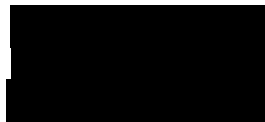


Applying the Quantity Theory of Credit: The role of the ECB in the propagation of the European financial and sovereign debt crisis and the policy implications

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Abstract. The financial crisis has led to the call for a new research programme on the link between banking and the economy, as a new consensus among economists has been emerging that it is necessary to include a banking sector in macroeconomic models, and include systemic, macroeconomic feedbacks in the finance and banking theory. There is a model that fulfils the requirements by distinguishing between different types of bank credit – credit boosting GDP and credit boosting asset prices and causing banking crises. It is consistent with the empirical record. In this paper the implications of this model are explored for the analysis of the causes of the financial crisis, the role of the ECB and the design of a financial architecture that is more stable and likely to deliver sustainable growth..

Keywords: bank credit, banking and the economy, credit creation, disaggregation of credit, methodology, quantity equation, macroeconomics

JEL Classification: E41, E52, E58

1 Introduction

Thanks to the banking crisis, a broader spectrum of the public became aware of the fact that leading economic theories and models, as well as influential advanced textbooks in macroeconomics and monetary economics, did not feature money (e.g. Woodford, 2003), or banks (Walsh, 2003; Woodford, 2003). Donald Kohn (2009), as Vice-Chairman of the Federal Reserve, reflected the sense of embarrassment of the economics profession when having to admit to the public that economic models simply assumed that banks did not exist:

“It is fair to say ...that the core macroeconomic modelling framework used at the Federal Reserve and other central banks around the world has included, at best, only a limited role for ...credit provision, and financial intermediation. ...asset price movements and the feedback among those movements, credit supply, and economic activity were not well captured by the models used at most central banks.”

While economists seem to have taken the brunt of the public critique triggered by the crisis, researchers in the fields of banking and finance also failed in delivering prescriptions, tools and recommendations for appropriate regulation, supervision and risk management to avoid banking crises. A fundamental problem seems to be the very separation of disciplines into economics on the one hand, with the potential to capture systemic and macroeconomic aspects, and finance and banking on the other, with the potential to model banks in detail. The separation allowed the systemic importance of banks to remain unnoticed: The economists have tended not to model the financial infrastructure and banking, and the finance and banking researchers have tended not to be concerned with macroeconomic effects of the collective behaviour of financial intermediaries. Focusing on microeconomic studies of representative financial institutions, they neglected the systemic effects of individual bank behaviour that may affect the entire economy and thus generate important feedback to financial intermediaries. Both disciplines had developed in a way that blindsided them concerning banking crises.

It could thus be said that economics needs more finance and banking, while finance and banking need more economics.¹ Fifteen years ago what must be the simplest possible model was proposed that incorporates banking into a basic macroeconomic framework and which is able to explain banking crises, as well as solve a number of observed ‘anomalies’ in macroeconomics and finance – published in the journal *Kredit und Kapital* (Werner, 1997). This model is briefly restated, before the policy implications are drawn for immediate measures that would end the current European crisis and the design for a stable and sustainable financial architecture in Europe.

¹ This was the message of the call for a new interdisciplinary research programme on ‘Banking and the Economy’, issued at the first European Conference on Banking and the Economy (ECOBATE), held on 29 September 2011 at Winchester Guildhall, and organised by the Centre for Banking, Finance and Sustainable Development, University of Southampton Management School.

2 An Alternative Model, Based on the Inductive Method

2.1 ‘Anomalies’ of the Old Approaches

Until about the mid-1980s, the hitherto prevailing approaches (classical, many neo-classical, Keynesian, monetarist and post-Keynesian approaches, as well as most eclectic models), despite their differences, had much in common. They still included a monetary aggregate that was linked to nominal GDP through the quantity equation:

$$(1) \quad M V = P Y$$

whereby M stands for the money supply (measured and defined variously as M0, M1, M2, M3 or M4), V denotes the (income) velocity of money, which has to be stable for a reliable relationship between money and the economy, P the GDP deflator (the appropriate price level) and Y symbolises real GDP. PY hence represents nominal GDP. Expressed in logarithms, this relationship can also be stated as:

$$(2) \quad m + v = p + y$$

Since the 1980s, the mainstream as well as several heterodox approach to macroeconomics have faced the problem of an increasing number of ‘anomalies’ – empirical facts that seem to contradict the theories. The list starts with the widespread empirical observation that velocity had become erratic, was declining significantly and the money demand function was unstable (e.g. Hendry, 1985; Belongia and Chalfant, 1990; Boughton, 1991). The ‘quantity equation’ relationship, expressed as a stable income velocity, “came apart at the seams during the course of the 1980s” (Goodhart, 1989). The implications for macroeconomics were far-reaching. This empirical failure not only discredited monetarism, but posed a major obstacle to all the other schools of thought as well, most of which had previously relied on the quantity equation in some way. As one monetary aggregate after another succumbed to an unstable relationship with nominal GDP, the profession became ever less specific about the very definition of money. Today, textbooks, as well as leading central bank publications, state that they do not know just what money is. In the words of then Federal Reserve staff:

“...there is still no definitive answer in terms of all its final uses to the question: What is money?” (Belongia and Chalfant, 1990, p. 32).

The empirical failure to define money without much ambiguity has been one of the weaknesses of the macroeconomics prevalent until about the mid-1980s, and it is one that remains unresolved. Motivated by the velocity decline and this inability to define money clearly, in the 1980s leading economists called for the adoption of “an alternative paradigm” (Spindt, 1987; Judd and Scadding, 1982; Gordon, 1984; Roley, 1985).

We know that this was the time at which the paradigm of moneyless economic models, real business cycle theories and supply-side economics became influential. Given that the profession had a fundamental problem with handling money, such moneyless models must have become more appealing to economists. If nothing else, they seemed to offer an escape route from an apparently intractable problem. Instead of rising to the challenges posed by the velocity decline and getting to the root of the problem, economists simply assumed away the problem, by operating on the empirically unsupported premise that money (and banks) did not matter.

But the role of banks had remained a persistent puzzle in macroeconomics – whether of the pre- or post-1980s type. Because of the belief that they are mere financial intermediaries without any special features that would justify a unique representation, they have not been explicitly modelled in a meaningful way in the major macroeconomic theories and models over the past thirty years. There is however a small though important body of evidence to the effect that banks are special in some way that standard theory cannot explain (e.g. Fama, 1985; Peek and Rosengren, 2000; Ashcraft, 2005; Werner, 1992; Werner, 2005; Leary, 2009; Voutsinas and Werner, 2011). Blanchard and Fischer (1989) pointed out already more than twenty years ago:

“The notion that there is something about banks that makes them ‘special’ is a recurrent theme.” (p. 478).

With banks unexplained, so has been the powerful phenomenon of the recurring banking crises, which time and again provide a stark reminder that banks indeed have an important role to play in the economy.

A further major ‘anomaly’ has been the fact that the central economic variable – the one emphasised since the mid-1980s as the main driving force of economic and financial market activity, namely interest rates – could not be shown to operate empirically in the way theory required: Empirically, interest rates seem far less powerful in explaining business cycles or developments in the economy than theory would have it.² In empirical work, interest rate variables often lack explanatory power, significance or the ‘right’ sign.³ When a correlation between interest rates and

² See Melvin (1983) and Leeper and Gordon (1983), who found little support for the so-called liquidity effect of interest rates on the money supply.

