coexistence in textbooks. According to one of the theories, banks simply act as intermediaries in

⁴ In this chapter we follow Werner’s (2015) arguments.

channelling savings to borrowers, and play no part at all in money creation. Banks do not create money, they create liquidity by providing long-term loans from short-term funds.⁵ This is called the *theory of financial intermediation* by the banking system. This approach can be considered to have been the most widely accepted in recent decades. Another set of theories maintains that individual banks are unable to create money, since they cannot print banknotes, but the banking system as a whole can create money in a manner governed by the central bank. This can be achieved through the money multiplier determined by the commercial bank's reserve ratio, which in turn is controlled or at least influenced by the central bank. This is called the *money multiplier theory*. In textbooks on macroeconomics, this is still the most frequently cited theory.⁶ This is all the more surprising, since most central banks in developed economies ceased to rely on this theory and to shape their monetary policy through the required reserves a long time ago. According to the third theory, banks may create money independently from the central bank through lending,⁷ but lending conditions are influenced by the central bank's monetary policy. In other words, the central bank and the commercial banking sector combines a complex system of money creation, in which the money flows observed in reality are shaped by the interactions and mutual adjustment of the parties. This is called the *endogenous money theory*. Due to some features of the period after the crisis, this approach has gained in popularity once again, and many researchers present their results in relation to this approach as fundamentally new realisations. However, the theory is so old that its origin can hardly be traced (Werner 2014a,b; 2015). It is not new in Hungary either: one need but cite Miklós Riesz's works as an example (Riesz 1980). Száz (1989) gives a very good overview of this approach and the theory. Yet probably the most original proponent of this approach in Hungary was Mária Augusztinovics who believed it was self-evident that "money is created through lending, and it is eliminated when the loan is repaid"⁸ (Augusztinovics 1965).

2.2. The financial intermediation theory

Banks and other financial enterprises perform financial intermediation between savers and borrowers. Investment funds, even if they typically do not grant loans, buy bonds issued by companies and thereby transfer investors' money to

⁵ Dewatripont, Rocher and Tirole (2010) provides an excellent analysis of the theory of banks as intermediaries.

⁶ For example in the textbooks following the neoclassical revolution that unfolded in the wake of Samuelson's (1948) seminal work.

⁷ The fact that banks create money out of nothing is a widely accepted phrase in the literature. This radically distinguishes the approach from other theories – based on the required reserve ratio by the central bank (money multiplier) or the intermediation of savings – but it entails the risk of disregarding important elements. Such an important element for example is the fact that in the absence of credit demand, banks' "ability" is limited. It is important to point out that money creation mostly entails purchasing power redistribution and the assumption of an obligation by an economic entity.

⁸ We will not discuss whether debt is negative money, i.e. whether the repayment of debt eliminates money. When money is taken to a bank to settle a debt, we do not think that the bank will shred the banknotes to eliminate the money. The interpretation of the cited expression, however, raises further questions that we will address when discussing balance sheet settlements.

companies. *Gurley and Shaw's (1960)* seminal book emphasises that banks and non-bank financial institutions basically perform the same function in financial intermediation. A simplified model of financial intermediation shows that out of 100 units of savings, banks create the reserves necessary for safe functioning, e.g. using 1 unit for this purpose, which they deposit with the central bank, where they receive (normally low) interest on it. The remaining 99 units are then extended as loans. Investment funds also manage their liquidity, but they do not necessarily have to put aside reserves for day-to-day payments, since the liquidity can be obtained by selling securities.⁹ To put it simply, we can say that out of 100 units of savings they buy 100 units of shares, i.e. the whole amount may be used for investments (direct financing). From a financing perspective, this is the same “intermediation” as if it happened through a bank. The main distinctive feature is that the prudential regulation of banks and non-bank financial institutions is significantly different, and therefore “intermediation” by investment funds is outside the regulation of banks. The stricter regulatory provisions with respect to banks are attributed to the fact that banks should not gamble with depositors’ money by taking up investment risk, but in the case of investment funds, there is no repayment guaranty, the clients accept that the risk is borne by themselves.

According to the theory of financial intermediation, banks do not create money individually or collectively, i.e. at the level of the banking system. This theory can be used easily in several economic models, since it basically implies that the money created (or rather not created) by the banking system can be left out of these models,¹⁰ and therefore banks’ behaviour is not important. In the majority of such models, money is simply a unit of account used to record income flows, but the theory does not say anything about money creation or the role played by banks in it. This theory is more like a theory of banking than a theory of money. This theory, which disregards the behaviour of banks and its impact on money flows, was called into question during the global financial crisis, and recently many attempts have been made at integrating banks’ behaviour into macroeconomic models.

