

Can Banks Individually Create Money Out of Nothing? – The Theories and the Empirical Evidence

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Abstract

This paper presents the first empirical evidence in the long history of banking on the question of whether banks can create money out of nothing. The banking crisis has revived interest in this question, but it remains unsettled. Recently the Bank of England (2014a, b, c, d) has endorsed conflicting views on it. Concerning the issue, three hypotheses are recognised in the literature. According to the *financial intermediation theory* of banking, banks are merely intermediaries like other non-bank financial institutions, collecting deposits that are then lent out, and without the power to create money ‘out of nothing’. According to the *fractional reserve theory* of banking, individual banks are mere financial intermediaries, but collectively they end up creating money. A third theory maintains that each individual bank has the power to create money ‘out of nothing’ and does so when it extends credit (the *credit creation theory*). All three have a considerable degree of plausibility and many followers over the past century. The question which of the three hypotheses is an accurate description of reality has far-reaching implications for research and policy. It must rank as a game-changer in bank regulation and central bank policy, as well as in the academic disciplines of macroeconomics, monetary economics, finance, development economics and others. The respective merit of these three hypotheses cannot be settled in theoretical models designed from first principles: worlds can be conceived in which each is plausible. It can however be settled through empirical evidence on the accounting practice of banking. Surprisingly, despite the longstanding controversy, until now no empirical study has been attempted to do so. This is the contribution of the present paper.

Qualitative empirical evidence gathered by questioning bank staff is inconclusive and contradictory. Staff seem unable to answer the question consistently and with confidence, probably because the relevant accounting operations are embedded in secure IT systems to which they are not privy. Thus an empirical test is conducted, whereby money is actually borrowed from a cooperating bank, while its accounting positions are being monitored, to establish whether in the process of making the loan available to the borrower, the bank transfers these funds from other accounts within or outside the bank, or whether they are newly created out of nothing. This study establishes for the first time empirically that banks individually create money. The money supply is created as ‘fairy dust’ produced by the banks out of thin air. The paper concludes by pointing towards some implications for further research and policy.

JEL Classifications: E30, E40, E50, E60

Keywords: bank credit; credit creation; financial intermediation, fractional reserve banking, money creation

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Abstract

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“The choice of a measure of value, of a monetary system, of currency and credit legislation – all are in the hands of society, and natural conditions... are relatively unimportant. Here, then, the decision-makers in society have the opportunity to directly demonstrate and test their economic wisdom – or folly. History shows that the latter has often prevailed.” (Wicksell, 1922, p. 3).²

1. Introduction

Since the US and European banking crisis of 2007-8, the role of banks in the economy has increasingly attracted interest within and outside the disciplines of banking, finance and economics. This interest is well justified: Thanks to the crisis, awareness has risen that the most widely used macroeconomic models and finance theories did not provide an adequate description of crucial features of our economies and financial systems, and, most notably, failed to include banks.³ These dominant but bank-less theories are likely to have influenced bank regulators and may thus have contributed to sub-optimal bank regulation: Systemic issues emanating from the banking sector may be impossible to detect in economic models that do not include banks, or in finance models that are based on individual, representative financial institutions without embedding these appropriately into macroeconomic models.⁴

Consequently, many researchers have since been directing their efforts at incorporating banks or banking sectors in economic models.⁵ This is a positive development. However, to accomplish this task in a parsimonious and effective fashion, researchers need to know which aspects of bank activity are essential and need to be featured – including important characteristics that may distinguish banks from non-bank financial institutions. In other words, researchers need to know whether banks are unique in crucial aspects, and if so, why.

In this paper the question of their potential ability to create money is examined, which may be a central distinguishing feature. A review of the literature in section 2 identifies three different, mutually exclusive views on the matter, each holding sway for about a third of the twentieth century. The present mainstream view is that banks are mere financial intermediaries that gather resources and re-allocate them, just like other non-bank financial institutions; any differences between banks and non-bank financial institutions are so minimal that they are immaterial for modelling or policy-makers. Thus modelling the financial sector in general is deemed sufficient, without including banks directly. This view shall be called the *financial intermediation theory* of banking. Authors supporting it include Diamond and Dybvig (1983), Diamond (1984), Allen and Gale (2000, 2004a, b), Kashyap et al. (2002), Walsh (2003); Woodford (2003), and many more

² Translated into English by the author. See also Wicksell (1935).

³ Federal Reserve Vice-Chairman Donald Kohn (2009) bemoaned this issue. Examples of leading macroeconomic and monetary models without any banks include Walsh (2003) and Woodford (2003), but this problem applies to all the conventional macro models proposed by all the major conventional schools of thought, such as the classical, Keynesian, monetarist and neo-classical theories, including real business cycle and DSGE models.

⁴ The ‘Basel’ approach to bank regulation focuses on regulation of capital adequacy. Werner (2010a) has argued that this is based on economic theories that do not feature a special role for banks. For an overview and critique, see Werner (2012).

⁵ One older attempt that has stood up to the test of time is Werner (1997).

recent authors in the world's leading finance and economics journals, too numerous to list individually.

Between approximately the 1930s and the late 1960s, the dominant view was that the banking system is 'unique', since banks can collectively create money, based on the fractional reserve or 'money multiplier' model of banking. Despite the collective power to create money, however, each individual bank is in this view considered to be a mere financial intermediary, gathering deposits and lending these out. This view shall be called the *fractional reserve theory* of banking (key authors being Phillips, 1920; Crick, 1927; Lutz, 1939; Samuelson, 1948, and others).

There is a third, even older theory about the functioning of the banking sector. Unlike the *financial intermediation theory* and in line with the *fractional reserve theory* it maintains that the banking system creates new money. However, it goes further than the latter and differs from it in a number of respects. It argues that each individual bank does not pass on reserves from the central bank in its lending, but instead creates the entire loan amount out of nothing. This view shall be called the *credit creation theory* (Macleod, 1855-6; Schumpeter, 1912; Hahn, 1920, and others).

The three theories are based on a different description of how money and banking works and they differ in their policy implications. Intriguingly, the controversy about which theory is correct has never been settled or even put to the test. Moreover, today we find central banks – sometimes the very same central bank – supporting each of the three theories.

But it matters greatly which of the three theories is right – not only for understanding and modelling the role of banks correctly within the economy, but for the design of appropriate bank regulation that aims at sustainable economic growth without crises. The modern approach to bank regulation, as implemented at least since Basel I (1988), is predicated on the understanding that the *financial intermediation theory* is correct.⁶ Capital adequacy-based bank regulation, even of the counter-cyclical type, is less likely to deliver financial stability, if one of the other two banking hypotheses is correct.⁷ Yet, confidence in the contemporary approach and its premise of the *financial intermediation theory* has been so strong that by 2004 it was argued that bank regulation would henceforth no longer be a causal factor in the propagation of banking crises.⁸ Even after the latest financial crisis had caused much soul-searching among members of the Basel Committee on Banking Supervision, in subsequent consultation and regulatory documents the BCBS remained

⁶ See, for instance, the first BCBS Working Paper (BCBS, 1999), looking back on the first decade of experience with Basel I for insights into the thinking of the Basel bank regulators. In a section headlined 'Do fixed minimum capital requirements create credit crunches affecting the real economy?', the authors argue: "It would in fact be strange if fixed minimum capital requirements did not bite in some periods, thereby constraining the banks, given that the purpose of bank [capital] requirements is to limit the amount of risk that can be taken relative to capital. However, for this to have an effect on output, it would have to be true that any shortfall in bank lending was not fully made up through lending by other intermediaries or by access to securities markets." This statement only makes sense, if the *financial intermediation theory* is assumed to hold. If banks are the creators of the money supply, and in this role unique and different from non-bank financial intermediaries, as the other two hypotheses maintain, then a reduction in bank credit (creation) must have effects that non-bank financial intermediaries cannot compensate for.

⁷ See, for instance, Werner (2005, 2010a).

⁸ PWC (2004) argued, in its assessment of the impact of Basel II: "The crises followed financial liberalisation (OECD 1995) when both banks and regulators were unfamiliar with risk assessment. This aspect should be less important now that financial system liberalisation is long established. The new capital framework should prompt both banks and their regulators to take a more forward-looking approach to risk identification, risk measurement and risk management that should make the system better able to cope with new developments going forward" (p. 134). This implies that financial regulators were, in fact, still 'unfamiliar' with realistic risk assessment of banks. This could, in turn, be due to the reliance on the wrong banking theory.

wedded to the *financial intermediation theory* in the design of its regulatory framework.⁹ Should this theory of the role of banks not be supported by the evidence, this could explain why the capital-adequacy based approach to bank regulation adopted by BCBS, as seen in Basel I and II, has so far not been successful in preventing major banking crises, and it would throw doubt on the suitability of Basel III, as well as various national approaches to bank regulation, which are equally predicated on the *financial intermediation theory*, such as in the UK.¹⁰

For progress to take place in banking, monetary and macroeconomics, as well as in the understanding of regulatory, monetary and fiscal policies, it is necessary to settle the question of which banking theory is more accurate in describing reality. This can be done by gathering empirical evidence of a kind that is able to differentiate between the three hypotheses, rejecting two of them, and failing to reject the third. To do this, bank accounting needs to be examined, since banking activity is measured by and can be monitored using accounting information. Indeed, it has recently been suggested that economic theories that take bank accounting into consideration are more likely to be empirically successful (Bezember, 2009).

Surprisingly, no such empirical test is cited in the literature. What all the relevant works in the past century and beyond have in common – irrespective of which of these three theories they support – is that they have been content to make diverging assertions and counter-assertions on this issue, without attempting to settle it on the basis of an empirical examination. The motivation of this paper is to review the various hypotheses and their proponents, and then provide an empirical test – likely the first in the long history of banking.

The remainder of the paper is structured as follows. Section two provides an overview of relevant literature, differentiating authors by their adherence to one of the three banking theories. In section three I briefly summarise results from empirical field work consisting of eye-witness testimonials from bankers concerning these questions. Such interviews remain inconclusive, since due to a high degree of specialisation and the dominant role that IT systems play in modern banking, many bank staff are unable to observe directly the accounting operations that might help an observer distinguish between the three theories, and consequently bankers can be found supporting each of the three hypotheses (perhaps the presently dominant *financial intermediation theory* boasting the largest number of supporters). In section four I then present an empirical test that is able to settle the question of whether banks are unique and whether they can individually create money ‘out of nothing’. It involves the actual processing of a ‘live’ bank loan, taken out by the researcher from a bank that cooperated in the monitoring of its accounting procedures and operations, allowing access to its internal bank documentation and electronic accounting systems. The results and some implications are subsequently discussed in section five.

2. The literature on whether banks can create money

⁹ BCBS publications, such as BCBS (2010), make clear that the BCBS and hence international bank regulation are based on the understanding that banks are mere financial intermediation. See also Werner (2010a).

¹⁰ As seen in the work of the Independent Commission on Banking, ICB, 2011, also known as the Vickers Commission. For contributions to the consultation of the ICB, see, for instance, Werner (2010b). The recommendations therein, especially the recommendation to discard the *financial intermediation theory*, were not heeded.

Much has been written on the role of banks in the economy in the past century. This literature review is restricted to authors that have contributed directly to the question of whether banks can create credit. During time periods when in the authors' countries banks issued promissory notes (bank notes) that circulated as paper money, writers would often, as a matter of course, mention, even if only in passing, that banks create or issue money. In England and Wales, the Bank Charter Act of 1844 forbade banks to "make any engagement for the payment of money payable to bearer on demand." This ended bank note issuance for most banks in England and Wales, leaving the (until 1946 officially privately owned) Bank of England with a monopoly on bank note issuance. Meanwhile, the practice continued in the United States until the 20th century (and was in fact expanded with the similarly timed New York Free Banking Act of 1838), so that US authors would refer to bank note issuance as evidence of the money creation function of banks until much later.¹¹ For sake of clarity, our main interest in this paper is the question whether banks that *do not* issue bank notes are able to create money and credit out of nothing. As a result, earlier authors, writing mainly about paper money issuance, are only mentioned in passing here, even if it could be said that their arguments might also apply to banks that do not issue bank notes. These include John Law (1705), James Steuart (1767), Adam Smith (1776), Henry Thornton (1802), Thomas Tooke (1838) and Adam Müller (1816), among others, who either directly or indirectly state that banks can individually create credit (in line with the *credit creation theory*).¹² Instead, the focus is on works by authors who are concerned with banks that cannot issue bank notes, thus confining ourselves to the era after the UK Bank Act of 1844.

(a) *The credit creation theory*

Influential writers that argue that non-issuing banks have the power to individually create money and credit out of nothing include Wicksell (1898, 1907), Withers (1909), Schumpeter (1912), Moeller (1920) and Hahn (1920).¹³ But our review of proponents of

¹¹ The practice of issuance of promissory notes by commercial banks has continued for far longer in Scotland and Northern Ireland – namely until today. This did not seem, however, to result in a sizeable literature on bank money creation in the UK throughout the 20th century.

¹² Referring to the issuance of bank notes that circulate as paper money, Smith comments "The banks, when their customers apply to them for money, generally advance it to them in their own promissory notes" (p. 242). ... "It is chiefly by discounting bills of exchange, that is, by advancing money upon them before they are due, that the greater part of banks and bankers issue their promissory notes. ... The banker, who advances to the merchant whose bill he discounts, not gold and silver, but his own promissory notes, has the advantage of being able to discount to a greater amount by the whole value of his promissory notes, which he finds, by experience, are commonly in circulation. He is thereby enabled to make his clear gain of interest on so much a larger sum" (Smith, 1776, p. 241).

"Jeder Provinzialbanquier strebt dahin, sein Privatgeld zum Nationalgelde zu erheben: er strebt nach der größtmöglichen und möglichst allgemeinen Umsetzbarkeit seines Privatgeldes. Es ist in England nicht bloß die Regierung, welche Geld macht, sondern die Bank von England, jede Privatbank, ja jede einzelne Haushaltung (ohne gerade bestimmte Noten auszugeben, aber, in wie fern sie sich an eine bestimmte Bank thätig anschließt) helfen das Geld machen" (Mueller, 1816, p. 240).

„Sobald die Regierung also die Geldzeichen mechanisch vermehrt, ohne in demselben Maße jene andern Organe, denen die Vortheile der Geldvermehrung nur indirekt zu gute kommen, zu stärken, ohne um so kräftiger und gerechter das Ganze zu umfassen, so überträgt sie im Grunde nur das Privilegium der Gelderzeugung, das sie im Nahmen des Ganzen ausübt, auf ein einzelnes Organ. ... sollte sie [die Regierung] also ihr Privilegium der Gelderzeugung nicht bloß aufheben, sondern das bisher erzeugte Geld zurück nehmen, so gibt sie damit nur dem Privatcredit, das heißt, dem verwöhnten verderbten Privatcredit, oder dem Wucher die förmliche Befugniß in die Hände, die Lücken zu ergänzen, selbst Geldmarken zu machen, und somit seinen verderblichen und vernichtenden Einfluß auf das Ganze nun erst recht zu äußern.“ (Mueller, 1816, p. 305).