³ King and Levine (1993) did not find evidence to support the hypothesized relationship between real interest rate and economic growth in a cross-section of countries. Taylor (1999) found that the link between real interest rates and macroeconomic aggregates such as consumption and investment is tenuous.

economic growth is found, it is not more likely to be negative than positive.⁴ Interest rates have also not been able to explain major asset price movements (on Japanese land prices, see Asako, 1991; on Japanese stock prices, see French and Poterba, 1991; on the US real estate market see Dokko et al., 1990), nor capital flows (Ueda, 1990; Werner, 1994) – phenomena that in theory should be explicable largely through the price of money (interest rates) or its differential. Furthermore, in terms of timing, interest rates appear as likely to follow economic activity as to lead it.⁵

This became apparent when the Japanese central bank lowered interest rates over a dozen times in the 1990s, while the economy continued to stagnate and the money supply failed to expand. But Keynesian, post-Keynesian and even most monetarist advice was based on a monetary transmission mechanism via interest rates.

There were many attempts at explaining this phenomenon, producing the voluminous ‘credit view’ literature (including the ‘bank lending view’ and the ‘balance sheet channel’ approach; see Bernanke and Gertler, 1995). These attempts also failed: They could not resolve the empirical puzzle, because according to its proponents the additional credit channel of monetary transmission should enhance the role of interest rates. This was evidently not the case in Japan or a number of other major economies. As a result, key proponents began to distance themselves from this approach (Bernanke, 1993; Bernanke and Gertler, 1995).

An attempt was made to explain the apparent failure of falling interest rates to stimulate the economy by reviving the ‘liquidity trap’ argument, originating in Keynesian approaches, and subsequently adopted by rational expectations theories (Krugman, 1998). While there is a widespread perception that the ‘liquidity trap’ explanation has been successful, in fact it failed to even ask the right question, let alone offer an answer to it: The liquidity trap argument is about a situation where interest rates have fallen to their lowest point, and it merely argues that, at this point, interest rate-based monetary policy cannot be effective (since rates cannot be reduced further). However, in Japan interest rates reached their lowest point only in March 2003, *after* over a decade of recession and over a dozen interest rate *reductions*. As to the relevant question at hand, namely why repeated interest rate *reductions* over a decade have failed to stimulate the economy, the liquidity trap argument has nothing to say.⁶ As it turns out, the liquidity trap argument is merely the restatement of the

⁴ Kuttner and Mosser (2002) pointed out the positive correlation between GDP growth and interest rates in the US between 1950 and 2000. Dotsey, Lantz and Scholl (2003) examined the behaviour of real interest rates. Their results disclosed the real interest rate series is contemporaneously positively correlated with lagged cyclical output. Other studies finding a positive correlation between interest rates and growth include Gelb (1989), Polak (1989), Easterly (1990) and Roubini and Sala-i-Martin (1992). This positive relationship between interest rates and growth is also acknowledged in a leading textbook in advanced macroeconomics (Sorensen and Whitta-Jacobsen, 2010). For a comparative empirical study on the US, UK, Germany and Japan, see Werner and Zhu (2011).

⁵ While Stock and Watson (1999) find that the nominal rate is a leading business-cycle indicator, short-term interest rates, since influenced by central banks, tend to follow nominal GDP growth. The same also seems to apply to long-term interest rates (Werner, 2005). Gurkaynak, Sack, and Swanson (2005) showed that long term interest rates react to various macroeconomic shocks that in the conventional macroeconomic models are only expected to affect short-term interest rates.

⁶ For a survey of how the literature has dealt with the ineffectiveness of interest rate policy in Japan, see Werner (2006).

tautology that rates cannot fall further when they have fallen to the lowest possible point.

For interest rates to play the role theory suggests, the money and credit markets have to be in equilibrium. But Japan's recession, about to enter its third decade, makes sport of the contention that in the medium to long run markets are in equilibrium. Many economists have been trained to avoid contemplating the possibility that markets may never be in equilibrium. Yet, this is a distinct possibility. In such a world, it would not be prices (such as interest rates) that determine outcomes, but quantities (such as the quantity of credit). Even Blanchard and Fischer (1989) noted, in a comment that echoes their sentiment on the missing role of banks:

"A recurrent theme in the literature and among market participants is that the interest alone does not adequately reflect the links between financial markets and the rest of the economy. Rather, it is argued, the availability of credit and the quality of balance sheets are important determinants of the rate of investment" (p. 478).

This has stirred interest in the credit rationing argument (Jaffee and Russell, 1976; Stiglitz and Weiss, 1981). However, even this eminently sensible explanation, for which a growing empirical literature has collected supportive evidence, raised more questions than it answered: the credit rationing argument itself does not explain why available alternatives to domestic bank credit (foreign bank credit, direct finance, equity issuance) failed to compensate for credit supply constraints. In effect, credit rationing is a microeconomic argument without any explicit macroeconomic implications. However, it is macroeconomic issues that require explanation: why have interest rate reductions failed to stimulate the economy, and why could non-bank sources of funding not compensate for lack of bank credit?

Proponents of real business cycle theories have argued that macroeconomics should respond to the challenges posed by the financial crisis by incorporating a financial or banking sector into DSGE models. This however would constitute an *ad hoc* modification of a fundamentally incompatible approach. Instead, it would seem a new paradigm is needed, as Joseph Stiglitz and collaborators had again called for before the recent financial crisis.⁷ The slow but steady rise of non-mainstream theories over the past twenty years, including institutional economics, experimental economics, psychological economics, behavioural economics and economic history – all sub-disciplines with an empirical orientation – suggests that momentum is building in favour of a paradigm shift towards a model developed from an inductive research methodology (unlike the prevailing paradigm, built on the hypothetico-deductive method). Werner (2012) has argued that it must rise to the challenge of explaining at least the seven central empirical puzzles in macro- and monetary economics (the last two of which have not been discussed in this paper):

(1) The apparent velocity decline, (2) the identification problem of money, and (3) of what makes banks special (while incorporating this feature appropriately into a macroeconomic model), (4) why there are recurring banking crises, (5) the

⁷ See Stiglitz (2001), Stiglitz and Greenwald (2003).

ineffectiveness of over a decade of interest rate reductions in stimulating growth in Japan, (6) the success of the German and East Asian economic model, despite widespread government intervention and use of non-market mechanisms, and (7) the ineffectiveness of supply-side reforms (deregulation, liberalization, privatization) in enhancing economic performance in Japan and other countries.

In the following section a model fulfilling this requirement, originally published in Werner (1997), will be restated. It is then used to explore the policy conclusions for post-crisis measures and the design of a European financial architecture that delivers stable and sustainable growth without major crises, which is the main contribution of the present paper.

2.2 A Macro Model Incorporating Banking

Equations (1) and (2) are derived from Irving Fisher (1911), who, drawing on Newcomb (1885) and John Stuart Mill (1848), formulated it as follows:

$$(3) \quad M V = P T$$

Fisher said that the ‘effective’ money MV (assumed to circulate and be used for transactions) is equal to the value of transactions (the sum of all pairs of prices times quantities transacted T).⁸ We can rephrase this slightly and say that, in its original form, the quantity equation stated:

The total value of transactions during any time period must be the same as the amount of money used to pay for these transactions.

This is now an equation that indeed is “valid under any set of circumstances whatever”.⁹ But there was an important drawback to Fisher’s equation. Data on Q was not readily available. As national income accounts were becoming increasingly available, Pigou (1917) and several of his colleagues at Cambridge University argued that the stock of money should be proportional to ‘total nominal expenditures’. Many Cambridge economists therefore replaced PQ with PY , yielding the most widely-known formulation of the quantity equation in (1) above.

This change in the definition of the quantity equation is usually undertaken with minimal justification. Milton Friedman, for instance, explains that

⁸ Fisher originally used the notation $MV=PT$, whereby T stands for the quantity of transactions.