2.3. The money multiplier theory

The money multiplier theory is based on the assumption that commercial bank’s reserves held at the central bank are an important element of the financial intermediation process. The money multiplier theory goes one step further than the intermediation theory. Although it still describes individual banks only as financial intermediaries, at the macro level it acknowledges the money creating potential inherent as a whole in the banking system. Deposits may be multiplied

⁹ It is no coincidence that in the case of such transactions some days pass between the order and the settlement.

¹⁰ The general shortcomings of representation of the role of banks in these models and the importance of changing this is portrayed in detail in *Jakab–Kumhof (2015)*.

in the banking system, since spending a loan extended from a bank's deposits may generate deposits at another bank, which may produce another loan and another deposit in the banking system. This deposit–loan multiplication can be influenced by adjusting the reserve requirement. This gives us a theory that provides monetary policy with a simple instrument for shaping money flows.

The multiplier theory is described in most macroeconomic and financial textbooks as a basic, self-evident principle. In practice, however, employing this principle for the analysis of money flows has advantages, but also serious drawbacks. We would emphasise the latter when judging the theory, but first we have to briefly present the principle of multiplication itself.¹¹ In the following, we examine the credit multiplication process resulting from the expansion of deposits based on the example by *Siklos (2001:322–328)* (with minor changes).

Demand deposits (current account balance) of Company C1 increased by HUF 1 million because it performed a contract for the state. The company holds an account with Bank B1. Banks are required to hold in reserve 5 per cent of the demand deposits to be able to make current payments and transfers.¹² The required¹³ reserve ratio (*rr*) is 5%. In excess of this, the bank still has additional funds (reserves) of HUF 950,000 from the HUF 1 million increase. Bank B1 deposits this temporarily at the central bank as an excess reserve.

Company C1 transfers HUF 1 million from its deposit to Company C2, which increases the current account balance of Company C2 with Bank B2, while overall the demand deposits and reserves of Bank B1 decrease by the same amount. The increase in its demand deposits is used the same way by Bank B2 as by B1, i.e. B2 deposits it at the central bank as a reserve. Overall in the banking system (when viewing the two banks together), the transfer transaction does not entail any growth in deposits and the reserve requirements also remain the same. However, there is still a surplus of HUF 950,000 in reserves in the banking system. This should be used by the bank where it appears, for example by extending loans or investing in securities.

The excess reserve of Bank B2 should be used for accepting Company C3's loan application and granting a loan of HUF 950,000 in bank money. From the loan, Company C3 repays its debt against Company C4. Company C4 also holds an account

¹¹ A more detailed and accessible description of the process supported by accounting relations can be found in the textbooks by *Száz (1991)* és *Siklos (2001)*.

¹² We present a simplified description of the reserve requirement process. We only highlight the liquidity necessary for ensuring that transfers are processed without interruption, and we do not discuss the other monetary policy goals the reserve requirement system may have.

¹³ It would be more appropriate to use the term "target reserves" instead of "required" by regulation, because what really matters in the money creation process is the level of reserves that the commercial banks would want to hold (target).

at Bank B2, and therefore the bank records an increase of HUF 950,000 in deposits at the same time when the loan is extended, out of which 5 per cent is put in the required reserve, but this still leaves it with excess reserves of HUF 902,500.

This process increased the deposits in the banking system to HUF 1.95 million. But this increase continues, as there are still excess reserves in the banking system, which generates further lending or investments, provided that credit demand allows this expansion. The banking system seeks to reduce its reserves to the level of the reserve requirement and attempts to lend out the excess reserves. Therefore the process can continue. If all excess reserves in the banking system are used for lending, the lower the required (or targeted) reserve ratio, the more deposits are generated. In our example, the sum of the required and excess reserves generated in step (a) was HUF 1 million, which was produced by the initial increase in deposits. If all the HUF 1 million is distilled into required reserves and no excess reserve remains in the banking system that could be used for lending, bank lending generates a HUF 20 million increase in deposits in the context of a 5 per cent reserve ratio.

Money multiplier describes the additional deposits and loans generated by the increase in excess reserves in the banking system which can be used for lending. In order to show the relationship between this process and the amount of money, we start our analysis with the central bank's balance sheet.

The amount of money in circulation ($M1$) that the private sector can use for payments is the sum of all the cash and demand deposits (*Siklos 2001:326*). The change in the amount of money in circulation is due to the change in the amount of cash and demand deposits. The process of money supply in the above example starts in step (a), at the level of individual banks, Company C1 deposited¹⁴ HUF 1 million in Bank B1. This reduced the amount of cash in circulation by HUF 1 million, while the stock of demand deposits increased by the same amount, i.e. the amount of money in circulation did not change. However, at the level of the banking system, the amount of money expanded by HUF 19 million due to the process of multiplication.