¹³ There is also a group of writers who to some extent agree with this description, but one way or another downplay its role or importance in practice. In terms of the history of economic thought it can be said that the latter group laid the groundwork and were the founding fathers of the *fractional reserve theory*. To the extent that they recognise the creation of credit by banks out of nothing under certain circumstances one might argue that they could be classified as

the *credit creation theory* must start with Henry Dunning Macleod, of Trinity College, Cambridge, and Barrister at Law at the Inner Temple, an Inn of Court with the status of a local authority, inside the territory of the City of London Corporation. Macleod produced an influential opus on banking, entitled *The Theory and Practice of Banking*, in two volumes. It was published in numerous editions well into the 20th century (Macleod, 1855/6; the quotes here are from the 6th edition of 1905). It illustrates the importance of considering accounting, legal and financial aspects of banking together. Concerning credit creation by individual banks, Macleod unequivocally argued that individual banks create credit and money out of nothing, whenever they do what is called 'lending':

"In modern times private bankers discontinued issuing notes, and merely created Credits in their customers' favour to be drawn against by Cheques. These Credits are in banking language termed Deposits. Now many persons seeing a material Bank Note, which is only a Right recorded on paper, are willing to admit that a Bank Note is cash. But, from the want of a little reflection, they feel a difficulty with regard to what they see as Deposits. They admit that a Bank Note is an "Issue", and "Currency," but they fail to see that a Bank Credit is exactly in the same sense equally an "Issue," "Currency," and "Circulation" (Macleod, 1905, vol. 2, p. 310).

"Nothing can be more unfortunate or misleading than the expression which is so frequently used that banking is only the "Economy of Capital," and that the business of a banker is to borrow money from one set of persons and lend it to another set. Bankers, no doubt, do collect sums from a vast number of persons, but the peculiar essence of their business is, not to lend that money to other persons, but on the basis of this bullion to create a vast superstructure of Credit; to multiply their promises to pay many times: these Credits being payable on demand and performing all the functions of an equal amount of cash. Thus banking is not an Economy of Capital, but an increase of Capital; *the business of banking is not to lend money, but to create Credit*: and by means of the Clearing House these Credits are now transferred from one bank to another, just as easily as a Credit is transferred from one account to another in the same bank by means of a cheque. And all these Credits are in the ordinary language and practice of commerce exactly equal to so much cash or Currency (p. 311, italics added)."¹⁴

"...Sir Robert Peel was quite mistaken in supposing that bankers only make advances out of *bona fide* capital. This is so fully set forth in the chapter on the Theory of Banking, that we need only to remind our readers that all banking advances are made, in the first instance, by **creating credit**" (p. 370, emphasis in original).

In his *Theory of Credit* Macleod (1891) put it this way:

supporter of either the *credit creation theory* or the *fractional reserve theory*, but to minimise confusion, here the impact their work has had in its common interpretation was chosen, as well as their emphasis on reserves as a key mechanism, so that they were included in the latter theory.

¹⁴ See also: "We have seen that all Banking consists in creating and issuing Rights of action, Credit, or Debts, in exchange for Money, or Debts. When the Banker had created this Liability in his books, the customer might, if he pleased, have this Credit in the form of the Banker's notes. London bankers continued to give their notes till about the year 1793, when they discontinued this practice, and their customers could only transfer their Rights, or Credit, by means of cheques. But it is perfectly manifest that the Liabilities of the Bank are exactly the same whether they give their own notes or merely create a Deposit" (MacLeod, 1855-6, p. 338).

“A bank is therefore not an office for “borrowing” and “lending” money, but it is a Manufactory of Credit” (Macleod 1891: II/2, 594).

According to the *credit creation theory* then, banks create credit in the form of what bankers call ‘deposits’, and this credit is money. But how much credit can they create? Wicksell (1907) described a credit-based economy in the *Economic Journal*, arguing that

“The banks in their lending business are not only not limited by their own capital; they are not, at least not immediately, limited by any capital whatever; by concentrating in their hands almost all payments, they themselves create the money required...”

“In a *pure* system of credit, where all payments were made by transference in the bank-books, the banks would be able to grant at any moment any amount of loans at any, however diminutive, rate of interest.” (Wicksell, 1907, 214).¹⁵

Withers (1909), from 1916 to 1921 the editor of the *Economist*, also saw few restraints on the amount of money banks could create out of nothing:

“...it is a common popular mistake, when one is told that the banks of the United Kingdom hold over 900 millions of deposits, to open one’s eyes in astonishment at the thought of this huge amount of cash that has been saved by the community as a whole, and stored by them in the hands of their bankers, and to regard it as a tremendous evidence of wealth.

“But this is not quite the true view of the case. Most of the money that is stored by the community in the banks consists of book-keeping credits lent to it by its bankers. (Withers, 1909, p. 57f).

“... The greater part of the banks’ deposits is thus seen to consist, not of cash paid in, but of credits borrowed. For every loan makes a deposit... (Withers, 1909, p. 63).

“When notes were the currency of commerce a bank which made an advance or discounted a bill gave its customer its own notes as the proceeds of the operation, and created a liability for itself. Now, a bank makes an advance or discounts a bill, and makes a liability for itself in the corresponding credit in its books; (Withers, 1909, p. 66).

“In old times, when a customer went to a banker for a loan, the banker, if he agreed, handed him out so many of his own notes; now when a customer goes to a banker for a loan, the banker gives him a credit in his books, *i.e.* adds to the deposits on the liability side of the balance sheet (Withers, 1916, p. 42).¹⁶

¹⁵ This paper was read by Wicksell in London in the Economic Section of the British Association in 1906 and it is recorded in the *Economic Journal* that Palgrave and Edgeworth commented on it. Their comments do not include any objections to the claims about the ability banks to create money out of nothing.

¹⁶ “It is true that the customer does not leave the deposit there but draws cheques against it, which he pays to people to whom he owes money. But these cheques, if paid to recipients who also bank at the bank which has made the advance, would simply be a transfer within the bank’s own books, and the effect of the transaction upon its balance sheet would be that it would hold among its assets an increase – if the loan was for £100,000 – of this amount among

“... It comes to this that, whenever a bank makes an advance or buys a security, it gives some one the right to draw a cheque upon it, which cheque will be paid in either to it or to some other banks, and so the volume of banking deposits as a whole will be increased and the cash resources of the banks as a whole will be unaltered. (Withers, 1916, p. 45).

“When once this fact is recognised, that the banks are still, among other things, manufacturers of currency, just as much as they were in the days when they issued notes, we see how important a function the banks exercise in the economic world, because it is now generally admitted that the volume of currency created has a direct and important effect upon prices. This arises from what is called the “quantity theory” of money... (Withers, 1916, p. 47).

“If, then, the quantity theory is, as I believe, broadly true, we see how great is the responsibility of the bankers as manufacturers of currency, seeing that by their action they affect, not only the convenience of their customers and the profits of their shareholders, but the general level of prices. If banks create currency faster than the rate at which goods are being produced, their action will cause a rise in prices which will have a perhaps disastrous effect...” (Withers, 1916, p. 54f).¹⁷

its advances to customers; and on the liability side there would be a similar increase in the deposits. ... and if we could look at an aggregate balance sheet of the whole of the banks of the country we should see that any increase in loans and advances would have this effect of increasing the deposits as long as those who receive these banking credits make use of them by drawing cheques against them. In the comparatively rare cases where the borrower makes use of the credit by drawing out coin or notes from the bank, then the first effect would be that the bank in question would hold a smaller amount of cash among its assets and a larger amount of advances to customers. But even here the currency withdrawn would almost certainly come round again, either to this bank or another, from the shopkeepers or other people to whom the borrower had made payments. And so the cash resources of the banks as a whole would be restored to the original level, while the deposits, owing to the increase at the credit of the shopkeepers and others who had paid the money in, would be added to the amount of the advance originally made. (p. 42f)

“Exactly the same thing happens when, for example, in times of war the banks subscribe to loans issued by the Government, whether in the form of long-dated loans, such as the recent War Loan, or in the form of shorter securities, such as Exchequer Bonds, Treasury Bills or Ways and Means Advances. (p. 43).

“It follows that the common belief that a great increase in bank deposits means that the wealth of the community has grown rapidly, and that people are saving more money and depositing more with the banks is, to a certain extent, a fallacy. A rise in bank deposits, as a rule, means that the banks are making large advances to their customers or increasing their holding of securities, and so are granting a larger amount of book-keeping credit, which appears as a liability to the public in the shape of deposits. (p. 44)

“It may be objected that the deposits have to come first before the banks can make advances. Does this necessarily follow? (p. 44)...

¹⁷ “Since, then, variations in the quantity of currency have these widespread effects, it is a matter which bankers have to consider seriously, how far it is possible from them to apply some scientific regulation to the volume of currency, and whether it is possible to modify the evils that follow from wide fluctuations in prices by some such regulation.” (p. 55). For a more recent application and more precise formulation of this principle, see Werner’s Quantity Theory of Credit (Werner, 1992, 1997, 2005, 2012).

“... the most important of the modern forms of currency, namely the cheque, is, in effect, manufactured for the use of its customers by banks; and, further, that since the volume of currency has an important effect upon raising prices, the extent to which currency is thus created is a responsibility which has to be seriously considered by those who work the financial machine. This manufacture of currency is worked through the granting of credit, and credit may thus be defined, for the purposes of this inquiry, as the process by which finance makes currency for its customers. As we saw in the last chapter, deposits, which are potential currency as they carry with them the right to draw a cheque, are produced largely through the loans, discounts and investments made by bankers” (p. 63).

“The creation of credit is thus seen clearly to result in the manufacture of currency whenever the banks buy bills of exchange... or make an advance... In either case the banks give somebody the right to draw cheques. ... When a bank makes an advance to a stock broker the result is exactly the same... The same result, in rather a different form, happens when a bank makes investments on its own account. ... There has thus been, in each case, an increase in deposits through the operation of the bank in lending, discounting, or investing. If we can imagine all the banks suddenly selling all their investments and bills of exchange and calling in all their advances, the process could only be brought about by the cancelling of deposits, their own and one another’s. (p. 72).

“And so it becomes evident, as before stated, that the deposits of the banks which give the commercial community the right to draw cheques are chiefly created by the action of the banks themselves in lending, discounting, and investing. (p. 71f)

“...then, it thus appears that credit is the machinery by which a very important part of modern currency is created... (p. 72).

Withers argues that the sovereign prerogative to manufacture the currency of the nation has effectively been *privatised* and granted to the commercial banks:

“By this interesting development the manufacture of currency, which for centuries has been in the hands of Government, has now passed, in regard to a very important part of it, into the hands of companies, working for the convenience of their customers and the profits of their shareholders.” (Withers, 1916, p. 40).

While Withers was a financial journalist, his writings had a high circulation and likely contributed to the dissemination of the *credit creation theory* in the form proposed by Macleod (1855/6). This view also caught on in Germany with the publication of Schumpeter's (1912, English 1934) influential book *The Theory of Economic Development*, in which he was unequivocal in his view that each individual bank has the power to create money out of nothing.

“Something like a certificate of future output or the award of purchasing power on the basis of promises of the entrepreneur actually exists. That is the service that the banker performs for the entrepreneur and to obtain which the entrepreneur approaches the banker. ...(the banker) would not be an intermediary, but *manufacturer of credit*, i.e. he would create himself the purchasing power that he lends to the entrepreneur... One could say, without committing a major sin, that the banker creates money” (Schumpeter, 1912, p. 197, emphasis in original).¹⁸

“[C]redit is essentially the creation of purchasing power for the purpose of transferring it to the entrepreneur, but not simply the transfer of existing purchasing power. ... By credit, entrepreneurs are given access to the social stream of goods before they have acquired the normal claim to it. And this function constitutes the keystone of the modern credit structure” (Schumpeter, 1934, p. 107).

“The fictitious certification of products, which, as it were, the credit means of payment originally represented, has become truth” (Schumpeter, 1912, p. 223).¹⁹

“The function of the banker, the manufacturer of and dealer in credit, is to select from the gamut of plans offered by entrepreneurs, ... enabling one to implement their plans and deny this to another” (Schumpeter, 1912, p. 225).²⁰

¹⁸ “Etwas Ähnliches wie eine Bescheinigung künftiger Produkte oder wie die Verleihung von Zahlkraft an die Versprechungen des Unternehmers gibt es nun wirklich. Das ist der Dienst, den der Bankier dem Unternehmer erweist und um den sich der Unternehmer an den Bankier wendet. ... so wäre er nicht Zwischenhändler, sondern *Produzent von Kredit*, d.h. er würde die Kaufkraft, die er dem Unternehmer leiht, selbst schaffen... Man könnte ohne große Sünde sagen, daß der Bankier Geld schaffe“ (S. 197). Translated by author.

¹⁹ „Die fiktive Bescheinigung von Produkten, die die Kreditzahlungsmittel sozusagen ursprünglich darstellten, ist zur Wahrheit geworden“ (Schumpeter, 1912, S. 223). Translated by author.

Later, Schumpeter (1954) would explain that

“this alters the analytic situation profoundly and makes it highly inadvisable to construe bank credit on the model of existing funds being withdrawn from previous uses by an entirely imaginary act of saving and then lent out by their owners. It is much more realistic to say that the banks ‘create credit’, that is, that they create deposits in their act of lending, than to say that they lend the deposits that have been entrusted to them. And the reason for insisting on this is that depositors should not be invested with the insignia of a role which they do not play. The theory to which economists clung so tenaciously makes them out to be savers when they neither save nor intend to do so; it attributes to them an influence on the ‘supply of credit’ which they do not have. The theory of ‘credit creation’ not only recognizes patent facts without obscuring them by artificial constructions; it also brings out the peculiar mechanism of saving and investment that is characteristic of fully fledged capitalist society and the true role of banks in capitalist evolution” (p. 1114).

This view was also well represented across the Atlantic, as the writings of Davenport (1913) indicate, or the writings of Robert H. Howe (1915):

“Banks do not loan money. They loan credit. They create this credit and charge interest for the use of it. It is universally admitted that the old State Banks that created credit in the form of bank notes, created currency – and our modern system of creating credit in the form of “Deposits” which circulate in the form of bank checks, is doing exactly the same thing – creating currency.

“All this in effect nullifies the National Banking Act, which provides for National Bank Currency based on U.S. Government Bonds, and also the act levying an annual tax of 10 per cent on all State Bank Currency. ... (p. 24)

“The public little realizes to what an extent Bank Credit, circulating in the form of bank checks, has supplanted all other circulating media. In 95 per cent of all the business done in the United States, the payments are made in bank checks and in only 5 per cent is any cash used; and of this 5 per cent an infinitesimal fraction only is gold. (p. 24f).