⁹ Since Fisher had the concept of species in mind as money M , and since he realized that the total volume of transactions was much larger than the stock of gold or precious metals, he, like other economists at the time, felt that banking or other financial innovations served to economise on this stock of gold. Thus some kind of ‘multiplication factor’ was necessary – the number of times one unit of gold money M was used for transactions during the period of observation. This is velocity V .

“Fisher, in his original version, used T to refer to all transactions – purchases of final goods and services..., intermediate transactions..., and capital transactions (the purchase of a house or a share of stock). In current usage, the item has come to be interpreted as referring to purchases of final goods and services only, and the notation has been changed accordingly, T being replaced by y, as corresponding to real income” (Friedman, 1990, p. 38).

While it is undoubtedly true that it “has come to be interpreted as referring to purchases of final goods and services only”, which can be represented by GDP, Friedman fails to tell us why this is justified and what the implicit assumptions are. From a comparison with Fisher’s earlier formulation it is obvious that equation (1) is a special case that is only accurate if:

$$(4) \quad P Y = P T$$

or, in other words, if nominal GDP is a robust proxy for the value of total transactions in the economy for which money is changing hands. When considering growth rates, the lesser requirement applies that transactions proxied by GDP are a constant proportion of total transactions. However, it is neither clear that GDP accurately reflects all transactions in the economy nor that GDP-based transactions are a constant proportion of total transactions. Friedman (1990, p. 38), casually inserts the formulation “if we restrict purchases to final goods and services...” in his explanation of equation (1). But as Friedman acknowledges, Fisher originally included asset transactions. These constitute an important potential use of money M. They may be of substantial volume in modern economies – often a multiple of GDP – yet are not included in the GDP statistics, as the latter reflect income, value added in production and services or expenditure on goods and services only. Capital gains on assets are not included in the income definition. Financial sector transactions affect wealth, but are not part of income and hence GDP (for more details on national income accounting, see UN 1993, 2003, or Lequiller, 2004). Likewise, the majority of real estate transactions are not part of the GDP statistics.

Thus equation (1) will not be reliable, when the value of non-GDP transactions, such as asset transactions, rises. In those time periods we must expect the traditional quantity theory of money, $MV=PY$, to give the appearance of a fall in the velocity V, as money is increasingly used for transactions other than nominal GDP (PY). This explains why in many countries with asset price booms economists puzzled over an apparent ‘velocity decline’, ‘breakdown of the money demand function’ or a ‘mystery of missing money’.¹⁰

The solution is to break the general equation of exchange for all transactions into two flows – those for GDP (‘real’, hence subscript R) and those for non-GDP transactions (‘financial’, subscript F). As Friedman pointed out about equation (3):

¹⁰ Spindt (1985), Howells and Biefang-Fisancho Mariscal (1992) and Werner (1992, 1997).

“Each side of this equation can be broken into subcategories: the right-hand side into different categories of transactions and the left-hand side into payments in different form” (Friedman, ‘Quantity Theory’, *Encyclopedia Britannica*, 15th edition, p. 435).

This was first successfully implemented by Werner (1992, 1997). Substituting the slightly more intuitive letter ‘Q’ for the quantity of transactions, and following this framework, we choose to disaggregate both sides of (1), on the one hand into money used for transactions that are part of GDP (called $M_R V_R$) and those that are not (called $M_F V_F$), and on the other hand the value of transactions that are part of GDP ($P_R Q_R$) which should be accurately proxied by nominal GDP ($P_R Y$), and those that are not ($P_F Q_F$):¹¹

$$(5) \quad MV = M_R V_R + M_F V_F$$

$$(6) \quad PQ = P_R Q_R + P_F Q_F$$

At the same time, equations (7) and (8) must also hold:

$$(7) \quad M_R V_R = P_R Q_R$$

$$(8) \quad M_F V_F = P_F Q_F$$

Since we defined $P_R Q_R$ as the value of all transactions contributing to GDP, the value of transactions that are part of GDP should be equal to nominal GDP ($P_R Y$):

$$(7') \quad M_R V_R = P_R Y$$

$$\text{with } V_R = (P_R Y) / M_R = \text{const.}$$

With a stable ‘real’ velocity of money, V_R , the effective amount of money used for GDP transactions during any period of time ($M_R V_R$) must be equal to nominal GDP. Meanwhile, the amount of money effectively used for non-GDP transactions will be equal to the value of these non-GDP transactions.

By definition, for economic growth to take place, the value of economic transactions during one time period must exceed that of the previous period of comparison. Considering therefore net changes in variables over the observed time period, we obtain:

$$(9) \quad \Delta(M_R V_R) = \Delta(P_R Y)$$

$$(10) \quad \Delta(M_F V_F) = \Delta(P_F Q_F)$$

¹¹ As has been suggested by Werner (1992, 1994b, 1994c, 1995a, 1995b, 1995c, 1996a, 1996b, 1996c, 1996d, 1996e, 1997a, 1997b, 1997c, 1997d, 1997e, 2002b, 2003c). See also Economics Focus, *The Economist*, 19 June 1993, p. 74

We can say that the rise (fall) in the amount of money used for GDP-based transactions is equal to the rise (fall) in nominal GDP. Similarly equation (10) states that the rise (fall) in the amount of money used for non-GDP transactions is equal to the change in the value of non-GDP transactions. In other words, an asset bubble can be caused if more money is created and injected into asset markets.

In order to put figures into these equations we must now agree on how to measure money (or MV, the net amount of nominal money effectively used for all transactions). Fisher, Keynes and most post-war researchers used deposit aggregates ranging from M0 to M4 to represent M in the quantity equation. But there are a number of problems with this approach.

Firstly, the original equation of exchange defines M as the purchasing power that is actually exerted when transactions take place. The M-aggregates measuring the 'money supply' as traditionally defined, mainly consist of money deposited with banks or the central bank. They money that, at the moment of measurement, is *not* used for transactions. The original equation of exchange however demands a measure of that money which is used for transactions – money *in* circulation, not money *out* of circulation. Effectively, the M-measure that have dominated until now are not monetary aggregates, but savings aggregates.

John Stuart Mill (1848) was clear on this point, but subsequent authors have tended to neglect it. First he defines the quantity equation as a transactions equation, as described later by Fisher and by us above.¹² He then points out that

“Whatever may be the quantity of money in the country, only that part of it will affect prices which goes into the market of commodities, and is there actually exchanged against goods. Whatever increases the amount of this portion of the money in the country, tends to raise prices. But money hoarded does not act on prices. Money kept in reserve by individuals to meet contingencies which do not occur, does not act on prices. The money in the coffers of the Bank, or retained as a reserve by private bankers, does not act on prices until drawn out, nor even then unless drawn out to be expended in commodities” (Book III, Chapter 8, par. 17, p. 20).

Secondly, defining money by certain private sector assets, such as deposits, creates the identification problem recognized by Friedman (1956) that “there is no hard-and-fast line between ‘money’ and other assets” (p. 65).

Thirdly, using the traditional definition of money as cash or deposits, it remains impossible to implement a disaggregation of the money by the use it is put to. As Friedman (1956) noted, “dollars of money are not distinguished according as they are said to be held for one or the other purpose” (p. 61).

¹² “The whole of the goods sold (counting each resale of the same goods as so much added to the goods) have been exchanged for the whole of the money, multiplied by the number of purchases made on the average by each piece. Consequently, the amount of goods and of transactions being the same, the value of money is inversely as its quantity multiplied by what is called the rapidity of circulation. And the quantity of money in circulation is equal to the money value of all the goods sold, divided by the number which expresses the rapidity of circulation” (Book III, Chapter 8, paragraph 13).