According to the theory, the central bank can influence the amount of money through several channels. It can increase the required reserve ratio and print money, which can be issued by purchasing foreign currencies or securities (government securities).¹⁵ Government securities purchases and the accumulation of foreign

¹⁴ Above in step (a) we assumed that the increase of HUF 1 million in deposits does not originate from the cash in circulation but from the state budget. If the revenue of the company is from a direct budget expenditure, then the state has created so-called "outside" money with this step. From the perspective of the multiplier, however, the nature of the initial step that induced the growth in deposits is irrelevant.

¹⁵ For the purpose of distinguishing it from the creation of fiat money, the money created by the central bank (or the *Treasury* in the United States of America) is called outside money, while the money created by banks is called inside money. In practice, in the case of developed economies, 90 per cent of the money supply is created by banks (*Goodhart 1998*), but as a result of quantitative easing, today this figure is closer to 97–98 per cent.

exchange reserves both boost the money supply, since the central bank pays for the foreign exchange and the government securities in forint. This process is referred to as controlling the money supply through changes in the monetary base (M0). The monetary base is the sum of the cash in circulation and the central bank reserves. All in all, it can be stated that the central bank can influence M1 money supply by changing the monetary base (M0) as follows:

$$\frac{M1}{M0} = \frac{(cr+1)}{(cr+rr)} \quad (1)$$

where $cr=CUR/DEP$ is the ratio of cash to deposits and $rr=RES/DEP$ is the required (or targeted) reserve ratio.

This formula follows the textbook conventions and highlights the concept of monetary policy (and money creation) that the central bank controls the money supply by changing the required reserve ratio. This formula assumes that banks do not hold reserves in excess of the required reserves because it is too costly. This is precisely the assumption on which the theory that the money supply is controlled through the required reserve ratio is based. In reality, however, especially after the crisis, the monetary base also expanded through the bloating of banks' excess reserves, but this did not lead to the multiplication of the money supply in the real economy.

The money multiplier model described above suggests that the central bank can easily influence the money supply by adjusting the items on the assets and liabilities sides of its balance sheet. This influence, however, cannot be exerted fully and perfectly on either side.¹⁶ The amount of cash in circulation is shaped by the cash-use habits of the public and banks' reserve decisions, and it does not depend solely on the size of the monetary base and the multiplier. As the monetary base is the sum of the cash and central bank reserves, it is difficult to control it, since banks' excess reserves can substantially change their size. This means that the formula describing the key to the central bank's control over the money supply is *unstable*. The parameters can be determined without difficulty at any time *ex-post*, but looking ahead they can usually change easily and unexpectedly. This is like pushing on a string. The central bank has several instruments at its disposal for influencing money flows. All in all, we may venture to claim that the central bank, should it wish to do so, could exert a relatively tight control over the monetary base even with considerable uncertainties,¹⁷ but the price for this control would be volatile fluctuations in interest rates. Nevertheless, the broad monetary aggregates could

¹⁶ See Siklos (2001:478).

¹⁷ Recently "helicopter" money has become a hotly debated issue. If we take into account this instrument as well, the central bank has an even better chance to influence the monetary base. At what price it would be able to do so is another matter.

not be controlled, not even at this price, because it would also be influenced by the portfolio decisions of economic actors.

The other, even bigger problem with controlling the money supply through the required reserve ratio is that the size of the multiplier is also uncertain. In reality, the creation of (bank) money does seem like a sort of multiplication. Nonetheless, money creation in the form of bank money is determined by credit demand and not a multiplier. The process of bank money creation can be described by a cause and effect relationship, which is not a matter of a simple ratio. The theory of endogenous money supply assumes a relationship which is quite the opposite of the one suggested by the money multiplier theory: the monetary base itself is endogenous too, and it is the result of endogenous credit, since it is created by the central bank in response to the lending activity of commercial banks. The belief that the multiplier is determined by the required reserve ratio is based on very radical simplifications and assumptions which are out of touch with reality.¹⁸ We do not know anything about the potential pace of iteration among individual banks in the whole banking system, and therefore we cannot know how many members are aggregated, which makes the result of our calculations of the multiplication process uncertain. The textbook construction of the multiplier is convincing and, on account of the simplification, it may be a very effective presentation tool, but no practical analysis should be based on it. There are further problems with controlling money supply. The very concept of money itself is hard to measure. Based on liquidity and flow features, several categories of money can be distinguished. The series *M0*, *M1*, *M2*, *M3* can be continued, and it may be useful to capture the categories of money in a continuum that enables an infinite number of divisions (*Barnett 1980*).

2.3.1. Money multiplier in reality

Figure 1 shows the development of the money multiplier over time, or more precisely the *M1* money multiplier indicator of the Federal Reserve Bank of St. Louis. The chart clearly illustrates the instability of the multiplier in the past decades. The direct causes of the changes will not be discussed here. Nonetheless, the development of the indicator shows that the Fed's interventions in the wake of the 2008 crisis considerably expanded the monetary base, which, however, was not reflected in lending, and therefore the multiplier dropped significantly.