“The introduction of bank notes was useful in weaning the public from the use of gold and silver coins, and prepared the way for the introduction of Bank Credit as the means of payment for commodities. As a result of this evolutionary process, the checks drawn and paid in the United States amount to between two hundred billion and two hundred and fifty billion dollars a year. It is clear that it would be a physical impossibility to do this amount of business by the use of gold coin. There is only about eight billions of gold money in the world, of which amount less than two billions of dollars are in the United States. (p. 25)

“The banks have created fifteen billions of dollars of credit by discounting the notes of merchants and manufacturers, and crediting the proceeds to the

²⁰ “Die Funktion des Bankiers, des Produzenten von und Händlers mit Kredit, ist in der Fülle der sich darbietenden Unternehmerpläne eine Auswahl zu treffen, die allen Lebensverhältnissen der Volkswirtschaft entspricht, dem einen die Durchführung zu ermöglichen, dem andern zu versagen” (Schumpeter, 1912, S. 225). Translated by author.

borrower's account under the head of Deposits. As a result, the borrower is enabled to draw checks and pay his debts with them. (p. 25)

Hawtrey (1919), another leading British economist who like Keynes, had a Treasury background and moved into academia, took a clear stance in favour of the *credit creation theory*:

“...for the manufacturers and others who have to pay money out, credits are still created by the exchange of obligations, the banker's immediate obligation being given to his customer in exchange for the customer's obligation to repay at a future date. We shall still describe this dual operation as the creation of credit. By its means the banker creates the means of payment out of nothing, whereas when he receives a bag of money from his customer, one means of payment, a bank credit, is merely substituted for another, an equal amount of cash” (p. 20).

Hawtrey's view has a strong affinity to the exposition of Macleod (1856). Apart from Schumpeter, a number of German-language authors also argued that banks created money and credit individually through the process of lending.²¹ Highly influential in both academic discourse and public debate was the book by Dr. Albert L. Hahn (1920), scion of a Frankfurt banking dynasty (as Thornton had been a banker) and since 1919 director of the family-owned bank (Effecten- und Wechsel-Bank, Frankfurt). Like Macleod a trained lawyer, he became an honorary professor at Goethe-University Frankfurt in 1928. Clearly aware of the works of Macleod, whom he cites, but likely aware of actual banking practice from his family business, Hahn argued that banks do indeed ‘create money out of nothing’:

“Every credit that is extended in the economy creates a deposit and thus the means to fund it. ... The conclusion from the process described can be expressed in reverse by saying... that every deposit that exists somewhere and somehow in the economy has come about by a prior extension of credit (Hahn, 1920, p. 28).²²

“We thus maintain – contrary to the entire literature on banking and credit – that the primary business of banks is not the liability business, especially the deposit business, but that in general and in each and every case an asset transaction of a bank must have previously taken place, in order to allow the possibility of a liability business and to cause it: The liability business of banks is nothing but a reflex of prior credit extension. The opposite view is based on a kind of optical illusion...” (Hahn, 1920, p. 29).²³

²¹ For instance, Moeller (1920) states that “In the modern monetary system the creation of new paper or bank accounting currency (‘Buchungsgeld’, or ‘bank book money’) is primarily in the hands of the banks. ... For the deposit money the same largely applies as for paper money...” (p. 177f).

²² “Jeder Kredit der gegeben wird, erzeugt seinerseits ein Deposit und damit die Mittel zu seiner Unterbringung. ... Die Folgerung aus dem skizzierten Vorgang kann man auch umgekehrt ausdrücken, indem man sagt – und dieser Schluß ist ebenso zwingend –, daß jedes irgendwie und irgendwo in der Volkswirtschaft vorhandene Scheck- oder Ueberweisungsguthaben sein Entstehen einer vorausgegangenen Kreditgewährung, einem zuvor eingeräumten Kredit zu verdanken hat“ (S. 28). Translated by author.

²³ “Wir behaupten also im Gegensatz zu der gesamten, in dieser Beziehung so gut wie einigen Bank- und Kreditliteratur, daß nicht das Passivgeschäft der Banken, insbesondere das Depositengeschäft das Primäre ist, sondern daß allgemein und in jedem einzelnen Falle ein Aktivgeschäft einer Bank vorangegangen sein muß, um erst das Passivgeschäft einer Bank möglich zu machen und es hervorzurufen: Das Passivgeschäft der Banken ist nichts anderes als ein Reflex vorangegangener Kreditgewährung. Die entgegengesetzte Ansicht beruht auf einer Art optischer Täuschung...” (S. 29). Translated by author.

Overall, Hahn probably did more than anyone to popularise the *credit creation theory* in Germany, his book becoming a bestseller, and spawning much controversy and new research among economists in Germany. It also greatly heightened awareness among journalists and the general public of the topic in the following decades. The broad impact of his book was likely a non-negligible reason why this theory remained entrenched in Germany, when it had long been discarded in the UK or the US, namely well into the post-war period. Hahn's book was however not just a popular explanation without academic credibility. Schumpeter cited it positively in the second (German) edition of his *Theory of Economic Development*, Schumpeter (1926), praising it as a further development in line with, but beyond, his own book. The English translation of 1934 also favourably cites Hahn (Schumpeter, 1934).

Overall it can be said that support for the *credit creation theory* appears to have been fairly widespread in the late 19th and early 20th century in English and German language academic publications. This was also reflected in textbooks, training a new generation of economists and policy makers: As late as 1930, the US textbook on monetary economics by James (1930) was unambiguous and confident in the assessment that

“... the bank is enabled to make loans to an amount many times larger than the sum of cash which has been deposited with it, and it will already have become apparent that *the greater part of the items appearing on the liabilities side of the balance sheet, under the heading of deposits, is created, not as a result of cash deposited with the bank by customers, but through the making of loans or discounts by the bank* to those customers. ...”

“...the bank has monetized credit. *It has created purchasing power which did not exist before*, since it has supplied the borrower with a means of paying his debts, without in any way reducing the amount of money in the hands of the other members of the community. Each addition to the existing volume of bank loans, therefore, results in a net increase in the total supply of money in the community, and any diminution in that volume will decrease the total volume of money.” (James, 1930, 194f, italics in original).

By 1920, the *credit creation theory* had become so widespread that it was dubbed the ‘current view’, the ‘traditional theory’ or the ‘time-worn theory of bank credit’ by later critics.²⁴ The early Keynes (1924) seemed to also have been a supporter of this dominant view. In his *Tract on Monetary Reform* (Keynes, 1924), he asserts, apparently without feeling the need to establish this further, that banks create credit and money, at least in aggregate:

“The internal price level is mainly determined by the amount of credit created by the banks, chiefly the Big Five; ... (p. 178)

“The amount of credit, so created, is in its turn roughly measured by the volume of the banks’ deposits – since variations in this total must correspond to the variations in the total of their investments, bill-holdings, and advances. (p. 178)”

²⁴ See, for instance, Phillips (1920, p. 72, p. 119).

In his *Treatise on Money* (Keynes, 1930), we can also find statements that indicate Keynes believed an individual bank can create credit and money (deposits), such as this:

“There can be no doubt that, in the most convenient use of language, all deposits are ‘created’ by the bank holding them. It is certainly not the case that the banks are limited to that kind of deposit, for the creation of which it is necessary that depositors should come on their own initiative bringing cash or cheques” (p. 30).

The *credit creation theory* was still dominant in the late 1920s and early 1930s, as testified by the final report of the Committee on Finance and Industry, commonly referred to as the Macmillan Committee (1931), after its chairman, Hugh Macmillan.²⁵ The Committee gathered much evidence, including empirical data, and first-hand eye-witness accounts, and quickly identified bank credit creation as a central focus of their inquiry.²⁶ It must be considered as one of the most thorough and wide-ranging investigations of banking and finance in the modern age conducted by such a broad group of stakeholders. The final report, submitted in June 1931, contained a number of statements on the question at hand. It is said to have been drafted and significantly influenced by Keynes, one of the committee members:

“It is not unnatural to think of the deposits of a bank as being created by the public through the deposit of cash representing either savings or amounts which are not for the time being required to meet expenditure. But the bulk of the deposits arise out of the action of the banks themselves, for by granting loans, allowing money to be drawn on an overdraft or purchasing securities a bank creates a credit in its books, which is the equivalent of a deposit” (p. 34).

The last sentence uses the singular: a loan from one bank results in credit creation, which is the “equivalent” of deposit creation, amounting to the size of the loan. If the bank was a financial intermediary, it would not newly create the deposit of the borrower, but transfer the funds from another account, either inside or outside the bank. This is most clearly seen “If no additional in-payments were made by customers and there were no withdrawals in cash,” because then

“the volume of deposits of a single banker would fluctuate only with the volume of the loans he himself made...” (p. 12).

²⁵ The committee was appointed by the Chancellor of the Exchequer in November 1929 to

“inquire into banking, finance and credit, paying regard to the factors both internal and international which govern their operation, and to make recommendations calculated to enable these agencies to promote the development of trade and commerce and the employment of labour” (p. 1).

It consisted of leading experts, opinion-leaders and stakeholders of the day, including John Maynard Keynes and Professor T. Gregory, professor of Banking at the LSE, treasury and Bank of England representatives and senior executives of banks, but also a union representative, a representative of the cooperative movement and a politician. Over almost two years the Committee held 49 meetings and interviewed 57 witnesses, reflecting “a wide and varied range of representatives of banking and finance, both in this country and in the United States and Germany, as well as of industry and commerce from the point of view both of employers and of employed, while members of the Universities and the Civil Service and eminent economists of diverse schools have also lent their assistance” (p. 1). This included Mantagu Norman, the governor of the Bank of England, Professor A. Pigou of Cambridge University, as well as senior representatives from Barclays Bank, Midland Bank, Lloyds Bank, National Provincial Bank, Westminster Bank, the Scottish banks and the Treasury, and such long-standing and internationally active banking insiders as Otto Ernst Niemeyer and Henry Strakosch.

²⁶ In his opening words to witness Josiah Stamp, chairman Lord Macmillan stated: “You appreciate that our main preoccupation is with the question of the basis of credit as affecting industry and employment...” (Macmillan Committee, 1931, appendix, witness transcripts, p. 238, question 3710).

Concerning the banking system as a whole, this bank credit and deposit creation was thought to influence aggregate demand and the formation of prices, as Schumpeter (1912) had argued:

“The volume of bankers’ loans is elastic, and so therefore is the mass of purchasing power.... The banking system thus forms the vital link between the two aspects of the complex structure with which we have to deal. For it relates the problems of the price level with the problems of finance, since the price level is undoubtedly influenced by the mass of purchasing power which the banking system creates and controls, and by structure of credit which it builds... Thus, questions relating to the volume of purchasing power and questions relating to the distribution of purchasing power find a common focus in the banking system” (p. 12f).

“... if, finally, the banks pursue an easier credit policy and lend more freely to the business community, forces are set in motion increasing profits and wages, and therefore the possibility of additional spending arises” (p. 13).

Concerning the question whether credit demand or credit supply are more important, the report argued that the root cause is the movement of the supply of credit:

“The expansion or contraction of the amount of credit made available by the banking system in other directions will, through a variety of channels, affect the ease of embarking on new investment propositions. This, in turn, will affect the volume and profitableness of business, and hence react in due course on the amount of accommodation required by industry from the banking system. ... Thus what started as an alteration in the *supply* of credit ends up in the guise of an alteration in the *demand* for credit” (p. 99).²⁷

While money is thus seen as endogenous to credit, which creates both credit and money when what is called a ‘bank loan’ is extended, the Committee argued that bank credit was exogenous as far as loan applicants are concerned:

“There can be no doubt as to the power of the banking system ... to increase or decrease the volume of bank money” (p. 102).

“In normal conditions we see no reason to doubt the capacity of the banking system to influence the volume of active investment by increasing the volume and reducing the cost of bank credit. ... Thus we consider that in any ordinary times the power of the banking system ... to increase or diminish the active employment of money in enterprise and investment is indisputable” (p. 102).

The Committee also argued that bank credit could be manipulated by the Bank of England, and thus was also considered exogenous in this sense.

The credit creation theory remained influential until the early post-war years. However, since the 1920s serious doubts had spread about its veracity. These doubts were initially uttered by economists who in principle supported the theory, but downplayed its

²⁷ This is in line with the credit supply determination view proposed by Werner (1997, 2005) and his Quantity Theory of Credit, as opposed to the endogenous credit supply view of many post-Keynesians.

significance. It is this group of writers that served as a stepping stone to the formulation of the modern *fractional reserve theory*, which in its most widespread (and later) version however argues that individuals banks cannot create credit, but only the banking system in aggregate. It is this theory about banks that we now turn to.

(b) The fractional reserve theory

After the end of the first world war, a number of influential economists argued that the ‘Old Theory’ (Phillips, 1920:72) of bank credit creation by individual banks was mistaken. Initially they were in the minority, but their view gradually became more influential. Phillips (1920) argued that it was important to distinguish between the theoretical possibility of an individual bank ‘manufacturing money’ by lending in excess to cash and reserves on the one hand, and, on the other, the banking system as a whole being able to do this. He argued that the ‘Old Theory’ was

“predicated upon the contention that a bank would be able to make loans to the extent of several times the amount of additional cash newly acquired and held *at the time the loans were made*, whereas a representative bank in a system is actually able ordinarily to lend an amount only roughly equal to such cash” (p. 72).²⁸

Phillips’ citation of the credit or money multiplier rendered him one of the earlier and most influential economists to formulate the mechanics of fractional reserve banking.²⁹ According to this theory, individual banks cannot create credit or money, but collectively the banking system does so, as a new reserve is “split into small fragments, becomes dispersed among the banks of the system. Through the process of dispersion, it comes to constitute the basis of a manifold loan expansion” (p. 40).

“What is true for the banking system as an aggregate is *not* true for an individual bank that constitutes only one of many units in that aggregate” (Phillips, 1920, p. 40).

Each bank is considered mainly a financial intermediary: “...the banker ... handles chiefly the funds of others” (p. 4-5). Phillips argued that since banks target particular cash to deposit and reserve to deposit ratios (as cited in the money multiplier), which they wish to maintain, each bank effectively works as an intermediary, lending out as much as it is able to gather in new cash. Through the process of dispersion and re-iteration, the financial intermediation function of individual banks, without the power to create credit, add up to an expansion in the money supply in aggregate.³⁰

²⁸ His analysis was based on the “overlooked ... pivotal fact that an addition to the usual volume of a bank’s loans tends to result in a *loss of reserve* for that bank only somewhat less on average than the amount of the additional loans. ... Manifold loans are not extended by an individual bank on the basis of a given amount of reserve” (Phillips, 1920, p. 73).