The correct definition of money for purposes of these equations is one that measures the money that actually circulates in the economy and is used for transactions at any moment in time, as Mill would have argued. It is an empirical question to find out what data conveys this information.

The issue can be reformulated: equation (9) defines nominal GDP growth (P_{RY}). Growth this year means that more transactions (that are part of GDP) have taken place this year than last year. We know that this is only possible if more money has also exchanged hands to pay for these transactions. The next question therefore is: how can the amount of money used for transactions increase in our modern financial system? If we had a pure gold standard – which is what most classical and many neoclassical theories were designed for – then the answer would be that either gold previously retired from circulation (savings) is spent and put into circulation, or more gold is discovered, extracted and injected into the economy. However, today no country is on a gold standard. Instead, we have a system of fiat money. There are many different ways of organising such a system and history is full of interesting case studies. How is money created and injected in our present-day system? This is a simple question that empirical research should quickly be able to answer. Intriguingly, virtually no research is published on this question at all in the leading journals of macroeconomics, monetary economics, or banking and finance. To be sure, they carry many articles that make *assumptions* about how a theoretical monetary system may be defined in the particular cases of their stylised models. This does not help us further though, if we are interested in reality.

The particular type of fiat money system that is currently employed world-wide is one in which about 97% of the money supply is created and allocated largely by private profit-oriented enterprises, namely the banks. How do banks create money? As Werner (1992, 1997, 2005) argues and as we show in Ryan-Collins et al. (2011), banks simply *invent* 97% of the money supply when they credit borrowers' bank accounts with sums of money that nobody transferred into these accounts from other parts of the economy.¹³ To use another phrase: banks create money out of nothing when they extend bank credit (or purchase other assets, or pay their staff). This is why the process of granting bank loans is better described by the expression *credit creation*.

It is a simple point. So much so that J. K. Galbraith (1975) said of it:

“The process by which banks create money is so simple that the mind is repelled. When something so important is involved, a deeper mystery seems only decent” (p. 18f).

On the one hand the fact that banks create the money supply is a fact well known to a small group of experts. This is attested by many central bank publications,

¹³ Thanks to the banking crisis, this seems to be turning into the mainstream view, as articles by Martin Wolf in the FT signify: “...it is the normal monetary system, in which the “printing” of money is delegated to commercial banks, that needs defending. This delegates a core public function – the creation of money – to a private and often irresponsible commercial oligopoly.” (Wolf, 2012)

although mostly in obscure locations that have not attracted attention.¹⁴ It has also been recognized by Pollexfen (1697), Law (1720), Thornton (1802), John Stuart Mill (1848), Macleod (1855/56) and others (even though usually not formulated explicitly or precisely). But it failed to become the mainstream view, probably due to the fixation on legal tender or metallic money, and the subsequent focus on ‘M’-type deposit aggregates. Schumpeter (1954) points out that these authors recognized that in their economic effect money (traditionally measured) and bank credit could be identical:

*“As soon as we realize that there is no essential difference between those forms of ‘paper credit’ that are used for paying and lending, and that demand, supported by ‘credit’, acts upon prices in essentially the same manner as does demand supported by legal tender, we are on the way toward a serviceable theory of the credit structure...”*¹⁵

The recognition that credit may have the same economic effect as money was a major breakthrough, because legally money and credit are quite different constructs. As Schumpeter pointed out:

*“And this is why Thornton’s perception of the fact that the different means of payments may, on a certain level of abstraction, be treated as essentially alike was a major analytic performance, for the mere practitioner will in general be impressed by the technical differences rather than by the fundamental sameness.”*¹⁶

But despite these early insights and occasional bursts of research focusing on credit, its role has remained too small in mainstream theories, especially in the post-war era. According to Schumpeter,

“it proved extraordinarily difficult for economists to recognize that bank loans and bank investments do create deposits. In fact, throughout the period under survey they refused with practical unanimity to do so” (p. 1114).

Thus this fact has not been properly reflected in macroeconomic or monetary models. Yet, the fact that banks create the money supply can be utilized to answer our

¹⁴ By far the largest role in creating broad money is played by the banking sector ... When banks make loans they create additional deposits for those that have borrowed.” (Bank of England, 2007). “Money-creating organisations issue liabilities that are treated as media of exchange by others. The rest of the economy can be referred to as money holders (Bank of England, 2007). “... changes in the money stock primarily reflect developments in bank lending as new deposits are created” (Bank of England, 2007). “Given the near identity of deposits and bank lending, Money and Credit are often used almost inseparably, even interchangeably ...” (Bank of England, 2008). “Each and every time a bank makes a loan, new bank credit is created – new deposits – brand new money” (Graham Towers, 1939, former Governor of the Central Bank of Canada). “Over time ... Banknotes and commercial bank money became fully interchangeable payment media that customers could use according to their needs” (European Central Bank, 2000). “The actual process of money creation takes place primarily in banks” (Federal Reserve Bank of Chicago, 1961). “In the Eurosystem, money is primarily created through the extension of bank credit ... The commercial banks can create money themselves, the so-called giro money” (Bundesbank, 2009).

¹⁵ Schumpeter (1954), p. 718f.

¹⁶ Schumpeter (1954), p. 719, emphasis as in original.

research question at hand: In an economy with a banking system, the amount of money actually used for transactions can only increase when banks create new credit (Werner, 1992, 1997). This means that bank credit creation should have a direct impact on transaction volumes, demand, and hence also prices, as Mill (1848) and Bentham (1952-4) suggested.¹⁷

In order to avoid confusion we should reflect these facts in our notation by replacing letter ‘M’ with ‘C’, for credit. Hence our equations become the Quantity Theory of Credit (as presented by Werner, 1992, 1997, 2005):

$$(11) \quad CV = PQ$$

$$(12) \quad CV = C_R V_R + C_F V_F$$

$$(13) \quad PQ = P_R Q_R + P_F Q_F$$

$$(14) \quad C_R V_R = P_R Q_R$$

Since we defined $P_R Q_R$ as the value of all GDP-based transactions, we also know that the following equation holds, where P_R stands for the GDP deflator and $(P_R Y)$ stands for nominal GDP.

$$(15) \quad C_R V_R = P_R Y$$

with $V_R = (P_R Y)/C_R = \text{const.}$

$$(16) \quad C_F V_F = P_F Q_F$$

with $V_F = (P_F Q_F)/C_F = \text{const.}$

For growth:

$$(17) \quad \Delta(C_R V_R) = \Delta(P_R Y)$$

$$(18) \quad \Delta(C_F V_F) = \Delta(P_F Q_F)$$

¹⁷ In Mill’s words, not dissimilar to the at the time unpublished Bentham: “This extension of credit by entries in a banker’s books, has all that superior efficiency in acting on prices, which we ascribed to an extension by means of bank notes...” p. 70. “Credit which is used to purchase commodities, affects prices in the same manner as money” (p. 71).

2.3 Solving Key Puzzles

Defining money

The simple model of disaggregated credit offers solutions to the puzzles and ‘anomalies’ that we have identified. Firstly, we find that the problems of the traditional approach in measuring the money supply can be addressed by employing the more accurate definition of money as credit created by the banking system (including the central bank).¹⁸

(1) Credit creation measures only purchasing power that is actually used for transactions at the time of measurement – which is what the equation of exchange requires, and deposit aggregates cannot deliver. Credit always represents *effective* purchasing power, as borrowers take out loans to engage in transactions.