Due to the uncertainties surrounding the money multiplier, by the late 1990s most central banks had abandoned the approach of controlling the money supply via the required reserve policy. In many cases this also meant that central banks abolished the reserve requirement, i.e. in the textbook model rr would be 0, which would mean the creation of an infinite amount of money. Instead of controlling the

¹⁸ This has been asserted by many people. For a detailed discussion, see *Keen (2011)*.

Figure 1
M1 money multiplier of the Federal Reserve Bank of St. Louis, 1984–2016



money supply, central banks shifted to influencing interest rates, which is currently integrated into an inflation targeting framework in many places.

2.4. Endogenous money theory

*The endogenous money theory states that money creation happens at the moment when banks extend a loan.*¹⁹ This single step, however, has radical consequences. In this manner, banks can extend loans without collecting any kinds of deposits for funding, because lending instantly creates money.²⁰ This is hard to accept, since we might believe that in order to provide someone with money that can be spent, banks need to acquire it first, as they cannot print money. While it is true that they cannot print money, they can keep accounts. The moment the loan is extended, it appears on the client's account. This is a bookkeeping entry, and the money registered here was not transferred from another account or intermediated from the savings of another economic actor. In creating a credit debt, the bank

¹⁹ In this sense, exogenous money is the money the emergence of which cannot be directly inferred from the credit demand of economic actors. An example for this is the central bank money created through quantitative easing or the money created by the central bank by purchasing the government securities issued in order to finance the general government.

²⁰ This money creation is markedly different from the one involving the state, and the two are usually distinguished at the conceptual level as well. The money created by banks is called inside money, while the money created by the state is called outside money. In practice, however, when we pay in a shop, we do not know the way the cash we use was created, which, fortunately, is irrelevant to those who sit on the other side of the till as well.

generates a client deposit with the amount credited to the borrower's account, over which, from this moment on, the client may dispose. This deposit, however, was not brought into the bank by anyone, it was created by the bank by crediting it in their own books.

Superficially, the amount credited to the account of the borrower appears to be a deposit, but as the condition for increasing the balance on the current account,²¹ the client undertook a future payment obligation to the bank as described in the documentation of the bank loan. At the macro level, credit growth entails an expansion of the money supply. This boosts the effective demand (consumption and investments), since it would make no sense to take out a loan at interest if people did not want to spend it on buying goods. If the loan is used to repay debts, we offset a potential loss in demand, which would occur if we repaid the debt from the savings accumulated by reducing our spending.

2.4.1. The accounting of loans

Any company can extend loans, but the accounting representation of the transaction is different in the case of banks and other companies. This difference is shown in Table 1. Lending by a company (non-financial enterprise or non-bank financial enterprise) means the realignment of its assets. Among the company's assets, a receivable against the borrower appears, and the balance of its bank account shrinks by the same amount. Banks usually only extend loans to their clients, and expect borrowers to keep their accounts at their institution. When a bank grants a loan, its assets increase by the amount of the loan, which is credited to the client's account, and therefore on the assets side its client deposits increase by the same amount.

Table 1
Changes in the balance sheets of companies, non-bank financial intermediaries and banks after the accounting of loans

Company		Non-bank financial intermediary		Bank	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Loan: +100		Loan: +100		Loan: +100	Client's current account balance +100
Deposit: -100		Deposit: -100			
Balance: 0	0	0	0	+100	+100

Source: Werner (2014:73)

²¹ Throughout the paper the terms current account balance, deposits or demand deposits of a company are used as synonyms.

Banks create money through lending. The idea that lending is money creation is not new. There have been many people who believed in this concept. We could mention *Hawtrey's (1919)* work, but *Werner (2015)* states that one of the earliest major books of the theory was the one written by *Henry D. Macleod (1856)* (*Werner 2015:6*).²² *Basil Moore's (1988)* book, which is still influential today, played a central role in the modern-day reinterpretation of the endogenous money theory.

In the next section, we detail several types of transactions that can be linked to money creation. Various types of transactions are examined, including ones involving commercial banks and ones involving the central bank. Using these examples, we illuminate the economic substance of money flows. The balance sheets used in accounting provide an accurate picture of financial processes, and therefore we present the process of the transactions through these balance sheets.