²⁹ Earlier authors were Davenport (1913) and Marshall (1890).

³⁰ It should be noted here that Phillips’ (1920) work can be interpreted in a more differentiated manner. For instance, Phillips did also point out that if all banks increased their lending at roughly the same pace, each bank *would*, after all, be able to create credit without losing reserves or cash, on balance (pp. 78ff). However, subsequent writers citing Phillips usually do not mention this. While a more detailed discussion of Phillips is, however, beyond the scope of this paper, it is here merely claimed that Phillips’ argument was an important stepping stone towards the formulation of the *fractional reserve theory* of banking, which is unequivocal in treating individual banks as mere financial intermediaries without the power to create credit or money individually under any and all circumstances, even though it could possibly be argued that Phillips himself may not have agreed with the latter in all respects.

Crick (1927) shared this conclusion (with some minor caveats). Thus he argued:

“The important point, which is responsible for much of the controversy and most of the misunderstanding, is that while one bank receiving an addition to its cash cannot forthwith undertake a full multiple addition to its own deposits, yet the cumulative effect of the additional cash is to produce a full multiple addition to the deposits of all the banks as a whole” (p. 196).

“Summing up, then, it is clear... that the banks, so long as they maintain steady ratios of cash to deposits, are merely passive agents of the Bank of England policy, as far as the volume of money in the form of credit is concerned. ... The banks ... have very little scope for policy in the matter of expansion or contraction of deposits, though they have in the matter of disposition of resources between loans, investments and other assets. But this is not to say that the banks cannot and do not effect multiple additions to or subtractions from deposits as a whole on the basis of an expansion of or contraction in bank cash ” (p. 201).

Crick notes that many observers are uncomfortable with the idea that banks could be creating money:

“To some minds the idea of “creating” anything is both objectionable and absurd, but disagreement on matters of terminology should not blind us to the relations, in sequence and amount, between the volume of bank credit outstanding and the quantity of bank cash held against it.”

Like later Keynes in some contexts, as well as even later James Tobin, Crick adopted the habit of placing the concept of creation in inverted commas (“credit “creation””), and while not entirely denying the potential for banks to create credit and money, succeeded in downplaying the significance and re-assuring the concerned public – or academia – by emphasising that while individual banks do not create money, the system taken together has the ability to do so – but that in any case it all boiled down to the ratio of bank credit to cash reserves – a technical matter, in other words, of little direct consequence for the economic model builder.

“To say that a bank cannot in practice “create” deposits to an indefinite extent is one thing; to say it cannot “create” deposits at all is another. The first assertion is true because a bank cannot make an addition at will to its own cash reserves without reducing its earning assets, while it feels it must conform to a regular ratio. The second is untrue, because we know as a fact that an addition to bank cash is accompanied, or closely followed by, a multiple addition to deposits, which cannot be attributed to any other cause but action by the banks” (Crick, 1927, p. 201).

While the wording is not unambiguous, the last sentence, as well as the thrust of Crick’s argument makes it clear that he believed, for all means and purposes, the system as a whole, not individual banks, can create money and credit.

The role of banks remained disputed during the 1920s and 1930s, as several writers criticized the *credit creation theory*. Views not only diverged, but were also in a flux, as

several experts apparently shifted their position gradually - overall an increasing number moving away from the *credit creation theory* and towards the *fractional reserve theory*.

Sir Josiah C. Stamp, a former director of the Bank of England, summarized the state of debate in his review of an article by Pigou (1927):

“The general public economic mind is in a fair state of muddlement at the present moment on the apparently simple question: “Can the banks create credit, and if so, how, and how much?” and between the teachings of Dr. Leaf and Mr. McKenna, Messrs. Keynes, Hawtrey, Cassel and Cannan and Gregory, people have not yet found their way” (Stamp, 1927, p. 424)

Contributions to this debate were also made by Dennis Robertson (1926), who was influenced by Keynes.³¹ Keynes did not greatly enhance clarity in this debate, as it appears possible to cite him in support of each of the three hypotheses. Despite his early support for the *credit creation theory* (Keynes, 1924), by 1930 he was condescending, if not dismissive, of supporters of this view, who he referred to as being part of the “Army of Heretics and Cranks, whose numbers and enthusiasm are extraordinary”, and who seem to believe in “magic” and some kind of “Utopia” (Keynes, 1930, vol. 2, p. 215).³²

It did not help that Keynes (1930) deploys confusing terminology by using the expression ‘creation of deposits’ also for the instance of a cash deposit at a bank (p. 24), arguing that

“only the bank itself can authorise the creation of a deposit in its books entitling the customer to draw cash or to transfer his claim to the order of someone else” (p. 24).

Since any adjustment of an account is thus termed the ‘creation’ of such an accounting record, by this definition banks are of course ‘creating’ entries whenever a transaction is made. However, by this definition any non-bank corporation would equally be ‘creating’ assets and liabilities on its balance sheet, whenever a transaction is entered into the firm’s accounts.

³¹ In the introduction, Robertson says: “I have had so many discussions with Mr. J. M. Keynes on the subject matter of chapters V and VI, and have rewritten them so drastically at his suggestion, that I think neither of us now knows how much of the ideas therein contained is his, and how much is mine. (p. 5).” (as cited in)

³² “There is a common element in the theories of nearly all monetary heretics. Their theories of Money and Credit are alike in supposing that in some way the banks can furnish all the real resources which manufacture and trade can reasonably require without real cost to anyone... For they argue thus. Money (meaning loans) is the life-blood of industry. If money (in this sense) is available in sufficient quantity and on easy terms, we shall have no difficulty in employing to the full the entire available supply of the factors of production. For the individual trader or manufacturer “bank credit” means “working capital”; a loan from his bank furnishes him with the means to pay wages, to buy materials and to carry stocks. If, therefore, sufficient bank credit was freely available, there need never be unemployment. Why then, he asks, if the banks can create credit, should they refuse any reasonable request for it? And why should they charge a fee for what costs them little or nothing?... There can only be one answer: the bankers, having a monopoly of magic, exercise their powers sparingly in order to raise the price. ... Where magic is at work, the public do not get the full benefit unless it is nationalised. Our heretic admits, indeed, that we must take care to avoid “inflation”; but that only occurs when credit is created which does not correspond to any productive process. To create credit to meet a genuine demand for working capital can never be inflationary; for such a credit is “self-liquidating” and is automatically paid off when the process of production is finished. If the creation of credit is strictly confined within these limits, there can never be inflation. Further, there is no reason for making any charge for such credit beyond what is required to meet bad debts and the expense of administration. Not a week, perhaps not a day or an hour, goes by in which some well-wisher of mankind does not suddenly see the light – that here is the key to Utopia” (vol. 2, p. 217f).

A modern textbook mirrors such ambiguous terminology:

“The process of multiple-deposit creation may seem somewhat like a magician pulling rabbits out of a hat: it seems to make something out of nothing. But it is, in fact a real physical process. Deposits are created by making entries in records; today electronic impulses create records on computer tapes. The rules of deposit creation are rules specifying when you may make certain entries in the books. It is these rules – in particular, the fractional reserve requirements – that give rise to the system’s ability to expand deposits by a multiple of the original deposit increase” (Stiglitz, 1997, p. 737).

Such terminology does not advance the quest to identify what makes banks different from non-banks, or if, indeed, they differ. Yet, it seems to have survived in leading economics textbooks until this day, thus giving the impression that the *credit creation theory* is not, after all, very different from the *fractional reserve theory*, since ‘creation’ of deposits and loans occurs in both – using such a narrow definition of this word, describing simply the creation of an accounting record.

Concerning the more substantial meaning of the concept of deposit or credit creation, the Keynes of the *Treatise* (1930) sided squarely with the *fractional reserve theory*, citing both Phillips (1920) and Crick (1927) approvingly (p. 25). Keynes explains the role of reserve holdings and the mechanics of determining a bank’s behaviour based on its preference to hold cash and reserves, together with the amount of reserves provided by the central bank – the fairly rigid mechanics postulated by the money multiplier in a fractional reserve model:

“Thus in countries where the percentage of reserves to deposits is by law or custom somewhat rigid, we are thrown back for the final determination of M, the Volume of Bank-money on the factors which determine the amount of these reserves” (p. 77).

Keynes also backed a key component of the *fractional reserve theory*, namely that banks gather deposits and place parts of them with the central bank, or, alternatively, may withdraw funds from their reserves at the central bank in order to lend these out to the non-banking sector of the economy:

“When a bank has a balance at the Bank of England in excess of its usual requirements, it can make an additional loan to the trading and manufacturing world, and this additional loan creates an additional deposit (to the credit of the borrower or to the credit of those to whom he may choose to transfer it) on the other side of the balance sheet of this or some other bank” (Keynes, 1930, vol. 2, p. 218).

Keynes here argues that new deposits, based on new loans, are dependent upon and connected to banks’ reserve balances held at the central bank. This view is sometimes also supported by present-day central bankers, such as in Paul Tucker’s or the ECB’s proposal to introduce negative interest rates on banks’ reserve holdings at the central bank, as an incentive for them to ‘move’ their money from the central bank and increase

lending.³³ Nevertheless, part of Keynes (1930), and much of his most influential work, his *General Theory* (1936), appears more in line with the *financial intermediation theory*, as will be discussed in the following section.

A representative example of the *fractional reserve theory* that at the same time was beginning to point in the direction of the *financial intermediation theory* is the work by Lutz (1939), who published in *Economica*, just like Crick and others debating these issues:

“The expansion of the economic system leads to an increase in the volume of deposits to a figure far in excess of the amount of the additional cash in use, simply because the same cash is deposited with the banking system over and over again. ... The fact that banking statistics show an aggregate of deposits far above the amount of cash in the banking system, is therefore not of itself a sign that the banks must have *created* the whole of the difference. This conclusion is also, of course, somehow implicit in the “multiple expansion” theory of the creation of bank deposits (of the Phillips or Crick variety). That theory explains the creation of deposits by the fact that the same cash (in decreasing amounts) is successively paid into different banks. It does, however, look upon this cash movement rather in the nature of a technical affair between banks ... which would disappear if the separate banks were merged into one. In that case the deposits would be regarded as coming into existence by outright creation. In our example we assume throughout only one bank, and still the deposits grow out of the return, again and again, of the same cash *by the public*. ... The force which really creates expansion is the trade credit given by producers to one another. ... The bank plays the role of a mere intermediary.

... This seems to lead not to a new, but to a very old theory of the function of banks: the function of a mere intermediary. ... (p. 166f)

“The modern idea of banks being able to create deposits seemed to be a startling departure from the view held by most economists in the nineteenth century. If, however, we approach this modern idea along the lines followed above, we find that it resolves itself into much the same elements as those which many of the older writers regarded as the essence of banking operations: the provision of confidence which induces the economic subjects to extend credit to each other by using the bank as an intermediary” (p. 169).

Another supporter of the *fractional reserve theory*, published in a leading journal, is Whittlesey (1944), who stated that banks are “creating money” (p. 251), “exercising the sovereign function of issuing money” (p. 252), “administrators of the money supply” and engage in “deposit creation” (p. 247) – but only collectively, not individually, in line with the *fractional reserve theory*:

“Despite the changes that have taken place, the mechanics of banking operations are essentially similar to what they were in the past. The process, whereby deposits are created – and may conceivably be destroyed – on the basis of

³³ On Paul Tucker’s proposal, see BBC (2013), but also the critique by Werner (2013a). Negative rates on bank reserves at the central bank were actually imposed by the Swedish central bank in 2009, the Danish central bank in 2012 and for the first time by the Swiss central bank in 1978 on deposits by foreign banks.

fractional reserves and against changes in the volume of debts held by banks, is still fundamentally the same” (p. 247).

The author was aware that the policy conclusion that bank credit creation could be considered a mechanical process that did not need to be modelled explicitly in economic theories, was dependent on a number of assumptions:

“The rise of a large and fluctuating volume of excess reserves is significant primarily because the assumption of a fixed reserve ratio underlies, to an extent that has not, I believe, received sufficient emphasis, the entire theory of commercial banking. The conventional description of the process of deposit expansion – with reserves overflowing from Bank 1 to Bank 2 and so on up to Bank 10, thereby generating a neatly descending series of deposit growth all along the line – rests on the assumption that reserves will be fully and promptly utilized” (p. 250).

Alhadeff (1954), a staff member of the US Federal Reserve system, argued as follows:

“One complication worth discussing concerns the alleged “creation” of money by bankers. It used to be claimed that bankers could create money by the simple device of opening deposit accounts for their business borrowers. It has since been amply demonstrated that under a fractional reserve system, only the totality of banks can expand deposits to the full reciprocal of the reserve ratio. [Footnote: ‘Chester A. Phillips, *Bank Credit* (New York: Macmillan, 1921), chapter 3, for the classical refutation of this claim.’] The individual bank can normally expand to an amount about equal to its primary deposits” (p. 7).

Statements like this became the mainstream view in the 1950 and 1960s.³⁴ The view of the *fractional reserve theory* in time also came to dominate textbook descriptions of the functioning of the monetary and banking system. There is no post-war textbook more representative and influential than that of Samuelson (1948). The original first edition is clear in its description of the *fractional reserve theory*: Under the heading “Can banks really create money?”, Samuelson first dismisses “false explanations still in wide circulation” (p. 324):

“According to these false explanations, the managers of an ordinary bank are able, by some use of their fountain pens, to lend several dollars for each dollar left on deposit with them. No wonder practical bankers see red when such behavior is attributed to them. They only wish they could do so. As every banker well knows, he cannot invest money that he does not have; and any money that he does invest in buying a security or making a loan will soon leave his bank” (p. 324).

³⁴ Even though a closer reading of Alhadeff shows that the author agreed that, under certain circumstances, banks can create credit and money: “In certain cases, the proportion between the legal reserve ratio and residual deposits is such that even a single bank can expand its deposits to a somewhat greater amount than its primary deposits. ... Again, it might be possible for a very large bank, or a bank in an isolated community with few business connections with outside banks, literally to create money because of flow back deposits. [Footnote: ‘Flow-back deposits refer to the circulation of deposits among the depositors of the same bank.’] In either case, this amounts to a partial reduction in the average cost of producing credit (making loans), at least in terms of the raw material costs...” (Alhadeff, 1954, p. 7). Although Alhadeff, if studied closely, could be said to have agreed that an individual bank can create credit out of nothing, he clearly thought this to be a special case without practical relevance, while it is normally only the banking system in aggregate that creates credit.

Samuelson thus argues that a bank needs to gather the funds first, before it can extend bank loans. This is not consistent with the *credit creation theory*. However, Samuelson argues that, in aggregate, the banking system creates money. He illustrates his argument with the example of a ‘small bank’ that faces a 20% reserve requirement, and considering the accounts of the bank (B/S). If this bank receives a new cash deposit of \$1,000, “What can the bank now do?”, Samuelson asks (p. 325).