(2) There is no doubt about where credit creation starts or stops – thus accurate and clear-cut measures of the effective ‘money supply’, namely credit creation, can be found. To be clear, only the net creation of new transferable purchasing power is part of the definition. Thus what is often termed ‘credit’, for instance, the issuance of corporate debt or government bonds, does not in itself constitute credit creation, as in these cases already existing purchasing power is transferred between parties. Trade credit, if not underwritten by financial institutions, is not transferrable and generally usable (although it may still have economic effects, which require further research).

(3) Credit creation can be disaggregated, as we can obtain and analyse information about who obtains loans and what use they are put to. Sectoral loan data provide us with information about the direction of purchasing power - something deposit aggregates cannot tell us. By institutional analysis and the use of such disaggregated credit data it can be determined, at least approximately, what share of purchasing power is primarily spent on ‘real’ transactions that are part of GDP and which part is primarily used for financial transactions. Further, transactions contributing to GDP can be divided into ‘productive’ ones that have a lower risk, as they generate income streams to service them (they can thus be referred to as sustainable or productive), and those that do not increase productivity or the stock of goods and services. Data availability is dependant on central bank publication of such data. The identification of transactions that are part of GDP and those that are not is more straight-forward, simply following the NIA rules.

¹⁸ Proponents of the deposit view sometimes argue that it should not matter whether deposits or loans are being analysed, as both tend to be equal in the long run. This is not true, due to the main problems with deposit aggregates, including the problem of defining them. Werner (1996c) has shown that in the Japanese case, a broad credit measure and M2+CD, the traditional deposit measure, diverged greatly in the 1990s. While significant growth of M2+CD seemed to suggest an economic recovery in 1995, the credit aggregate suggested a contraction of nominal GDP growth - for the first time since 1931. The latter is what happened. Conversely, while M2+CD growth remained stable from mid-1995, the credit aggregate suggested a sudden economic recovery from the fourth quarter of 1995, which again materialised.

Explaining the velocity decline

The disaggregated model shows that the apparent velocity decline was due to the neglect of non-GDP transactions (financial transactions). A correct quantity equation, which is disaggregated at least into the two streams of GDP and non-GDP based transactions, should not suffer from a velocity decline. Empirical evidence for this has been offered in Werner (1997, 2005).¹⁹

Explaining what makes banks special

The approach places credit creation at its centre. The ability and license to create credit is the function of banks that sets them apart from other non-bank players in the economy. That banks ration and allocate credit is recognized in the literature. But this takes on a whole new dimension of importance when it is combined with the recognition that banks are the creators of the money supply. This is the missing link that causes credit rationing (Jaffee and Modigliani, 1969, Jaffee and Russell, 1976; Stiglitz and Weiss, 1981) to have macroeconomic implications (Werner, 1992, 1997). Since the credit market is rationed *and* determines the money supply, the *quantity* and the *quality* of credit creation are key factors shaping the economy. This explains why non-bank sources of funding can never compensate in aggregate for a lack of bank credit: neither non-bank financial institutions, nor debt and equity markets can create credit. There are many policy implications of this fact, some of which will be explored in the second part of this paper.

Explaining the ineffectiveness of interest rate reductions

The puzzle of why over a decade of interest rate reductions failed to stimulate the Japanese economy is solved by equation (15). Nominal GDP growth is determined by credit creation used for GDP-based transactions. Interest rates do not appear in equation (15). Further, an inspection of the link between credit growth and interest rates shows that there is not a robust negative correlation between the two (Werner, 2005). In other words, it is not surprising that lower interest rates may at times not stimulate the economy, if the key variable driving growth – credit for GDP-transactions – is not growing. Likewise, raising interest rates should not slow the economy, if credit creation for GDP transactions continues to grow.

Explaining why we experience recurring banking crises

Many empirical papers have found that banking crises follow a build-up of asset prices (e.g. Englund, 1999; Allen, 2001; Borio and Lowe, 2002; Reinhart and Rogoff, 2009). There has however not been a convincing reflection of this relationship in macroeconomic models (partly because banks do not usually feature). Equation (16) fills the gap and offers the simplest possible argument: asset inflation is caused by the creation of credit (and hence new money) by banks for asset transactions. This boosts asset prices, but their continued rise is predicated on continued credit creation for asset transactions. As soon as this is not forthcoming sufficiently, asset prices must be

¹⁹ The very concept of velocity is also called into question by an empirical approach recognizing the reality of transaction settlement via the banking system. The original concept of velocity was based on the assumption of a gold standard and the idea that the number of times a quantity of gold circulates would increase the value of transactions that it can be used for. The mechanics are different in a modern, bank-based financial system where all non-cash transactions (close to 97% of all transaction values) are settled via the banking system. More on this elsewhere.

expected to fall, which will render speculators out of pocket and asset loans non-performing. Due to the modest capital cushion in banking, a mere 10% drop in the present value of the loan portfolio (e.g. due to non-performance) would tend to wipe out the majority of equity, rendering banks technically bankrupt (*banca rotta*), the banking system subject to either runs or avoidance in the inter-bank market – both of which leave banks unable to operate.

The fact that asset prices are in aggregate determined by bank credit creation yields another important insight: the extension of credit for non-GDP transactions, if large and sustained enough, will produce a Ponzi scheme, whereby early entrants (those buying those assets that are driven up by bank credit creation), have a chance to exit with profits, while the late entrants (usually the broader public, buying at close to the peak of an asset bubble, as the media comes to focus on the phenomenal profits made by earlier entrants) will lose. The reason why credit for non-GDP transactions must be a Ponzi scheme is that only GDP transactions – as national income accountants know – generate the value that can yield income streams to service and repay loans. Thus any gains made from selling assets that have risen constitute a zero-sum game, whereby they are merely transfers from the losers. Credit creation for non-GDP transactions is thus inherently unsustainable, and if large enough results in major bankruptcies, banking crises and massive resource misallocation.

Given these dangers of credit for non-GDP transactions it is reasonable to contemplate how to avoid asset inflation and banking crises, or consumer price inflation for that matter. It is commonly held among economists and the public that the process of money creation should be performed in a prudent manner. Since most commentators assume that this task is performed only by the central bank, bank credit growth and the decisions of banks as to who obtains the newly created money have often escaped attention. Once we recognize that banks are the creators of the bulk of the money supply, it stands to reason that some kind of responsibility goes with this privilege. Hence banks should monitor – ideally following specific rules – the quantity and quality of their credit creation.

According to equation (16), asset inflation and boom/bust cycles – and hence systemic banking crises – can be avoided if banks do not extend credit for asset transactions. It also follows from equation (15) that credit of the type that increases productivity or the amount of goods and services available in the economy is less likely to produce consumer price inflation than credit creation in the form of consumer loans. We can thus usefully distinguish between productive, speculative and consumptive credit creation and its monitoring can serve to predict and prevent undesirable outcomes caused by credit creation. This is a distinction that has been used in the German-language literature almost a hundred years ago, but even some mainstream economists have been aware of it.²⁰ For details, see Werner (2005).

²⁰ “When banks loan money to finance productive and profitable endeavors, the loans are paid off rapidly and bank credit continues to be generally available.” “The excess credit which the Fed pumped into the economy spilled over into the stock market -- triggering a fantastic speculative boom.” Greenspan (1967).