In *Table 1*, we showed that different types of companies record lending in their balance sheets differently. This is analysed in more detail below. If a loan is extended to Company "A", the balance sheet of a commercial bank changes in the way shown in *Figure 2*. Lending affects the assets and the liabilities side of the bank's balance sheet at the same time. On the assets side, the new loan is recorded, while on the liabilities side a deposit of the same amount is credited. In other words, the act of lending creates its own source, and the cornerstone of the whole process is credit and not savings in the traditional sense. Thus, the subject of both the loan and the deposit transaction is Client "A". Other accounting items and consequences related to the operation of the bank such as the capital requirement, the required reserve ratio and other regulations and regulatory requirements may hamper the bank's lending activity. These effects are analysed later.

Figure 2
The balance sheet of the commercial bank extending a loan to Company "A"

Assets	Liabilities and equity
Reserves at the central bank (required reserve, other and excess reserve items) and cash	Previous Deposit
Previous Loans [1] New Loan ('A' company) [3]	New deposit ('A' company)* [2] Other liabilities (net) [4]

* Balance increase credited to the borrower's account by the lending bank, [2]=[3]

Source: Authors' compilation

²² Others also cite the works by Marx, Wicksell and Keynes.

The promise of Client “A” to pay back the loan becomes a generally accepted means of payment through this transaction. In other words, the bank performs a transformation: the individual debt of Participant “A” becomes a generally accepted liability (with higher liquidity) against the bank. In fact, due to the state’s deposit insurance schemes, the amount that appears as the increase in the client’s current account balance and designated on Figure 2 as “new deposit” may potentially become a receivable against the state within the framework of deposit insurance. It is important to note that deposit insurance means a conditional and therefore limited obligation by the state, but in general the state’s intention to ensure the uninterrupted functioning of the whole banking system suggests a sort of unlimited implicit guarantee. When viewing bank lending as money creation, it is important to bear this in mind, since this fact also indicates the practical significance of money creation through lending by individual banks.

In parallel with lending (or rather after lending), commercial banks create reserves in line with the regulations. Central bank reserves mean the commercial bank assets (various deposits, required reserves) held on an account with the central bank. The increase in required reserves is settled by the bank by reallocating some of its excess central bank reserves to the required reserves. Should a bank not have enough reserves, the missing liquidity is offset by interbank borrowing or a central bank loan. The latter assumes money creation by the central bank: as we have pointed out earlier, in the complex system of money creation, the decisions of the central bank and commercial banks all play a role.

All in all, it can be stated that banks do not act as intermediaries with respect to savings, but basically allocate purchasing power among economic actors in line with certain market, business and economic considerations.

Here we have presented the first moment of the act of money creation, but it is worth examining some further steps in the transaction and the resulting consequences for the central bank.

Figure 3
Commercial banks’ balance sheet when using deposits while transferring funds to a client within the bank

Assets	Liabilities and equity
Reserves at the central bank (required reserve, other and excess reserve items) and cash	Previous Deposits
Previous Loans [1] (+) New Loan (Company ‘A’) [3]	(+) New deposit (Company ‘A’) [2] (-) Deposit (Company ‘A’) [4] (+) New deposit (‘B’ vállalat) [5] Other liabilities (net)

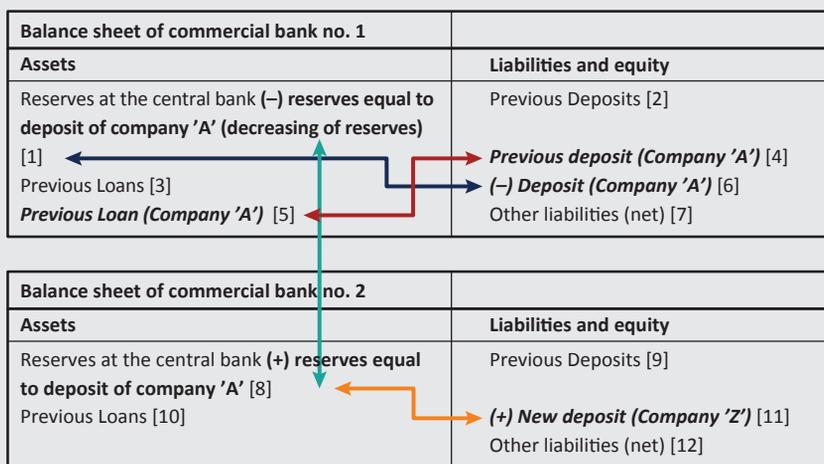
Note: (+) Loan (Company “A”) = (+) Deposit (Company “A”), [3]=[2], [4]=[5].

Source: Authors’ compilation

If, after the loan is extended, Company “A” buys a product from Company “B”, and settles the purchase with an intrabank transfer, then the transaction entails only a realignment on the liabilities side of the bank. At the end of the process, the increase in the account balance of Participant “B” finances the loan of “A”. *It is important to underline that this is a result of the borrowing and the subsequent use of the loan by “A”, not a financing act or a reason enabling the loan.*

If the initial loan is used for a transfer outside the bank, the situation is different (Figure 4). In this case, the transaction between two banks within the banking system can only be settled in central bank money, and through the bank accounts held with the central bank.²³ This transfer affects the reserves of both banks held on their accounts with the central bank, reducing the account balance of the bank initiating the transfer and increasing it in the case of the recipient bank, as if it was a case of “reserve transfer”.