“Can it expand its loans and investments by \$4,000 so that the change in its balance sheet looks as shown in Table 4b?”

Table 4b. *Impossible Situation for Single Small Bank*

Assets		Liabilities	
Cash reserves.....	+\$1,000	Deposits.....	+\$5,000
Loans and investments....	<u>+\$4,000</u>		
Total.....	+\$5,000	Total.....	<u>+\$5,000</u>

“The answer is definitely ‘no’. Why not? Total assets equal total liabilities. Cash reserves meet the legal requirement of being 20 per cent of total deposits. True enough. But how does the bank pay for the investments or earning assets that it buys? Like everyone else it writes out a check – to the man who sells the bond or signs the promissory note. ... The borrower spends the money on labor, on materials, or perhaps on an automobile. The money will very soon, therefore, have to be paid out of the bank. ... A bank cannot eat its cake and have it too. Table 4b gives, therefore a completely false picture of what an individual bank can do” (p. 325f).

Instead, Samuelson explains, since all the money lent out will leave the bank, after loan extension the true balance sheet of this bank that has received a new deposit of \$1,000 will look as follows:

Table 4c. *Original Bank in Final Position*

Assets		Liabilities	
Cash reserves.....	+\$ 200	Deposits.....	+\$1,000
Loans and investments....	<u>+\$ 800</u>		
Total.....	+\$1,000	Total.....	<u>+\$1,000</u>

(Samuelson, 1948, p. 326).

Samuelson is adamant that an individual bank cannot create credit out of nothing:

“As far as this first bank is concerned, we are through. Its legal reserves are just enough to match its deposits. There is nothing more it can do until the public decides to bring in some more money on deposit” (p. 326).

On the other hand, Samuelson emphasizes that

“The banking system as a whole can do what each small bank cannot do!” (p. 324),

namely create money. This, Samuelson explains via the iterative process of one bank’s loans (based on prior deposits) becoming another bank’s deposits, and so forth. He shows “this chain of deposit creation” in a table, amounting to total deposits in the banking system of \$5,000 (out of the \$1,000, due to the reserve requirement of 20% implying a ‘money multiplier’ of 5 times (assuming no cash ‘leakage’). As a result the consolidated balance sheet of the banking system will appear as follows:

Table 4*i*. Consolidated Balance Sheet Showing Final Positions of All Banks Together

Assets		Liabilities	
Cash reserves.....	+\$1,000	Deposits.....	+\$5,000
Loans and investments....	<u>+\$4,000</u>		
Total.....	+\$5,000	Total.....	<u>+\$5,000</u>

“If the reader will turn to Table 4*b* previously marked *impossible*, he will see that the whole banking system can do what no one bank can do by itself. Bank money has been created 5 for 1 – and all the while each bank has only invested and lent a fraction of what it has received as deposits!” (p. 329)

What Samuelson calls the “multiple deposit expansion” is described in the same way and with remarkable similarity in the fifteenth edition of his book (Samuelson, Nordhaus, 1995), only that the reserve requirement cited as example has been lowered to 10%: “All banks can do what one can’t do alone” (p. 493). The table with the ‘chain’ of *n*th-generation banks to whom decreasing portions of deposits have moved is the same, as is the caption “All banks together do accomplish what no one small bank can do – multiple expansion of reserves...” (p. 492). Table 4*i* re-appears, with the same title (“*Consolidated Balance Sheet Showing Final Positions of All Banks*”).

There are subtle though important differences. The overall space devoted to this topic is much smaller in 1995 compared to 1948. The modern textbook says that the central bank-created reserves are used by the banks “as an input” and then “transformed” “into a much larger amount of bank money” (p. 490). There is far less of an attempt to deal with the *credit creation theory*. There is no equivalent of Table 4*b* – the idea that an individual bank might create deposits is not mentioned at all.³⁵ Instead, each bank is unambiguously represented as a pure financial intermediary, collecting deposits and lending out this money (minus the reserve requirement).³⁶ The *fractional reserve theory* had become mainstream:

“Each small bank is limited in its ability to expand its loans and investments. It cannot lend or invest more than it has received from depositors” (p. 496).

³⁵ Furthermore, unlike the original Samuelson (1948), the more recent textbook mentions nowhere that in terms of its operations an individual bank might also be able to ‘create deposits’ (even though it might then lose the money quickly), which can be said, somewhat contradictorily, to support the *credit creation theory*.

³⁶ Moreover, the original Samuelson (1948: 331) offered an important (even though not prominently displayed) section headed ‘Simultaneous expansion or contraction by all banks’, which provided the caveat that each individual bank could, after all, create deposits, if only all banks did the same at the same rate (thus outflows being on balance cancelled by inflows, as Alhadeff, 1954, also mentioned). There is no such reference in the modern, ‘up-to-date’ textbook.

Meanwhile, bank deposit money is “supplied” by “the financial system” in an abstract process that each individual bank has little control over (p. 494). The unambiguous fractional reserve theory thus appears to have come about in the years after the 1950s. It can be described in Table 5:

Table 5

The Textbook Representation of ‘Money Multiplication’

	Deposit	-	1% Reserve	=	Loanable Funds
Bank A	\$100	-	\$1	=	\$99.00
Bank B	\$99	-	\$0.99	=	\$98.01
Bank C	\$98.01	-	\$0.9801	=	\$97.0299

	=====		=====		=====
	Σ\$10,000	-	Σ\$100	=	Σ \$9,900.00

Source: Werner (2005), p. 175.

In this scheme, each bank is a financial intermediary, but in aggregate, due to fractional reserve banking, money is created (‘multiplied’) in the banking system. Specifically, each bank can only grant a loan if it has previously received new reserves. It will then only be able to lend out as much as these excess reserves, as is made clear in major textbooks. In the words of Stiglitz (1997):

“It should be clear that when there are many banks, no individual bank can create multiple deposits. Individual banks may not even be aware of the role they play in the process of multiple-deposit creation. All they see is that their deposits have increased and therefore they are able to make more loans” (p. 737).

In another textbook on money and banking:

“In this example, a person went into bank 1 and deposited a \$100,000 check drawn on another bank. That \$100,000 became part of the reserves of bank 1. Because that deposit immediately created excess reserves, further loans were possible for bank 1. Bank 1 lent the excess reserves to earn interest. A bank will not lend more than its excess reserves because, by law, it must hold a certain amount of required reserves” (Miller, VanHoose, 1993, p. 331).

The deposit of a cheque from another bank does not however increase the “total amounts of deposits and money”:

“Remember, though, that the deposit was a check written on another bank. Therefore, the other bank suffered a decline in its transactions deposits and its reserves. While total assets and liabilities in bank 1 have increased by \$100,000, they have decreased in the other bank by \$100,000. *Thus the total amount of money and credit in the economy is unaffected by the transfer of funds from one depository institution to another.* Each depository institution can create loans (and deposits) only to the extent that it has excess reserves. The thing to remember is that new reserves are not created when checks written on a one bank are deposited in another bank. The Federal Reserve System, however, can create new reserves” (p. 331).

(c) *The financial intermediation theory*

While the *fractional reserve theory* of banking was influential from the 1930s to the 1960s, Keynes may have sown important seeds of doubt. Already in his ‘Treatise’, Keynes (1930) makes use of inverted commas in order to refer to ‘The “Creation” of Bank-Money’ (a section title), copied by many other writers after him, and emphasizes the role of banks as ‘financial intermediaries’.

“A banker is in possession of resources which he can lend or invest equal to a large proportion (nearly 90 per cent) of the deposits standing to the credit of his depositors. In so far as his deposits are Savings-deposits, he is acting merely as an intermediary for the transfer of loan-capital. In so far as they are Cash-deposits, he is acting both as a provider of money for his depositors, and also as a provider of resources for his borrowing-customers. Thus the modern banker performs two distinct sets of services. He supplies a substitute for State Money by acting as a clearing-house and transferring current payments backwards and forwards between his different customers by means of book-entries on the credit and debit sides. But he is also acting as a middleman in respect of a particular type of lending, receiving deposits from the public which he employs in purchasing securities, or in making loans to industry and trade mainly to meet demands for working capital. This duality of function is the clue to many difficulties in the modern Theory of Money and Credit and the source of some serious confusions of thought” (Keynes, 1930, vol. 2, p. 213).

Keynes seems to say that the two functions of banks are to either act as financial intermediary fulfilling the utility banking function of settling trades, or to act as financial intermediary gathering deposits and lending the majority of these out. There seems no money creation at all involved, certainly not on the individual bank level. Keynes’ most influential opus, *General Theory* (Keynes, 1936) quickly eclipsed his earlier *Treatise on Money* in terms of its influence on public debate. In it, Keynes did not place any emphasis on banks, which he argued were financial intermediaries that needed to acquire deposits before they can lend:

“The notion that the creation of credit by the banking system allows investment to take place to which ‘no genuine saving’ corresponds can only be the result of isolating one of the consequences of the increased bank-credit to the exclusion of the others. ... it is impossible that the intention of the entrepreneur who has borrowed in order to increase investment can become effective (except in substitution for investment by other entrepreneurs which would have occurred otherwise) at a faster rate than the public decide to increase their savings. ... No

one can be compelled to own the additional money corresponding to the new bank-credit, unless he deliberately prefers to hold more money rather than some other form of wealth. ...

Thus the old-fashioned view that saving always involves investment, though incomplete and misleading, is formally sounder than the newfangled view that there can be saving without investment or investment without 'genuine' saving" (Keynes, 1936, p. 82f).

Schumpeter (1954) commented on this shift in Keynes' view:

The "deposit-creating bank loan and its role in the financing of investment *without any previous saving up of the sums thus lent* have practically disappeared in the analytic schema of the General Theory, where it is again the saving public that holds the scene. Orthodox Keynesianism has in fact reverted to the old view... Whether this spells progress or retrogression, every economist must decide for himself" (p. 1115, italics in original).

The early post-war period saw unprecedented influence of Keynes' General Theory, and a Keynesian school of thought that somehow managed to ignore Keynes' earlier writings on bank credit creation, became dominant in academia. Given that a former major proponent of both the *credit creation* and the *fractional reserve theories* of banking had shifted his stance to the new *financial intermediation theory*, it is not surprising that others would follow.

A highly influential challenge to the *fractional reserve theory* of banking was staged by Gurley and Shaw (1955). They rejected the view that "banks stand apart in their ability to create loanable funds out of hand while other intermediaries in contrast are busy with the modest brokerage function of transmitting loanable funds that are somehow generated elsewhere" (1955, p. 521). Their argument was that banks should not be singled out as being 'special'. Instead, according to them the banks' financial intermediation function is identical to that of other financial intermediaries:

"There are many similarities between the monetary system and nonmonetary intermediaries, and the similarities are more important than the differences. Both types of financial institutions create financial claims; and both may engage in multiple creation of their particular liabilities in relation to any one class of asset that they hold" (1960, p. 202).

Gurley and Shaw argued that banks and non-bank financial institutions largely shared the function of being financial intermediaries and of being able to create financial claims, thus arguing that effectively there was nothing special about banks. Instead, we are told, banks and the banking system, like other financial intermediaries, need to first gather deposits, and then are able to lend these out. In this view, any remaining special role of banks was due to outmoded regulation, which treated banks differently. Therefore, they argue, the Federal Reserve should extend its banking supervision to the growing set of non-bank financial intermediaries, thus treating them equally to banks.

Gurley and Shaw were robustly challenged during the 1950s and 1960s in influential journals by, among others, Culbertson (1958), Aschheim (1959), Warren Smith (1959),

Solomon (1959) and Paul Smith (1966), many of whom were supporters of the *fractional reserve theory*.³⁷

However, such challenges by proponents of the *fractional reserve theory* of banking were swept away when in 1963, James Tobin, a new rising star in economics, took a clear stand to proclaim another ‘new view’ of banking, formulating the modern version of the *financial intermediation theory* of banking.

“Tobin (1963), standing atop the wreckage in 1963 to set forth the ‘new view’ of commercial banking, stands squarely with Gurley and Shaw against the traditional view” (Guttentag and Lindsay, 1968, p. 993).

Like Keynes, Alhadreff and others before him, Tobin only referred to bank credit creation in inverted commas, and used expressions to ridicule the idea that banks – individually or collectively, could create money and credit. In particular, Tobin (1963) argued:

“Neither individually nor collectively do commercial banks possess a widow's cruse” (p. 412).

“The distinction between commercial banks and other financial intermediaries has been too sharply drawn. The differences are of degree, not of kind... In particular, the differences which do exist have little intrinsically to do with the monetary nature of bank liabilities... The differences are more importantly related to the special reserve requirements and interest rate ceilings to which banks are subject. Any other financial industry subject to the same kind of regulations would behave in much the same way” (p. 418).

Banks only seem to be different from others, because regulators erroneously chose to single them out for special regulation. In Tobin's view, “commercial banks are different, because they are controlled, and not the other way around” (Guttentag and Lindsay, 1968, p. 993). Tobin's (1969) and Tobin-Brainard's (1963) portfolio model made no distinction between banks and non-bank financial intermediaries, indeed, ignored the role of banks altogether and contributed much towards the modern mainstream view of economics models without banks. Branson (1968) further developed Tobin's new approach, which was popular in the leading journals.

³⁷ Smith (1959), for instance, argued in the *Quarterly Journal of Economics* that banks ‘can create money’ and that “their credit-creating activities expand the supply of loanable funds available to finance expenditure” (p. 535).

“Commercial banks do have a special ability to expand credit for a reason that is simple but often overlooked... What is truly unique... about commercial banks is... their distinctive role as issuers of means of payment [which] gives commercial banks a peculiar ability to expand credit.”

Smith argues that banks are (presumably in aggregate) not financial intermediaries and their function is distinct from that of financial intermediaries (what in modern parlance is referred to as ‘non-bank financial intermediaries’). According to Smith, the money creation by banks is due to a ‘multiplier process’ (which he also calls the “credit expansion multiplier” or “multiple credit creation”).

“Commercial bank credit creation makes funds available to finance expenditures in excess of the funds arising out of the current income flow. Intermediaries, to the extent that their activities are as described so far, merely collect a portion of current voluntary saving and serve the function of making these funds available for the financing of current expenditures - i.e., they help to channel saving into investment in a broad sense. Thus, intermediaries are exactly what their name indicates. Commercial banks, on the other hand, are distinctly not intermediaries” (p. 538).

Yet, Guttentag and Lindsey (1968) wrote in the *Journal of Political Economy* that despite the challenge by Gurley and Shaw (1955) “The uniqueness issue, on the other hand, remains unsettled” (p. 992). They side with Smith and others, and conclude that “banks are unique” and different in their role and impact from non-bank financial intermediaries, since “commercial banks have a greater capacity for varying the aggregate volume of credit than other financial intermediaries” (p. 991). “These points provide a rationale for special controls on commercial banks that goes beyond the need to prevent financial panic. It is the rationale that has been sought by defenders of the traditional view that commercial banks are ‘unique’ ever since the Gurley-Shaw challenge to this view” (p. 991).