Explaining the ineffectiveness of supply-side reforms

In Japan more than two decades of significant structural reform, deregulation, liberalization and privatization, have failed to stimulate the economy. Likewise, the structural reforms implemented in transition economies, or Greece under its debt restructuring, have not stimulated demand. This may surprise proponents of supply-side models (such as real business cycle or DSGE models). But it is easily explained in our framework, which includes a monetary sector that affects the real economy. According to equation (15), nominal GDP growth is restricted by credit creation for GDP transactions. Structural reforms may raise the potential growth rate, but if a lack of credit creation does not allow the demand side to expand, the economy will continue to grow below its potential. In this situation, the more the potential growth rate is raised through supply-side reforms, the greater the deflationary pressure would be. This seems to describe the situation in Japan well, as it is entering into the third decade of recession and deflationary pressures. It also throws a critical light on the recent argument by the World Bank (2012) that China requires structural reform to stimulate the economy and maintain high growth.

Explaining the success of the German and East Asian economic model

Economies that manage to focus credit creation on productive and sustainable use – i.e. not for consumption and asset transactions – are likely to achieve superior economic performance (high nominal GDP growth and low inflation, without asset price cycles and with financial system stability). As the World Bank (1993) indicated, and others have also found (Patrick, 1962; Wade, 1990; Werner, 2000a, b; Werner, 2003), at the heart of the East Asian economic miracle has been a process of guiding credit towards productive use and suppressing unproductive and unsustainable (hence systemically risky) use of credit.

In East Asia this was done through the monetary policy tool of ‘window guidance’ (see Werner, 1998, 2002, 2003, 2005). In the wake of the banking crisis, many governments have indeed reconsidered and embraced the idea that they need to intervene in banks’ credit allocation decisions (and the concept of direction of credit is now also discussed in the UK, for instance, by Lord Turner, 2011, in this issue).

However, this tool was not employed in post-war Germany. Yet the economy avoided boom-bust cycles and asset bubbles and achieved relatively high, non-inflationary growth. This raises the possibility that there is an alternative to the introduction of a system of ‘credit guidance’ by the central bank. It stands to reason that a similar result to direct intervention can be achieved by designing the structure of the banking sector such that a type of banks is dominant that generally takes little interest in lending for financial transactions. In Germany, banking is dominated by locally-headquartered, small banks that focus on lending to the productive SME sector (as opposed to financial speculators). There is much discussion about the lack of funding for SMEs in the UK. This should not surprise with a highly concentrated banking system where five banks account for over 90% of deposits. In Germany, about 70% of deposits are accounted for by over 1,000 locally-headquartered, small savings and cooperative banks (Sparkassen and Volksbanken).

We find that the framework can account for the anomalies identified. In addition, there is a growing body of empirical evidence in its support, which is reviewed in Werner (2012).

3 Policy Implications

3.1 How to prevent Banking Crises, and the Role of the ECB in the propagation of the crisis.

Equations (17) and (18) indicate that banking crises can be avoided if bank credit is mainly used for transactions that are part of GDP, ideally for investment purposes ('productive credit creation'). Werner (2005) has suggested to do this either via regulation (the government or central bank imposing regulations on banks restricting credit creation for transactions that do not contribute to GDP), or via the design of the banking structure such that it is dominated by banks that tend not to engage in credit creation for non-GDP transactions (such as small, locally headquartered banks, including municipality-owned banks and credit unions, which account for about 70% of the banking market in Germany), as Werner (2011) has argued. The design of a resilient, sustainable financial architecture must thus incorporate a mechanism that either discourages the extension of bank credit for non-GDP transactions (via the design of the structure of the banking sector, as has been the case in Germany) or establish a macro-prudential supervision, for instance operated by the central bank, which restricts credit for non-GDP transactions (as operated in East Asian economies in the form of 'window guidance', itself a policy introduced from pre-1945 Germany, see Werner, 2002).

The framework is also useful for an analysis of the causes of the European crisis. Consider the case of Ireland: its economy has been presented as a model by the ECB in numerous speeches by senior ECB officials who have praised its policies of deregulation, liberalization and deregulation, and argued that these policies were the cause of its high economic growth. Ireland at the time had no fiscal or national debt problems. However, critics such as the author had pointed out as early as 2003 and 2004 that a significant asset bubble was about to be created by the ECB, followed by a major banking and economic crisis (Werner, 2003). Today we do not hear much from the ECB leadership about the structural and supply-side advantages of the deregulated Irish economy. Indeed, the massive depression in Ireland is easier to explain by the fact that credit creation is negative, with bank credit shrinking at double-digit pace, than with the attempt to explain it with a sudden loss of structural supply-side advantages. Likewise, the preceding Irish boom is easier explained with bank credit growth of about 20% year after year, indicating in application of our theory that credit had been created mainly for non-GDP, i.e. unsustainable asset

transactions, which will always turn non-performing, busting the banking system. When the latter happened, the ECB did not make the Irish government aware of the availability of zero-cost policy options to solve the crisis (discussed below). As a result, the Irish government felt compelled to guarantee the by then bloated banking system and its ballooned assets. This turned the Irish state from a model of fiscal virtue to near-default. Ireland called in the IMF and other international lenders to avoid bankruptcy.

The story is not much different in Spain, Portugal and Greece. Each time the fundamental cause of the current predicament was bank credit growth in excess of 20% for several years, creating property and financial bubbles that boosted also tax revenues to such an extent that governments kept expanding their budget forecasts. When the credit bubble ended, costs ballooned and tax revenues vanished. National bankruptcy loomed.

The question about causation and responsibility thus hinges on the question of who was responsible for the rapid expansion in bank credit creation. The answer is unambiguous. To monitor and contain bank credit creation in the eurozone is the core responsibility of the central bank – in Europe’s case that of the ECB and its national branches (the national central banks). In the vast majority of eurozone members the national central banks, which are a constituent part of the ECB, have even been functioning as the main bank regulators.

In my encounter with M Trichet in 2004 (cited in Werner, 2005) I questioned him about the quantity of credit creation in the eurozone. His response was to feign ignorance. “Credit creation? I don’t know what you mean.” Indeed, the ECB argues that it did not watch bank credit growth, and that it was not even concerned with national-level inflation data, but was merely watching European-wide inflation data to determine its policy. But claiming ignorance or incompetence does not absolve the ECB from responsibility.

This analysis calls into question the wisdom of granting such vast powers to independent and unaccountable institutions such as the ECB or the proposed ESM, with similar powers and legal immunity. I argued in 2003 (Werner, 2003) that the excessive independence of the ECB – essentially the revived Reichsbank, not the continuation of the Bundesbank – is likely to result in credit boom-bust cycles. I was hoping the ECB would prove me wrong, but it wasted no time in implementing its misguided policies.

3.2 How to Render Fiscal Policy Effective

What are the implications of the refined quantity equation, as presented above, for the role and impact of fiscal policy? Consider equation (17), rewritten with constant velocity:

$$(17') \quad \Delta(P_R Y) = V_R \Delta C_R$$

Any exogenous increase in a component of nominal GDP (such as nominal government expenditure g) cannot affect total nominal GDP, if credit creation for GDP transactions (ΔC_R) remains unaltered: assuming $\Delta C_R = 0$, and breaking down nominal GDP ($P_R Y$) into nominal consumption c , nominal government expenditure g , nominal investment i and nominal net exports nx , we obtain:

$$(20) \quad \Delta C_R = 0$$

$$(21) \quad \Delta(P_R Y) = \Delta c + \Delta i + \Delta g + \Delta nx$$

$$(22) \quad \Delta g = -(\Delta c + \Delta i + \Delta nx)$$

Equation (22) indicates that the change in government expenditure Δg is countered by a change in private sector expenditure of equal size and opposite sign, as long as credit creation remains unaltered. In this framework, just as proposed in classical economics and by the early quantity theory literature, fiscal policy cannot affect nominal GDP growth, if it is not linked to the monetary side of the economy: an increase in credit creation is necessary (and sufficient) for nominal growth.