Figure 4
Using deposits in interbank transfers



Note: [4]=[5], [1]=[6], [1]=[8], [8]=[11].
Source: Authors’ compilation

Due to the “transfer” of reserves, the liquidity of both banks changes. Banks’ liquidity management focuses on central bank money. Liquidity management seeks to ensure that the given commercial bank always has available funds with the central

²³ In theory, commercial banks can keep accounts for each other. In such a scenario, the transfer is settled as an intrabank transaction with the amount credited on the account of Bank “B” held with Bank “A”, and therefore the money does not leave the bank. For the sake of simplicity, in this paper we will assume that commercial banks interact with each other through their accounts held with the central bank. Transfers are thus settled in an interbank transaction.

bank for making interbank transfers for their clients. Interbank settlements are carried out through banks' accounts held with the central bank. Nothing prohibits banks from keeping accounts for each other and from settling their transactions through these accounts, but we do not deal with this in this paper. We assume that banks settle their transactions through the central bank. The endogenous money created by banks does not influence banks' accounts held with the central bank at the moment of money creation, but when clients use the loan granted to them for buying something from the client of another bank or transferring a portion of it to someone else, that transaction does have an impact on the balance of banks' accounts held with the central bank.

It is possible that banks' clients only do business with intrabank clients. This does not change the liquidity of banks. In this case, liquidity management is limited to adjusting the composition of the required reserve and managing the potentially arising demand for cash. The other extreme is when, after the loan is extended, clients transfer the full amount to another bank without receiving any transfers to their own accounts. In this case, banks' liquidity management has to acquire a stock of central bank money equivalent to the full amount of the client's loan. Of course, the real cases are between these two extremes in most instances, and the netted interbank settlements further reduce demand for central bank money.

Central bank money can be acquired in several ways, for example by issuing bonds, interbank borrowing, a loan received from the central bank or a capital increase. Interbank lending is presented in *Figure 5*.

Figure 5
Commercial banks' balance sheet during interbank lending

Balance sheet of commercial bank no. 1	
Assets	Liabilities and equity
Reserves at the central bank (+) reserves equal to interbank loan [1]	Previous deposits [2]
Previous loans [4]	(+) interbank loan [3] Other liabilities (net) [5]

Balance sheet of commercial bank no. 2	
Assets	Liabilities and equity
Reserves at the central bank (-) reserves equal to interbank loan [7]	Previous deposits [8]
(+) interbank deposit [9] Previous loans [10]	Other liabilities (net) [11]

Note: [1]=[3], [1]=[7], [7]=[9].
Source: Authors' compilation

In addition to interbank lending, central bank money can be included in bank financing through a capital increase, by issuing bank bonds,²⁴ and of course the central bank money held at the bank may increase/decrease during the day-to-day operations of the bank, depending on the decisions of the clients. In the case of a well-functioning interbank market, i.e. when the participants of the banking system completely trust each other, the amount of central bank money available at the given institution usually does not limit lending, as participants can smoothly manage their temporary shortfalls in central bank money on the interbank market. In the case of the potential interruptions on the interbank market, the financing loans extended by the central bank may provide a solution for ensuring liquidity. And in the case of a bankruptcy, the state deposit insurance ensures the convertibility to central bank money to a certain limit.

Thus, in practice, the amount of central bank money depends on both the decisions by the central bank and the banking system. The banking system influences the banking system's liquidity through central bank operations. The commercial banking sector as a whole does not directly influence the aggregate balance of its accounts held with the central bank, i.e. it cannot create central bank money. At the level of the sector as a whole, banks' decisions can only influence the realignment among the individual central bank instruments, i.e. they only determine the structure of O/N deposits, longer-term deposits and required reserves. This statement assumes that we disregard government security purchases on the market. Indirectly, however, the lending activity of commercial banks does have an impact on the level of central bank money. This is because the central bank adjusts to the central bank money demand of the commercial banking sector by actively monitoring it and intervening in the case of potential tensions. Therefore, central bank money demand can be derived from credit demand and endogenous money creation itself on the one hand, and from the structural characteristics of the commercial banking sector on the other hand (e.g. the intensity of interbank lending or the limits allocated by the banks to each other for these transactions).

A large government securities market would, of course, profoundly change this situation. Therefore, we discuss an illustration focusing on buying and selling government securities as follows.