Tobin (1969) re-stated his view in an article establishing his portfolio balance approach to financial markets. This was the first article in the first edition of a new journal, the *Journal of Money, Credit and Banking*. While its name may suggest openness towards the various theories of banking, in practice it has only published articles that did not support the *credit creation theory* and were mainly in line with the *financial intermediation theory*. This is also true for most other journals classified as ‘leading journals’ (for instance, using the 4-rated journals from the UK Association of Business Schools list in economics). Henceforth, the portfolio balance approach, which treated all financial institutions as mere portfolio managers, and which is in line with the *financial intermediation theory*, was to hold sway and become the dominant creed among economists world-wide.

Modern proponents of the ubiquitous *financial intermediation theory* include Sealy and Lindley, 1977, Diamond and Dybvig (1983), Diamond (1984, 1991, 1997), Gorton and Pennacchi (1990), Bencivenga and Smith (1991), Bernanke and Gertler (1990), Rajan (1996), Allen and Gale (1994, 2004); Allen and Santomero (2001); Diamond and Rajan (2001), Kashyap et al. (2002), Casu and Girardone (2006). It includes the ‘credit view’ in macroeconomics, discussing a ‘bank lending channel’ of monetary transmission (Bernanke and Blinder, 1989, Bernanke and Gertler, 1995), as well as the neo-classical and new classical macroeconomic models (if they consider banks at all). To these and most contemporary authors in economics and finance, banks are financial intermediaries like other firms in the financial sector, which focus on the ‘transformation’ of liabilities with particular features into assets with other features (e.g. with respect to maturity, liquidity and quantity/size), or which focus on ‘monitoring’ others (Sheard, 1989), but do not create credit individually or collectively.

Since Tobin, banks have been considered as just one type of financial intermediary among many. As there is no clear distinction of banks from non-banks, economists also saw no reason why banks needed to be singled out for special treatment or indeed inclusion in their macroeconomic theories. Thus the leading monetary economics textbooks (Walsh, 2003; Woodford, 2003) left out banks altogether, as uninteresting and unimportant. Many went as far as to leave out any kind of money (there are no monetary aggregates in Woodford, 2003). A recent paper by Allen, Carletti and Gale (2014) introduces money – albeit only cash created by the central bank, while banks are mere financial intermediaries that cannot create money or credit.

As a result, the leading forecasting models used by policy makers also do not include banks (Bank of England, 2014a). Thus even when some staff at the Bank of England argued in mid-March 2014 that the *credit creation theory* might after all be true (without providing empirical evidence), it was clear that this was a minority view: At the same

time, Bank of England governor Mark Carney gave a speech at Cass Business School (the Mais Lecture) and cited the monetary theory of Brunnermeier and Sannikov (2013). In their as yet unpublished paper they argue prominently, in their abstract (quite visibly to the governor) that banks are financial intermediaries that “take deposits from ...households to extend loans...” and that “finance themselves borrowing from households”. At the end of March 2014, Dame Clara Furse, external member of the Financial Policy Committee of the Bank of England, gave a speech to the Chartered Institute for Securities and Investment in Liverpool, in which she explains:

“The financial system performs vital functions for us all – it exists to intermediate savings and investment... Banks, non-banks and markets all contribute to this....” (Bank of England, 2013d).

Further, she argues that for economic growth to take place, bank activity can be substituted by ‘direct finance’, and she recommends, as one of the lessons of the crisis, to enhance ‘market based finance’, i.e. funding not via banks. Even the original meaning of credit creation seemed forgotten by this literature: Bernanke (1993) uses credit creation in its title, but the article then explains that this concept is defined as the ‘financial intermediation of savers’ deposits into loans’.

Conclusion of the literature review:

Since the 1960s it has become the conventional view not to consider banks as unique and able to create money, but instead as mere financial intermediaries like other financial firms. Banks have thus been dropped from economics models and finance models have not suggested that bank action has significant macroeconomic effects. The question of where money comes from, how the money supply is created and allocated have remained unaddressed.

This literature review has identified a gradual progression of views from the *credit creation theory* to the *fractional reserve theory* to the present-day *financial intermediation theory*. The development has not been entirely smooth; several influential writers have either changed their views (on occasion several times) or have shifted between the theories. Some institutions, such as the Bank of England, manage to issue statements in support of each of the three theories.

Thus today the conclusion of 1968 still holds, namely that the issue cannot be considered as ‘settled’. It is possible that the pendulum is about to swing away from the *financial intermediation theory* to one of the other two. But how can we avoid that history will repeat itself and the profession will spend another century locked into a debate without firm conclusion? How can the issue be settled? Theoretical models cannot give an answer, since it is possible to build models consistent with any one of the three theories. It is empirical evidence one must turn to. Surprisingly, despite the length of the dispute (going in fact back far further than the observation period of more than a century), there has so far not been a successful empirical examination in order to settle the questions at hand. The following section will briefly present the results of empirical fieldwork, gleaned from interviews with bankers. This is followed by an empirical test of the various banking theories.

3. A Brief Comment on Field Work Results

About twenty interviews were arranged with bankers at various levels of seniority, and working for a variety of banks. This included very senior bankers, such as a former CEO of Deutsche Bank, as well as loan officers and ordinary bank staff of very small, local banks. Many of the meetings were tape recorded. The findings, to be reported in more detail separately, can be summarised as follows: The majority of experienced bankers argued that either the *financial intermediation theory* or the *fractional reserve theory* was true. A minority supported the *credit creation theory*. The views were scattered without discernable pattern with respect to seniority, size of bank, type of bank or country.

When asked for evidence concerning the accounting procedures to be followed when a bank loan is extended, all witnesses testified that nowadays such details are embedded in the IT systems of the banks, and therefore bank staff no longer see what happens in terms of precise booking procedures. As a result they could not provide firm evidence. When asked for permission to 'see into the IT', the response was that this was not possible, due to the high requirements concerning security, as well as client confidentiality, regulatory restrictions, and the need to keep commercial secrets safe.

The field work found (a) that many bank staff are not aware of any potential power to create money, and (b) in today's computerised banking world, the answer to the crucial questions are tied up in bank accounting software and cannot be conclusively settled by observation of human actions, such as accounting entries, manual transfers or other explicit commands. As a result, it is concluded that other empirical techniques needed to be implemented.

4. The Empirical Test

It was found that the simplest possible test design is to examine a bank's internal accounting during the process of obtaining a bank loan. When all the necessary bank credit procedures have been undertaken (starting from KYC to credit analysis, risk rating to the negotiation of the details of the loan contract) and the bank loan becomes 'real', the borrower's current account will be credited with the amount of the loan. The key question is whether as a prerequisite of this accounting operation of booking the borrower's loan principal into their bank account the bank actually withdraws this amount from another account, resulting in a reduction of equal value in the balance of another entity – either at the bank (as the *fractional reserve theory* maintains, drawing down reserves) or external to it (as the *financial intermediation theory* maintains). Should it be found that the bank was able to credit the borrower's account with the loan principal without actually having withdrawn money from any other internal or external account, or of transferring the money from any other source, this would constitute prima facie evidence that the bank was able to create the loan principal out of nothing. In that case, the credit creation theory would be supported and the theory that the individual bank acts as an intermediary that needs to obtain savings or funds first, before being able to extend credit (whether in conformity with the *fractional reserve theory* or the *financial intermediation theory*), would be rejected.

4.1. Expected Results

With a bank loan of E200,000, drawn by the researcher from a bank, the following changes in the lending bank's accounting entries are expected a priori according to each theory:

(a) Bank credit accounting according to the *credit creation theory*

According to this theory, banks do not separate customer funds from own funds. Thus when lending, banks credit the borrower's account with the borrowed amount, although no new deposit has taken place (credit creation out of nothing). The balance sheet lengthens. Cash, central bank reserves or balances with other banks are not immediately needed, as reserve and capital requirements only need to be met at particular measurement intervals.

Table 6 Account Changes due to Bank Loan (*Credit Creation Theory*)

Assets		Liabilities	
		Deposits (borrower's A/C).	+E 200
Loans and investments....	+E 200		
Total.....	+E 200	Total.....	+E 200

(b) Bank credit accounting according to the *fractional reserve theory*

The distinguishing feature of this theory is that each individual bank cannot create credit out of nothing. A bank can only lend money, when it has previously received the same amount in excess reserves from another bank, whose own reserve balances will have declined, or from the central bank.

“A bank will not lend more than its excess reserves because, by law, it must hold a certain amount of required reserves. ... Each depository institution can create loans (and deposits) only to the extent that it has excess reserves.” (Miller, VanHoose, 1993, p. 331).

Following the exposition in Miller, VanHoose (1993, 330-331), the balance sheet evolution is as follows:

Table 7 Account Changes due to Bank Loan (*Fractional Reserve Theory*)

Step 1 Precondition for the Bank Loan

Assets		Liabilities	
Excess Reserves...	+E 200	Deposits.....	+E 200
....			
Total.....	+E 200	Total.....	+E 200

Step 2 The Bank Loan

Assets		Liabilities	
Excess Reserves...	- E 200		
Loans and investments....	+E 200		
Total.....	0	Total.....	0

In other words, for the bank to be able to make a loan, it first has to check its excess reserves, as this is, according to this theory, a strictly binding requirement and limitation, as well as its distinguishing feature. The bank cannot at any moment lend more money than its excess reserves, and it will have to draw down the reserve balance to lend. (Thus, as noted, another distinguishing feature is that the balance sheet expansion is driven by the prior increase in a deposit that boosted excess reserves, *not* by the granting of a loan).

It needs to be verified when the empirical test of bank lending is implemented, whether the bank first confirmed the precise amount of its available excess reserves before entering into the loan contract or paying out the loan funds to the customer, so as not to exceed that figure. If the bank is found not to have checked or not to be concerned about its reserve balances then this constitutes a rejection of the *fractional reserve theory*.

(c) Bank credit accounting according to the *financial intermediation theory*

According to this theory, banks are, as far as payments and accounts are concerned, not different from non-bank financial institutions. The latter are required by Client Money rules to hold deposits in custody for customers (warehousing; legally bailments). Client funds are kept separately from the bank's own funds, so that customer deposits are not shown on the balance sheet as liabilities. All funds are central bank money that can be held in reserve at the central bank or deposited with other banks.

Table 8 Account Changes due to Bank Loan (*Fin. Intermediation Theory*)

Assets			Liabilities		
Excess Reserves...	– E	200		
Loans and investments....	+ E	200			
Total.....		0	Total.....		0

According to this theory, the bank balance sheet does not lengthen as a result of the bank loan.

4. 2. A Live Empirical Test (No. 1)

Several banks in the UK and Germany were approached and asked to cooperate in an academic study of bank loan operations. The design of the empirical test takes the form of a researcher actually entering into a loan contract with the bank, and the bank extending a loan, while its internal accounting is revealed as much as possible.

The large banks declined to cooperate. The reason given was usually twofold: the required disclosure of internal accounting data and procedures would breach their confidentiality or IT security rules; secondly, the transactions volumes of the banks were so large that the planned test would be very difficult to conduct when borrowing sensibly sized amounts of money that would not clash with the banks' internal risk management rules (as the author is not an ultra-high net worth customer). In that case, any single transaction would not be easy to isolate within the bank's IT systems. In response, the researcher proposed to get agreement from a bank to conduct the test on a bank holiday, when the bank was closed and no transactions would take place – apart from the planned loan transaction for the test. Despite various discussions with a number of banks, in the

end the banks declined on the basis of the above reasons and additionally that the costs of operating their systems and controlling for any potential other transactions would be prohibitive.

It was therefore decided to approach smaller banks, of which there are many in Germany (there are approximately 1,700 local, mostly small banks in Germany). Each owns a full banking license and engages in universal banking, offering all major banking services, including stock trading and FX, to the general public. A local bank with a balance sheet of approximately E 3 bn was approached, as well as a bank with a balance sheet of about E 700m. Both declined on the same grounds as the larger banks, but one suggested that a much smaller bank might be able to oblige, pointing out the advantage that there would be fewer transactions booked during the day, allowing a clearer identification of the empirical test transaction.

Thus an introduction to Raiffeisenbank Wildenberg e.G., located in a small Bavarian town in the district of Lower Bavaria, was made. The bank is a cooperative bank within the Raiffeisen and cooperative banking association of banks, with eight full-time staff. The two joint directors, Mr Michael Betzenbichler and Mr Marco Rebl both agreed to the scientific empirical examination and also to share all available internal accounting records. For this purpose an agreement was signed that confirmed that the planned transactions would be part of a scientific empirical test, and the researcher would not transfer any funds outside the designated accounts, and would immediately repay the loan upon completion of the test (Appendix 1). One limitation on the accounting records, which is common to most banks is that they are outsourcing the IT to a bank IT company, which maintains its own rules concerning data protection and confidentiality.

It was agreed that the researcher would borrow E 200,000 from the bank. The transaction was undertaken on 7 August 2013 in the offices of the bank in Wildenberg in Bavaria. Apart from the two (sole) directors, also the head (and sole staff) of the credit department, Mr Ludwig Keil was present. The directors were bystanders not engaging in any action. Mr Keil was the only bank representative involved in processing the loan from the start of the customer documentation, to the signing of the loan contract and finally paying out the loan into the borrower's account. The entire transaction, including the manual entries made by Mr Keil, was filmed. The screens of the bank internal IT terminal were also photographed. Moreover, a team from the BBC was present and filmed the central part of the empirical bank credit experiment (Reporter Alistair Fee and a cameraman).

The bank disclosed their standard internal credit procedure. The sequence of the key steps is shown in Appendix 2. As can be seen, the last two steps are the signing of the 'credit documents' by the borrower (the researcher) and, finally, the payment of the loan at the value date.³⁸

It was agreed that the researcher would borrow EUR 200,000.—from the bank, at prime rate conditions (in the event the bank did not insist on any interest proceeds, in support of the scientific research project).

³⁸ It is of interest that the last step expressly requires the bank staff implementing this credit procedure to only pay out the loan for the agreed purpose, as evidence for which a receipt for any purchases undertaken with the loan funds are demanded by the bank. This demonstrates that the implementation of policies of credit guidance by purpose of the loan is practically possible, since such data is available and the use of the loan is monitored and enforced by each bank.