In the general formulation of the model, with variable ΔC_R we find, substituting (21) into equation (17¹):

$$(23) \quad \Delta(c + i + nx) = V\Delta C_R - \Delta g$$

whereby the coefficient for Δg is expected to be close to -1 . In other words, given the amount of credit creation produced by the banking system and the central bank, an autonomous increase in government expenditure g must result in an equal reduction in private demand. If the government issues bonds to fund fiscal expenditure, private sector investors (such as life insurance companies) that purchase the bonds must withdraw purchasing power elsewhere from the economy. The same applies (more visibly) to tax-financed government spending. With unchanged credit creation, every yen in additional government spending reduces private sector activity by one yen.

Notice that this conclusion is not dependent on the classical assumption of full employment. Instead of the employment constraint that was deployed by classical or monetarist economists, we observe that the economy can be held back by a lack of credit creation (see above). Fiscal policy can crowd out private demand even when there is less than full employment. Furthermore, our finding is in line with Fisher's and Friedman's argument that such crowding out does not occur via higher interest rates (which do not appear in our model). It is quantity crowding out due to a lack of money used for transactions (credit creation). Thus record fiscal stimulation in the Japan of the 1990s failed to trigger a significant or lasting recovery, while interest rates continued to decline.

Put simply, for unchanged credit creation (which determines the size of the income pie), an increase in government expenditure amounts to an increase in the government share of the same income pie – and hence implies a reduction in the private sector share. As Milton Friedman put it:

“The quantity theory implies that the effect of government deficits or surpluses depends critically on how they are financed. If a deficit is financed by borrowing from the public without an increase in the quantity of money, the direct expansionary effect of the excess of government spending over receipts will be offset to some extent, and possibly to a very great extent, by the indirect contractionary effect of the transfer of funds to the government through borrowing. ... If a deficit is financed by printing money, there will be no offset, and the enlarged stock of money will continue to exert an effect after the deficit is terminated. What matters most is the behavior of the stock of money, and government deficits are expansionary primarily if they serve as the means of increasing the stock of money; other means of increasing the stock of money will have closely similar effects.”²¹

Werner (2005, 2012) provides empirical evidence from Japan: the sizeable fiscal stimulation occurring in Japan during the 1990s failed to trigger a lasting economic recovery, because it was not backed by credit creation.

Policy-makers that wish to stimulate growth can do so by increasing credit creation. There are a number of options available. One is via fiscal policy that is funded by credit creation or other measures that increase credit creation (as Werner, 1995, suggested in Japan, referring to this as ‘quantitative easing’ – an expression which was later borrowed by central banks to refer mainly to conventional monetarist bank reserve or high powered money expansion – for which many expressions already existed).²² As Blinder and Solow (1973:323) pointed out, there “is no controversy over government spending financed by printing money. ... it will be expansionary”. The lack of incentives to coordinate monetary policy with the government’s fiscal policy may be one of the disadvantages of central bank independence.²³

A More Effective Way to Monetise Fiscal Policy

There is a policy for governments to monetise fiscal policy even without cooperation from the central bank. The method, first suggested by Werner (1996, 1998, 2000a, 2000b) renders fiscal policy effective, according to the above model. The Ministry of Finance could cover the public sector borrowing requirement by substituting bond finance with borrowing from the private sector commercial banks.

²¹ Milton Friedman (1977), in his entry under Money: Quantity Theory in the *Encyclopaedia Britannica*, p. 476.

²² I argued in the Nikkei (Werner, 1995) that a new type of monetary policy was necessary that did not focus on the price of money, but on its quantity. That quantity is credit creation. Since I did not want to be confused with monetarist proposals - and in fact warned that boosting bank reserves or high powered money, for instance via open market purchases from the banks was also doomed to fail - I needed a new expression for this, especially since in the Japanese language the expression ‘credit creation’ used to be little understood. I thus added the word ‘quantitative’ to the standard expression of stimulatory monetary policy (‘monetary easing’), short ‘quantitative easing’. Having denied that my proposal to expand credit creation would work, the Bank of Japan then switched from its failed interest policy to the older, and also failed monetarist policy of expanding bank reserves - but had the nerve to call this ‘quantitative easing’.

²³ Independence is not necessarily an obstacle, since a central bank can voluntarily cooperate to support the government’s policy. As Bernanke (2000) pointed out, “Cooperation with the fiscal authorities in pursuit of a common goal is not the same as subservience” (p. 163). Unfortunately, there are few examples of such cooperation by independent central banks.

This would increase credit creation and, according to the above model, stimulate the economy.

Thus funding of fiscal expenditure by borrowing from banks would increase credit creation and hence the total amount of purchasing power in the economy. As a result, ΔC_R in equation (17') above would rise, which would, in turn, boost nominal GDP. By shifting government funding away from bond finance and replacing it with borrowing from the commercial banks via simple loan contracts, credit creation will be stimulated.²⁴ Unlike bond markets, banks create new purchasing power when they lend. This means that overall economic activity can be boosted (via fiscal policy), without any quantity crowding out that rendered fiscal policy ineffective during the 1990s.²⁵

Figures 1 and 2 are used to illustrate the difference between stimulatory fiscal policy – here the example of a fiscal spending package – funded via bond issuance taken up by investors, such as life insurers, and stimulatory fiscal policy that is backed by credit creation.

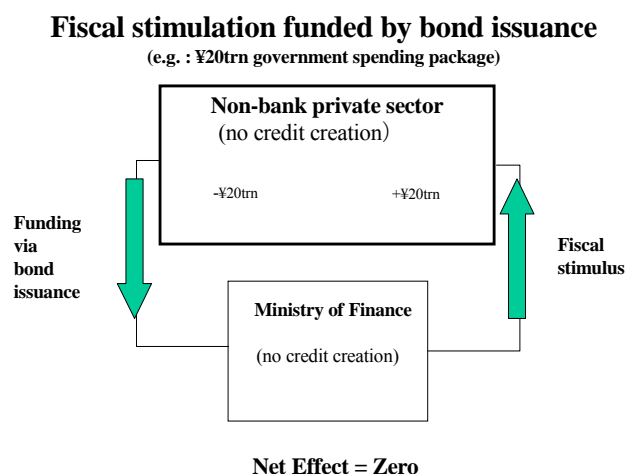


Figure 1. Standard fiscal policy, funded via bond issuance.

²⁴ This is effectively the policy combination adopted by the Reichsbank from 1933 to 1937. Its President, Hjalmar Schacht, appeared to have been well aware of the quantity crowding out problem of unmonetised fiscal policy. In addition to stepping up the credit creation of the Reichsbank (by purchasing various forms of assets, including government bonds and bonds of other government institutions), Schacht instructed the establishment of government institutions that implemented fiscal spending programmes and were funded by the issuance of bills of exchange that were purchased by the banks and the central bank. Funding fiscal expenditure with money creation, as opposed to public bond auctions is called ‘silent funding’ (*geräuschlose Finanzierung*) in the German tradition.

²⁵ The Werner (1996, 1998) proposal is supported and seconded by economists such as Congdon (2001), Smithers (2001) and the Financial Times’ Martin Wolf (2002), although they fail to cite it.