In the case of buying government securities (on the primary market), the realignment occurs on the liabilities side of the central bank's balance sheet (Figure 6), between the central bank deposits of commercial banks and the account of the state held with the central bank. In this sense, quantitative easing, which is currently used

²⁴ Except when it is bought by a client in the same bank, but in such a scenario the demand for central bank money diminishes due to the bond funds that have lower liquidity.

extensively, only means a swap of assets on the assets side of the players other than the state: government securities with different yields and maturities are exchanged for central bank money, which, in the case of non-bank players, appears in the form of commercial bank deposits. If we assume that the government securities market is liquid and stable enough, the direct effect of quantitative easing on the banking system is not pronounced, since actually two assets with similar liquidity and the same issuer, the state, are exchanged. Of course, indirectly, by pushing down the yields on government securities, quantitative easing may boost the prices of risky assets.

If the central bank does not buy government securities but buys other, less liquid instruments that are difficult to sell, the situation is different. In this case, the intervention may improve lending, but not by expanding the central bank money supply, but rather owing to the cleansing of commercial banks' balance sheets. In this manner, an expected loss of uncertain size is removed from banks' balance sheets, which may boost lending.

The expansion of the central bank's asset purchases could prompt higher monetary categories (M2, M3, etc.) to gravitate towards M0, which in turn may contribute to a drop in yields and changes to the liquidity of the individual asset categories, but we do not address these effects here.

The analysis of a direct capital injection by the central bank (helicopter money) discussed on several forums nowadays is also beyond the scope of the present paper. Normally, this would mean a realignment on the liability side of the central bank's balance sheet from the central bank's capital elements to the deposits of commercial banks held with the central bank. The assets side would remain intact, i.e. in the future the stock of central bank money would not be reduced automatically as it would in the case of a normal quantitative easing measure, in which, in the absence of a potential reinvestment by the central bank, happens eventually when the bonds mature.

In the case of quantitative easing, when the central bank buys government securities, the increase in the stock of central bank money can be considered as an exogenous factor from the perspective of the banking system, i.e. its developments cannot be directly derived from the demand for central bank money arising from endogenous money creation by banks. In this case, the expansion of the stock of central bank money is exogenously given for the banking sector. This fact also means that the widespread criticism that commercial banks keep the money with the central bank rather than lending it to the real economy is misguided. Central bank money, just like in other cases, cannot be considered a traditional liability that

Figure 6
Changes to the balance sheets after government security purchases on the primary market

Balance sheet of the investment fund	
Assets	Equity
Government bonds (+) New government purchased on primary market [1]	Investment unit [2]
Commercial bank deposit (-) Amount of money from purchasing government bonds [3]	
<i>Note: [1]=[3]</i>	

Balance sheet of the commercial bank	
Assets	Liabilities and equity
Reserves and cash (-) Amount of money from purchasing government bonds [4]	Previous deposits (-) Amount of money from purchasing government bonds [5]
Previous loans [6]	Other liabilities (net) [7]
<i>Note: [3]=[5]=[4]</i>	

Central bank balance sheet	
Assets	Liabilities and equity
Assets (FX reserves etc.) [8]	Commercial bank reserves + cash (-) Amount of money from purchasing government bonds [9]
	+ Government deposit: (+) Amount of money from purchasing government bonds [10]
	Other liabilities (net) [11]
<i>Note: [4]=[9]=[10]</i>	

Source: Authors' compilation

can be lent out. It is rather an instrument at the disposal of commercial banks that can be used for meeting the transactions needs linked to lending and for ensuring liquidity. In other words, the lending activity of commercial banks does not influence the amount of central bank money created through quantitative easing, and it does not disappear from the balance sheet of the central bank even if lending in the real economy gains momentum.

The money created by commercial bank ceases to exist at the moment when the loan is repaid, i.e. the obligation assumed by the borrower and at the same time the obligation assumed by the bank (deposit) ends.

Figure 7
Quantitative easing – Government securities purchases by the central bank

Balance sheet of the investment fund	
Assets	Equity
Government bonds (–) Government bonds sold [1]	Investment unit [2]
Commercial bank deposit (+) Amount of money from selling government bonds [3]	

Balance sheet of the commercial bank	
Assets	Liabilities and equity
Reserves and cash (+) Amount of money from selling government bonds [4]	Deposits (+) Amount of money from selling government bonds [5]
Loans [6]	Other liabilities (net) [7]

Central bank balance sheet	
Assets	Liabilities and equity
Assets (FX reserve etc.) [8]	Commercial bank reserves + cash (+) Amount of money from selling government bonds [9]
(+) Government bonds sold [10]	+ Government deposits* [11]
	Other liabilities (net) [12]

Notes: [1]=[10], [1]=[3], [3]=[5]=[4]=[9]=[10]

* Also includes the amount raised from issuing government securities if it has not been used since then. If transactions were carried out with the private sector (e.g. paying the wages of public sector employees), this portion is also recorded among the commercial bank deposits held with the central bank.
Source: Authors' compilation

Figure 8
The cessation of commercial bank money

Assets	Liabilities and equity
Reserves at the central bank (required reserve, other and excess reserve items) and cash [1]	Deposits [2]
Loans [3]	Deposit (Company 'A') – Loan = 0 [4]
Loan (Company 'A') – Deposit = 0 [5]	Other liabilities (net) [6]

Note: [4]=[5]=[0].