When the bank loan contract was signed by both the bank and the borrower on 7 August 2013, the loan amount was credited to the borrower's account with the bank immediately (as agreed in the loan contract). Appendix 3 shows the original borrower's accounts and balances with Raiffeisenbank Wildenberg. The key information from the account summary table is repeated here, in English, as Table 9:

Table 9: The Empirical Researcher's New Bank Account

Bank: Raiffeisenbank Wildenberg eG

Customer: Richard Werner

Date: 7 August 2013

Current Account

<u>Account No.</u>	<u>Type of Product</u>	<u>Currency</u>	<u>A/C Balance</u>
44636	current account w/o fees	EUR	200,000.00
Total in EUR:			200,000.00

Loan

<u>Account No.</u>	<u>Type of Product</u>	<u>Currency</u>	<u>A/C Balance</u>
20044636	other private financing	EUR	-200,000.00
Total in EUR:			-200,000.00

The bank also issued the following accounts overview, which is like a standard T-account of the transaction from the borrower's perspective:

Table 10: The Empirical Researcher's New Bank Account Balances

Accounts Overview

<u>EUR</u>	<u>Credit</u>	<u>Liabilities</u>	<u>Balance</u>	<u>No. Contracts</u>
Current Account	200,000.00		200,000.00	1
Loan		200,000.00	-200,000.00	1
Bank Sum Total	200,000.00	200,000.00	0.00	2

The borrower confirmed that his new current account with the bank now showed a balance of EUR 200,000 that was available for spending. (An extension of the experiment, to be reported on separately, used the balance the following day for a particular transaction outside the banking institution, transferring the funds elsewhere; this transfer was duly completed, demonstrating that the funds could be used for actual transactions).

We are now moving to the empirical test of the three banking theories. The critical question is: where did Raiffeisenbank Wildenberg eG obtain the funds from, which the borrower (researcher) obtained (and duly used and transferred out of the bank the following day). Director Marco Rebl explained that the bank maintained its reserves with the central organisation of cooperative banks, which in turn maintained an account with

the central bank. These amounted to a fixed amount of E 350,000 that did not change during the observation period. Concerning the bank credit procedure, the researcher attempted to verify the source of the funds that were about to be lent.

Firstly, the researcher confirmed that the only 3 bank officers involved in this test and bank transaction were present throughout, whereby 2 (the directors) only watched and neither accessed any computer terminal or transmitted any instructions whatsoever. The accounts manager (head of the credit department, Mr Keil) was the only operator involved in implementing, booking and paying out the loan. His actions were filmed. It was noted and confirmed that none of the bank staff present engaged in any additional activity, such as ascertaining the available deposits or funds within the bank, or giving instructions to transfer funds from various sources to the borrower's account (for instance by contacting the bank internal treasury desk or contacting bank external interbank funding sources etc.). Neither were there instructions to increase, draw down or borrow reserves from the central bank or any other bank. In other words, it was apparent that upon the signing of the loan contract by both parties, the funds were credited to the borrower's account immediately, without any other activity of checking or giving instructions to transfer. There were no delays or deliberations or other bookings. The moment the loan was implemented, the borrower saw his current account balance increase by the loan amount. The overall credit transaction, from start to funds being available in the borrower's account took about 35 minutes (and was clearly slowed by the filming and frequent questions by the researcher).

Secondly, the researcher asked the three bank staff present whether they had, either before or after signing the loan contract and before crediting the borrower's account with the full amount borrowed inquired of any other parties internally or externally, checked their available deposit balances, or made any bookings or transfers of any kind, in connection to this loan contract. They all confirmed that they did not engage in any such activity. They confirmed that upon signing the loan contract the borrower's account was credited immediately, without any such steps.

Thirdly, the researcher obtained the internal daily account statements from the bank. These are produced only once a day, after close of business. Since the bank is small, it was hoped that it would be possible to identify the impact of the E 200,000 loan transaction, and distinguish the accounting pattern corresponding to one of the three banking hypotheses.

Results

Appendix 4 shows the scan of the bank's balance sheet at the end of 6 August 2013, the day before the test transaction was undertaken. Appendix 5 shows the daily balance of the following day. In Table 11 the key positions are summarised and account names translated:

Table 11 Raiffeisenbank Wildenberg eG: Daily Accounts Assets

6 August 2013, 22.46 hrs. vs. 7 August 2013, 22.56 hrs.

EUR

ASSETS	Balance 6 Aug 2013	Balance 7 Aug 2013	Difference
1 Cash	181,703.03	340,032.89	158,329.86
2 Bills of exchange			
3 Claims on financial. inst.	5,298,713.76	5,079,709.21	-219,004.55
4 Claims on customers	23,712,558.13	23,947,729.92	235,171.79
- maturing daily	932,695.44	967,767.32	35,071.88
- maturity under 4 years	1,689,619.97	1,889,619.97	200,000.00
- maturity 4 yrs or longer	21,090,242.72	21,090,342.72	
5 Bonds, bills, debt instr.	19,178,065.00	19,178,065.00	
6 Stocks and shares			
7 Stake holdings	397,768.68	397,768.68	
8 Stakes in related firms			
9 Trust assets	5,262.69	5,262.69	
10 Compensation claims on the public sector			
11 Immaterial assets	102.00	102.00	
12 Fixed assets	221,549.46	221,549.46	
13 Called but not deployed capital			
14 Other assets	707,569.26	711,288.64	3,719.38
15 Balancing item	2,844.32	2,844.32	
16 SUM OF ASSETS	49,706,136.33	49,884,352.81	178,216.48

Table 12 Raiffeisenbank Wildenberg eG: Daily Accounts Liabilities

6 August 2013, 22.46 hrs. vs. 7 August 2013, 22.56 hrs.

EUR

LIABILITIES	Balance 6 Aug 2013	Balance 7 Aug 2013	Difference
1 Claims by financial inst.	5,621,456.60	5,621,879.66	423.06
2 Claims by customers	39,589,177.09	39,759,156.42	169,979.33
2A Savings accounts	10,234,806.01	10,237,118.24	2,312.23
2B Other liabilities	29,354,371.08	29,522,038.18	167,667.10
- BA daily	13,773,925.93	13,963,899.89	189,973.96
- BB maturity less 4 yrs	13,296,042.92	13,273,736.06	-22,306.86
- BC maturity 4 yrs &	2,284,402.23	2,284,402.23	
4 Trust liabilities	5,262.70	5,262.70	
5 Other liabilities	12,378.81	12,599.44	220.63
6 Balancing item	16,996.04	16,996.04	
7 Reserves	1,138,497.64	1,138,497.64	
11 Fund for Bank Risk	250,000.00	250,000.00	
12 Own Capital	3,057,248.57	3,057,248.57	
13 SUM LIABILITIES	49,706,136.33	49,884,352.81	178,216.48

Starting by analysing the liability side information, we find that customer deposits are considered part of the financial institution's balance sheet. This contradicts the *financial intermediation theory*, which assumes that banks are not special and are virtually indistinguishable from non-bank financial institutions that have to keep customer deposits off balance sheet. In actual fact, a bank considers a customers' deposit as a loan to the bank, recorded by what is known as the account statement. This can only be reconciled with the *credit creation* or *fractional reserve hypotheses* of banking.

We observe that an amount not far below the loan balance (about E190,000) has been deposited with the bank. This is itself not far from the increase in total liabilities (and assets). Since the *fractional reserve hypothesis* requires such an increase in deposits as a precondition for being able to grant the bank loan, i.e. it must precede the bank loan, it is difficult to reconcile with the *fractional reserve theory*. Moreover, the researcher confirmed that in his own bank account the loan balance of E200,000 was shown on the same day. This means that the increase in liabilities was driven by the increase by E200,000 in daily liabilities (item 2B BA in Table 12). Thus the total increase in liabilities could not have been due to a coincidental increase in customer deposits on the day of the loan. Overall, the liability side account information seems only fully in line with the *credit creation theory*.

Turning to an analysis of the asset side, we note that the category where we find our loan is item 4, claims on customers – fortunately the only one that day with a maturity below 4 years and hence clearly identifiable on the bank balance sheet. Apparently, customers also took out short-term loans (most likely overdrafts) amounting to E35,071.88, producing a total new loan balance of E235,071.88. In order to keep the analysis as simple as possible, let us proceed from here assuming that our test loan amounted to this total figure (E235,071.88). So the balance sheet item of interest on the asset side is ΔA_4 , the increase in loans (claims on customers) amounting to E235,071.88.

We now would like to analyse the balance sheet in order to see whether this new loan of E235,071.88 was withdrawn from other accounts at the bank, or how it was funded. We first proceed with considering activity on the asset side. Denoting balances in thousands below, we can summarise the balance sheet changes during the observation period, within the balance sheet constraints as follows:

$$(1) \quad \Delta \text{Assets} = \Delta A_1 (\text{cash}) + \Delta A_3 (\text{claims on other FI}) + \Delta A_4 (\text{claims on customers}) + \Delta A_{14} (\text{other assets})$$

Numerically, these are, rounded in thousand euro:

$$(2) \quad 178 = 158 - 219 + 235 + 4$$

The *fractional reserve theory* says that the loan balance must be paid from reserves. These can be either cash balances or reserves with other banks (including the central bank). The deposits (claims) with other financial institutions (which effectively includes the bank's central bank reserve balances) declined significantly, by E 219k. At the same time cash

reserves increased significantly. What may have happened is that the bank withdrew legal tender from its account with the cooperative central bank, explaining both the rise in cash and decline in balances with other financial institutions. Since the theories do not distinguish between these categories, we can aggregate A1 and A3, the cash balances and reserves. Also, to simplify, we aggregate A14 (other assets) with A4 (claims on customers), to obtain:

$$(3) \quad \begin{array}{ccc} 178 & = & -61 & + & 239 \\ (\Delta \text{Assets}) & & (\Delta \text{reserves}) & & (\Delta \text{claims on customers, others}) \end{array}$$

We observe that reserves fell, while claims on customers rose significantly. Moreover, total assets also rose, by an amount not dissimilar to our loan balance. Can this information be reconciled with the three theories of banking?

Considering the *financial intermediation hypothesis*, we would expect a decline in reserves (accounts with other financial institutions and cash) of the same amount as customer loans. Reserves however declined by far less. At the same time, the balance sheet expanded, driven by a significant increase in claims on customers. If the bank borrowed money from other banks in order to fund the loan (thus reducing its balance of net claims on other banks), in line with the *financial intermediation* theory of banking, vault cash should not increase and neither should the balance sheet. We observe both a significant rise in cash holdings and an expansion in the total balance sheet (total assets and total liabilities), which expanded by E178k. This cannot be reconciled with the *financial intermediation theory*, which we therefore must consider as rejected.

Considering the *fractional reserve theory*, we confirmed by asking the credit department's Mr Keil, as well as the directors, that none of them checked their reserve balance or even balance of deposits with other banks before signing the loan contract and making the funds available to the borrower. Furthermore, there seems no evidence that reserves (cash and claims on other financial institutions) declined in an amount commensurate with the loan taken out. Finally, the observed increase in the balance sheet can also not be reconciled with the standard description of the *fractional reserve theory*. We must therefore consider it as rejected, too.

This leaves us with the *credit creation theory*. Can we reconcile the observed accounting asset side information with it? And what do we learn from the liability side information? The transactions are linked to each other via the accounting identities of the balance sheet (equations 1, 2 and 3). We can therefore ask the question what would have happened to total assets, if we assumed for the moment that no other transaction had taken place, apart from the loan (235). We can set the change in each asset item (except for $\Delta A4$, our loan) to zero, if we subtract the same amount from the change in total assets. The new total asset balance in this hypothetical scenario would be:

$$(3) \quad 178 - 158 + 219 - 4 = 235$$

or, in general,

$$(4) \quad \Delta A4 \text{ (claims on customers)} =$$

$$= \Delta \text{Assets} - \Delta A1 \text{ (cash)} - \Delta A3 \text{ (claims on other FI)} - \Delta A14 \text{ (other assets)}$$

In other words, if the other transactions had not happened, the bank's balance sheet would have expanded by the same amount as the loans taken out. This finding is consistent only with the *credit creation theory* of bank lending.

The evidence is not as easily interpreted as may have been desired, since in practice it is not possible to stop all other bank transactions that may be initiated by bank customers (who are nowadays able to implement transactions even on holidays). But the available accounting data cannot be reconciled with the *fractional reserve* and the *financial intermediation* hypotheses of banking.

4.3. A Fully Controlled Empirical Test (No. 2)

Considering this issue, bank director Mr Marco Rebl suggested an alternative additional method of testing the banking hypotheses, which would allow the researcher to control for all other transactions without fail. Mr Rebl explained again that all bank accounting takes place within the IT system that is used on a daily basis by bank staff. Although the code of the software would directly show the commands following the entry of a bank loan, gaining access to the internal software code is difficult, given the high security requirements of bank IT systems. However, Mr Rebl then pointed out that there are in fact two parallel IT systems in operation that maintain all the accounting information of each of the cooperative banks. The daily balance sheets used above are from the software called 'BAP agree' (Bankarbeitsplatz – 'bank work place' – agree). This software is however not used for the compilation of the formal annual accounts, which are submitted to bank auditors and the regulatory authorities. For these formal accounts, a second, parallel system is utilised, called Hersbrucker Jahresabschlussprogramm (below 'HJAP'; literally: Hersbruck annual accounts programme, named after the town where the Raiffeisen cooperative bank is located whose director, Mr Weidinger, originally developed this programme). HJAP is also a full-blown bank IT system, but with the specialisation of meeting the more stringent annual reporting requirements and having features useful for their compilation, checking and submission. Mr Rebl pointed out that the system contains all the bank accounting rules and it conforms with all bank supervisory, prudential and legal requirements and regulations (which may not necessarily be relevant or enforceable on a daily basis as visible in BAP agree).

All transactions are aggregated in HJAP for the annual accounts at the end of the calendar year. While transactions booked in BAP feed into HJAP, sometimes transactions take place late in December that, possibly due to the holidays, were not properly recorded or reflected in the BAP agree system. In this case, the bank directors have the opportunity to ensure that these are booked as appropriate for the formal annual accounts by manual entry.

Thus Mr Rebl explained that our empirical test can also be conducted by using the latest annual accounts (as of writing, the 2013 annual accounts), and using the latest HJAP software (as of writing, 2.0.2013/5), in order to book the test bank loan of €200,000 as if it was a missed trade that had to be booked after 31 December 2013, to be added to the official accounts for reporting purposes. Since in this case only one transaction will be booked – the bank loan from the researcher – there is no noise due to other autonomous transactions being undertaken by other bank customers, as in our first test.

In other words, all other factors are controlled for. Since the bank loan could be entered into by the researcher after the end of 2013 in such a way that it needed manual input in HJAP, as indeed happens on occasion with standard loans, this therefore does constitute a realistic and actual empirical test. This was implemented as suggested by Director Rebl, using the audited accounts of 2013.