Source: Authors' compilation

2.4.2. The limits of money creation²⁵

It does not follow from the endogenous money theory that money creation has no limits. The volume of credit changes constantly as a result of the complex correlations between economic actors' decisions. The practical limits of money creation are determined by financial regulators, capital adequacy requirements,

²⁵ The work of McLeay, Radia and Thomas (2014a;b) gives a good account of endogenous money creation. In the following, we base our description on that.

reserve requirement regulations, liquidity rules and lending risks. The central bank influences lending activity by adjusting the price of central bank money and using other monetary policy instruments.

Banks also need to manage the risks associated with new loans. One of the ways to manage *liquidity risks* may be to attract relatively “stable” deposits. This means deposits that depositors are unable or unwilling to withdraw in large amounts at the same time, i.e. in the case of which banks, during liquidity management, only need to plan for a negligible potential use outside the bank until maturity. This is because banks try to ensure that a portion of their deposits is kept in time deposits with a certain maturity in order to mitigate liquidity risk.²⁶ Depositors, however, expect to be compensated for having deposits with longer maturities, which is costly for banks, and hampers lending. In the case of demand deposits, the higher liquidity risk is offset by the lower interest rate. Banks’ lending activity may also be limited by *credit risk considerations*. Banks can protect themselves against this by keeping an appropriate amount of capital. But loans always pose some risk to banks, and therefore, when setting the price of loans, credit institutions also take into account the costs of loan loss provisioning. If banks expand their loan portfolio, the anticipated average loss is expected to rise, which, from a profitability perspective, also limits banks’ lending activity and the money creation potential. In addition, losses beyond a certain limit may also affect compliance with capital adequacy rules.

The behaviour of households and companies may also limit the banking system’s ability to create money. The behaviour of the non-bank private sector influences the ultimate effect exerted by the lending activity of the banking system on money supply. In the absence of credit demand, the framework provided by the central bank and the commercial banking sector is only necessary, but not sufficient conditions for money creation. Therefore, the economic actors that obtain the newly created money may decide to eliminate it at once, for example by repaying previous loans. The behaviour of economic actors has a significant influence on the amount of money in the economy, which in turn has inflationary implications. If the new loan is not eliminated at once, but increases spending by economic actors, the process may create inflationary pressures. The improving capital adequacy of commercial banks indirectly boosts lending capacity, but this is not a sufficient condition to jump start lending.

Central bank monetary policy may also limit the money creation potential of the banking sector. By influencing interest rates, central banks’ monetary policy influences demand for loans. In simple terms, if the price the banking system pays for accessing central bank money increases, it raises the costs of lending as well as the cost of deposits created by commercial banks. This also increases the costs of banking services. The central bank acts as one of the most important “production

²⁶ Banks can also mitigate liquidity risks by holding assets in their balance sheet that are liquid or that can be liquidated easily.

and service” input for commercial banks, and provides them with central bank money. The costs of this process are passed on to the customers. Therefore, the base rate has a direct impact on the lending rates and indirectly, via other channels, it affects banks’ lending opportunities.

3. Summary

When generating loans to their clients, commercial banks create money. The disbursement of the loan does not require the prior collection of additional funds, since as the loan is approved, the amount is credited to the account of the client kept by the bank. This act also creates the source of the loan. Lending is not the financial intermediation of savings in the sense that banks do not need to directly collect savings for lending or to reallocate them from somewhere else.

In using the loan, the client may transfer the obtained funds to another bank. The bank maintaining the account provides liquidity for completing the transfer. Liquidity management ensures the availability of an adequate amount of central bank money on the accounts of commercial banks held with the central bank, so that the bank can fulfil the payment orders initiated by their clients. The funds for this can be obtained by collecting deposits, taking out interbank loans from other banks or the central bank, or by other means. The costs of acquiring funds may influence banks’ lending activity through this channel. However, the real limit to lending is determined by credit demand.

The credit demand of companies and households can be influenced by many factors. The interest rate policy of the central bank affects lending costs via several indirect channels, and the cost of loans obviously influences credit demand as well. Credit demand, however, also depends on the performance of the economy, the general conditions of supply and demand as well as business prospects and expectations.

The active management of the amount of central bank money does not directly determine the endogenous money creation in the economy, although it does exert an impact on it through the effect on its costs.

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