Appendix 6 shows the audited and formally submitted accounts of Raiffeisenbank Wildenberg for the year 2013. Appendix 7 shows the same accounts after our empirical test bank loan of E200,000 has been transacted in the annual accounts bank IT software (HJAP). The summary accounts are shown below:

Table 13 **Raiffeisenbank Wildenberg eG: Audited Annual Accounts 2013**
EUR

ASSETS	31 Dec. 2013	Post-Test	Difference
1 Cash	227,072.87	227,072.87	
2 Bills of exchange			
3 Claims on financial. inst.	6,123,707.01	6,123,707.01	
4 Claims on customers	24,066,899.94	24,066,899.94	200,000.00
5 Bonds, bills, debt instr.	19,655,934.00	19,655,934.00	
6 Stocks and shares			
7 Stake holdings	397,768.68	397,768.68	
8 Stakes in related firms			
9 Trust assets	4,713.81	4,713.81	
10 Compensation claims on the public sector			
11 Immaterial assets			
12 Fixed assets	188,977.92	221,549.46	
13 Other assets	335,969.95	335,969.95	
14 Balancing item	2,126.22	2,126.22	
15 Difference from asset valuations	46,334.50	46,334.50	
16 SUM OF ASSETS	51,049,504.92	51,249,504.92	200,000.00

The only two items that are affected are the claims on customers – the bank loan as a claim by the bank on the borrower due to the borrower's obligation to repay the loan, and the total balance of assets. Both increased by the loan amount of E200,000.

Table 14 **Raiffeisenbank Wildenberg eG: Audited Annual Accounts 2013**
EUR

LIABILITIES	31 Dec. 2013	Post-Test	Difference
1 Claims by financial inst.	5,265,491.16	5,265,491.16	
2 Claims by customers	41,462,424.00	41,662,424.00	200,000.00
2A Savings accounts	10,494,856.16	10,494,856.16	
2B Other liabilities	30,967,567.84	31,167,567.84	200,000.00

- BA daily	14,069,056.09	14,269,056.09	200,000.00
- BB with agreed maturity	16,898,511.75	16,898,511.75	
4 Trust liabilities	4,713.82	4,713.82	
5 Other liabilities	33,812.09	33,812.09	
6 Balancing item	12,787.37	12,787.37	
7 Reserves	682,874.80	682,874.80	
11 Fund for Bank Risk	420,000.00	420,000.00	
12 Own Capital	3,167,401.68	3,167,401.68	
13 SUM LIABILITIES	51,049,504.92	51,249,504.92	200,000.00

As can be seen, the only difference lies in the items expected a priori by the *credit creation theory*. This test design is in line with the suggestion by the Macmillan Committee (1931), which said that a feature of the *credit creation theory* is:

“If no additional in-payments were made by customers and there were no withdrawals in cash, the volume of deposits of a single banker would fluctuate only with the volume of the loans he himself made...” (p. 12).

We thus conclude that the *fractional reserve* and *financial intermediation hypotheses* are rejected.

5. Conclusion

This paper was intended to serve two functions. First, the history of economic thought was examined concerning the question of how banks function. It was found that a long-standing controversy exists that has not been settled empirically. Secondly, empirical tests were conducted to settle the existing and continuing controversies.

5. 1. Three theories but no empirical test

Concerning the first issue, in this paper we identified three distinct hypotheses concerning the role of banks, namely the *credit creation theory*, the *fractional reserve theory* and the *financial intermediation theory*. The first argues that each bank can create credit and money out of nothing (‘credit creation’). The second argues that while each bank is a mere financial intermediary, the banking system as a whole creates credit and money. The third argues that banks are financial intermediaries not materially different from other non-bank financial institutions and, specifically, function by gathering deposits and then investing these, similar to an asset management company. Further, it was found that the first theory was dominant until about the 1920s, featuring leading proponents such as Macleod and Schumpeter. Then the second theory became dominant, under the influence of such economists as Keynes, Crick, Phillips and Samuelson, until about the early 1960s. From the early 1960s, first under the influence of Tobin, the *Journal of Money, Credit and Banking*, since then in line with the dominant group of economists, the *financial intermediation theory* became dominant.

Yet, despite these identifiable eras of predominance, doubts remained concerning each theory. Most recently, the *credit creation theory* has experienced a revival, having been championed again in the aftermath of the Japanese banking crisis in the early 1990s (Werner, 1992, 1997) and in the run-up to and aftermath of the European and US

financial crises since 2007 (see Werner, 2003, 2005, 2012; Ryan-Collins, Greenham, Werner and Jackson, 2011, 2012; Benes and Kumhof, 2012; Bank of England, 2014a, b). However, such works have not yet become influential in the majority of models and theories of the macroeconomy or banking.

Surprisingly, despite much and ongoing controversy over at least the past one hundred and fifty years examined in this study concerning the question of just how banks operate – are they individually able to create credit out of nothing, or are they mere financial intermediaries – there had hitherto not been any scientific attempt to settle the issue using empirical evidence.

5.2. The empirical evidence: Credit creation theory wins

The second contribution of this paper has been to report on the first empirical study testing the three main hypotheses. The three hypotheses have been successfully tested in a real world setting of borrowing from a bank and examining the actual bank accounting taking place, both in an uncontrolled and in a completely controlled environment so that no unrelated transactions could interfere or create ambiguity.

It was examined whether in the process of making money available to the borrower the bank transfers these funds from other accounts (within or outside the bank). In the process of making loaned money available in the borrower's bank account, it was found that the bank did not transfer the money away from other internal or external accounts, but instead 'invented' it. The conclusion is that both the *fractional reserve theory* and the *financial intermediation theory* were rejected. The *credit creation theory* was found empirically supported.

Thus it can now be said with confidence for the first time – possibly in the 5,000 years' history of banking – that it has been scientifically demonstrated that each individual bank creates credit and money out of nothing, when it extends what is called a 'bank loan'. The bank does not loan any existing money, but instead creates new money. Thus the money supply is created as 'fairy dust' produced by the banks out of thin air.³⁹

5.3. What is special about banks

Henceforth, economists need not rely on assertions concerning banks. We now know, based on empirical evidence, that banks are different, indeed unique – solving the longstanding puzzle posed by Fama (1985) and others. We also now know *why* banks are unique among financial institutions and firms, different from both non-bank financial institutions and corporations: it is because they can individually create money out of nothing.

5.4. Erroneous theories due to erroneous accounting

It seems that careful consideration of bank accounting should already have raised serious doubts concerning both the *fractional reserve* and the *financial intermediation theories*, even without our conclusive empirical test:

³⁹ Thanks to Charlie Haswell for the 'fairy dust' allegory.

Accounting problems of the *fractional reserve theory*:

Customer deposits become the property of the bank and are fully shown on the balance sheet. Thus it is *a priori* not clear why reserves should be the constraint on bank lending as claimed. This theory neglects, despite its rhetorical awareness of the ‘creation of accounting records’, the very transaction of booking a loan on the bank’s balance sheet: the borrower’s account is not shown, as it is simply assumed that the money ‘leaves the bank immediately’, effectively on the assumption that the loan is paid out in cash. Let us assume therefore that the borrower, due to delays, initially does not spend the money and it stays in his account, or alternatively, that Step 1 and Step 2 of fractional reserve banking (Table 7) happen on the same day, as may be possible:

Table 15 Account Changes due to Bank Loan (*Fractional Reserve Theory*)
Steps 1 and 2 all in one

Assets			Liabilities		
Excess Reserves....	+E	200	Deposits.....	+E	200
Excess Reserves	–E	200			
Loans and investments....	+E	200			
Total.....		200	Total.....		200

The deposit, according to this theory, is the primary step, due to another customer having deposited it. The borrower receives the loan in the form of cash. That seems an unusual special case. Once we consider the more common case that the borrower receives the loan as credit to the borrower’s cheque account at the bank, we are right back at the *credit creation theory*. In that case, the bank is not restricted to lending only as much as its excess reserves. Despite Samuelson’s (1948) protestation that “A bank cannot eat its cake and have it too” (p. 325f), the bank still has its reserves at the moment it has granted the bank loan and credited the borrower’s account. Equally, the bank is able to lend more than its excess reserves, since, as seen, the amount of reserves does not fall when the loan is granted. In any case, any theoretical doubts can be empirically verified – which was done in this paper. Banks, it was found, do not check for excess reserves before they grant credit.

Accounting problems of the *financial intermediation theory*:

As discussed above, the *financial intermediation theory* maintains that banks are, like non-banks, mere financial intermediaries. The accounts of financial intermediaries are characterised by a required separation of client money and the firm’s own funds. Thus a careful study of accounting quickly reveals that the *financial intermediation theory* is impossible to reconcile with observed bank balance sheet information. Stock brokers do not show their clients’ assets, even if invested by them on a discretionary basis, as part of their own balance sheets. Mutual fund management firms and the assets of their fund investor clients are kept completely separately. Thus a comparative analysis of stock brokers (as representative examples of non-bank financial intermediaries) and banks would reveal that banks are quite different: their clients’ assets are fully on their balance sheet and not segregated. Stock brokers’ assets are boosted by their own investments, but not those of their clients. Thus an insolvency of a stock broker leaves client funds unencumbered: they are fully owned by the clients. But bank deposits are owned by the banks and bank insolvency means that the client funds are part of the assets of the bankrupt firm. Depositors are merely general creditors, ranking below preference

shareholders (while smaller amounts may be covered by deposit insurance schemes). Thus a careful analysis of bank balance sheets and its accounting information would have provided ample notice to supporters of the *financial intermediation theory*, so dominant over the past half-century, that it always was a non-starter, since banks could not possibly be financial intermediaries: how else could the rapid growth and massive scale of their own balance sheets be explained?

5.5. Implications

The Importance of Accounting

One of the implications of the findings is that it does not make much sense to build economic theories of the financial sector, if these are not based on accounting realities. The role of accounting in economics should thus be increased, both in research and in the teaching of economics. This includes the role of national income accounting and flow of funds information (see Winkler et al., 2013a, b).

Implications for Government Policy

There are other, far-reaching ramifications of the finding that banks individually create credit and money when they do what is called ‘lending money’. It is readily seen that this fact is important for monetary policy, but also fiscal policy, and needs to be reflected in economic theories. They call for a whole new paradigm in monetary economics, macroeconomics, finance and banking (see Werner, 1997, 2005, 2012, 2013) that is based on the reality of banks as creators of the money supply. It has potentially important implications for other disciplines, such as accounting, economic and business history, economic geography, politics, sociology and law.

Implications for Bank Regulation

Furthermore, the implications are far-reaching for bank regulation and the design of official policies. As mentioned in the introduction, modern national and international banking regulation is predicated on the assumption that the *financial intermediation theory* is correct. Since in fact banks are able to create money out of nothing, imposing higher capital requirements on banks will not necessarily enable the prevention of boom-bust cycles and banking crises, since even with higher capital requirements, banks could still continue to expand the money supply, thereby fuelling asset prices, whereby some of this newly created money can be used to increase bank capital.

This has been most graphically illustrated by the actions of Barclays Bank during the financial crisis: unwilling to accept public money to shore up its capital, as several other major UK banks had done, it arranged for a Gulf investor to purchase several billion pounds worth of its newly issued preference shares, thus raising the amount of its capital and avoiding bankruptcy. The Gulf investor did not need to take the trouble of making liquid assets available for this investment: Barclays Bank generously offered to lend it to the Gulf investor – or, in other words, Barclays invented the money through credit creation. The preference shares of Barclays served as collateral. Table 16 illustrates such bootstrapping.

Table 16 **Boot-strapping Barclays Bank in the Crisis: Capital Out of Nothing**
billion pounds

Step 1: Loan to Gulf Investor

Assets			Liabilities		
Loans and investments....	+E	10	Deposits.....	+E	10
Total.....		10	Capital	+E	0
			Total.....		10

Step 2: Capital Raising

Assets			Liabilities		
Loans and investments....	+E	10	Deposits.....	+E	0
Total.....		10	Capital	+E	10
			Total.....		10

Since, as we know from this paper, banks newly invent the money that is ‘loaned’ by creating it out of nothing, it is possible for banks under the right circumstances to show almost any amount of capital to regulators, irrespective of the true state of their books. For instance, the attempt to improve on Basel I through the Basel II framework focused on measures that were known to reduce the capital needed by large banks, which was at the time thought to *lower* risks and deliver net benefits, including a ‘slight’ reduction in the frequency of banking crises.⁴⁰

Despite such gregarious examples, it will be pointed out that in practise banks’ ability to create money meets some limitations. However, if banks of roughly equal size and customer base create credit at about the same pace, they may in practice not face any limitations on their ability to create money and credit. Even higher required capital can be supplied from the very money created by the banks.

Monetary Reform

The Bank of England’s (2014a, b) recent intervention has triggered a public debate about whether the privilege of banks to create money should be revoked (Wolf, 2014). The reality of banks as creators of the money supply does raise the question of the ideal type of monetary system. Much research is needed on this account. Among the many different monetary system designs tried over the past 5,000 years, very few have met the requirement for a fair, effective, accountable, stable, sustainable and democratic creation

⁴⁰ A PriceWaterhouseCoopers Risk Management study commissioned by the European Commission on the effects of Basel II (PWC, 2004) argued that “A key objective of banking regulation is to ensure the efficient and safe operation of banks through the economic cycle, and any assessment of the impact of Base II needs therefore to take account of its macroeconomic effects. These effects can be divided into two kinds: the short- to medium-term effects on the current economic cycle and the longer-term effects. ...our analysis of the impact of Basel II on the balance sheet and capital structure of banks... revealed that Basel II could, on balance, reduce the amount of regulatory capital in a number of EU countries, in turn potentially leading to lower lending rates. So the trade-off outlined above between possible short-term loss and logner term gain does not really occur. There is little or no short-term loss at a [sic] EU level. On the other hand, the National Institute’s historical analysis of past banking crises suggests that Basel II will only have a moderate effect on the frequency of banking crises... The effect of changes in regulatory capital rules are likely to be helpful in this regard, but they are small relative to the other causes of banking crises. They are likely, at best, to reduce only slightly the frequency of such crises.”

and allocation of money. The view of the author, based on more than twenty-three years of research on this topic, is that it is the safest bet to ensure that the awesome power to create money is returned directly to those to whom it belongs: ordinary people, not technocrats. This can be ensured by the introduction of a network small, not-for-profit local banks across the nation – most countries do not currently possess such a system. However, it is at the heart of the success of the German economic performance in the past 200 years. It is the very Raiffeisen, Volksbank or Sparkasse banks – the smaller the better – that were helpful in the implementation of this empirical study that should serve as the role model for future policies concerning our monetary system. In addition, one can complement such local public bank money with money issued by local authorities that is accepted to pay local taxes – a local public money that has not come about by creating debt, but that is created for services rendered to local authorities of the community. Both forms of local money creation together would create a decentralised and more accountable monetary system that may well perform better than the unholy alliance of central banks and big banks, which have done much to create unsustainable asset bubbles and banking crises (Werner, 2013b,c).

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