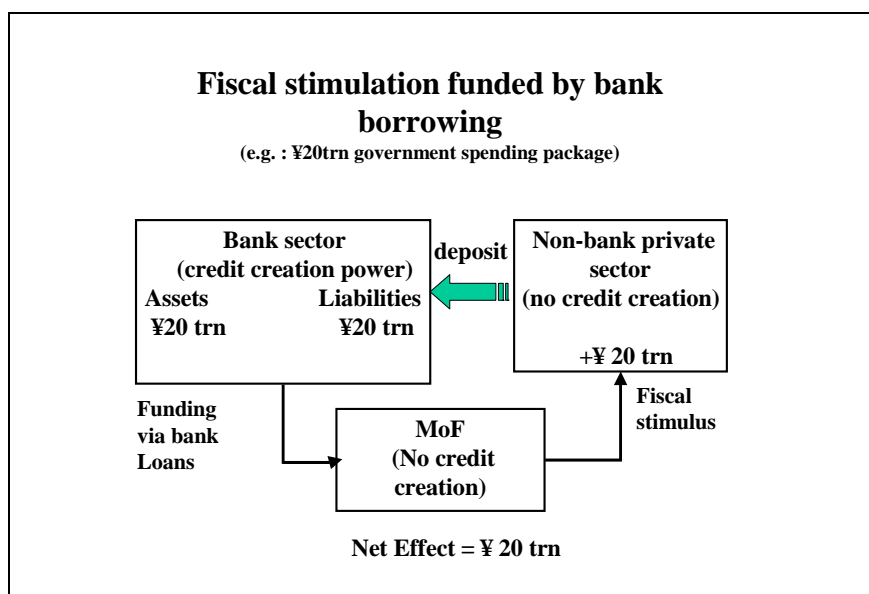


Figure 2. Bank-funded fiscal policy

Although the central government funded parts of the 1998 budget from banks, this has remained negligible in size. With the majority of bond issuance taken up by the non-bank private sector (which does not have the power to create credit), fiscal spending had to crowd out private activity.

Germany in 1968, under finance minister Karl Schiller, funded about 70% of the public sector borrowing requirement (amounting to DM13bn) through long-term borrowing from private banks. More recently, such as in 1999, Germany funded its public sector borrowing requirement (amounting to E35bn, approx. DM70bn), entirely through the issuance of government bonds, and, additionally, reduced its borrowing from financial institutions (by a net E10bn, approx. DM20bn).²⁶ The model seems consistent with such evidence and the observation that fiscal policy in the late 1960s seemed more effective and fiscal multipliers were larger, than in the late 1990s or presently. It provides an explanation for this puzzle of declining fiscal multipliers.

²⁶ I am grateful to Mr Wolfgang Eichmann, Head of Section III of the German Federal Statistical Office, for kindly writing to me, upon reading some of my work, and pointing out these supportive facts from Germany to me. See also Eichmann's (2002) relevant article on the velocity of money, which, among others, cites Werner (1997).

3.3 How to solve the European sovereign debt crisis

A main drawback of the recent policies to tackle the European sovereign debt crisis has been that none addresses the central problem of falling growth in the periphery. What is required is a policy that not only shields the government borrowing of the Eurozone government from adverse market movements (such as rising yields due to speculative attacks or downgrades by rating agencies), but more importantly one that stimulates economic growth in the eurozone.

Politicians and market participants have proposed that the ECB should purchase European government bonds. This may be based on the understanding that the central bank is the principal creator of the money supply. However, central banks only create about 3% of the money supply in most economies. The vast majority is created and allocated by private-sector profit-oriented enterprises, the commercial banks. It is thus more logical to ask the banks to help fund government expenditure. Applying the Werner (1996, 1998, 2000) proposal to the eurozone, we find that governments can stabilise their borrowing costs and stimulate domestic demand by a de-securitisation of their funding operations: instead of issuing government bonds, a superior policy would be to borrow the public sector borrowing requirement from the commercial banks in their respective country (Siekmann and Werner, 2011). For instance, they can enter into 3-year loan contracts at the prime rate (which as of November 2011 was lower than the longer dated bond yields for all affected periphery countries). The prime rate is closer to the banks' refinancing costs of 1%.

The immediate savings would be substantial, as this method of enhanced debt management reduces the new borrowing costs. Instead of governments injecting money into banks, banks would give money to governments. This helps the banking sector, as its core business, to extend credit, is expanded, thus increasing retained earnings. These can then be used by banks to shore up their capital. There are substantial savings to the taxpayer as new bank rescues become largely unnecessary. Bank credit to the government will not be forced (as is forbidden in the EU treaties) but on a voluntary basis, at the prime rate. Eurozone governments remain zero risk borrowers according to the Basel capital adequacy framework (banks are thus happy to lend).

Finally, this proposal addresses the core underlying problem: slowing growth and the need to stimulate it. From the credit model we know that the proposal will boost nominal GDP growth – and avoid crowding out from the bond markets. This is especially a problem as fiscal policy has tightened in the eurozone, and monetary policy is de facto also tight: bank credit is slowing down sharply, and recently has turned to contraction in many eurozone countries, including Germany and the periphery. Bank credit extension is credit creation, adding to the money supply. From the credit model we know that the proposal will boost nominal GDP growth – and avoid crowding out from the bond markets. This increases employment and tax revenues. It can push countries back from the brink of a deflationary and contractionary downward spiral into an upward cycle of growth, greater tax revenues and falling debt/GDP.

Would banks be willing to lend to governments?

Their main business is the credit business, but this has taken a sharp dip in the past 3 years. Banks have become risk-averse and are only willing to lend to the lowest risk borrowers. This is the government, able to command in theory even lower rates than the private sector prime rate. The Basel capital adequacy framework reflects this reality. This is also true for periphery countries: banks' solvency is ultimately guaranteed by governments, not the other way round. Thus lending to their governments, when undertaken as part of this plan, cannot hurt the banks. To the contrary, it will improve banks's P&L and balance sheets, as well as the fiscal situation of the governments concerned, directly and indirectly, as economic growth will be boosted.

The European Central Bank's Long-Term Refinance Operation (LTRO), announced on 8 December 2011, offered banks unlimited funding at a fixed interest rate of 1%, while formalizing that all bank lending is eligible as collateral for central bank funding. By February 2012, over 1 trn Euro in LTRO funding were borrowed by banks. However, much of this money is put into deposit with the ECB system. This policy on its own is thus not likely to be sufficient to accelerate bank credit creation. One problem is that banks are required to mark to market any securities holdings, thus limiting the appeal of investing in periphery government bonds. What is needed is an increase in the supply of bank credit.

After the ECB has replaced the market-based funding of banks via the interbank market with its direct lending programme, governments now need to match this policy by replacing the market-based government funding via the bond market with a direct government borrowing programme via loan contracts from the commercial banks.

This policy would boost domestic demand in the countries that adopt it, as bank credit creation would accelerate, in line with equation (17).

3.4 Towards a New, Sustainable Financial Architecture

Based on the above framework, the following framework for monetary and banking policy is proposed, which can largely be adopted by the ECB, and which will go a long way towards ensuring stable and sustainable growth without major boom-bust cycles and banking crises. Since the ECB has complete legal independence not only in the choice of policies, but also the choice of targets and instruments, there are no legal obstacles to their implementation.

1. Cancelling the bad debts in the banking system without new costs

The ECB should purchase all non-performing assets from all Eurozone banks at face value, in exchange for banks agreeing to comply with a new 'credit guidance regime' run by the ECB. This is the most cost-effective way to end the banking crisis (triggered by a monetary policy that allowed banks to expand credit for financial circulation, often growing by 30% or more in Ireland, Spain, Greece and Portugal), as no tax money is required and national debts or obligations of member states do not rise. It is thus preferable to the debt-based proposals that are currently being implemented (via the EFSF or ESM or national budgets).

Sometimes a counterargument is formulated that it should not be possible to solve the bad debt crisis in this way without incurring costs (see the comment by Jörg Asmussen on this proposal in a public debate in Berlin on 18 June 2012, with Daniel Gros and Richard Werner as co-discussants). The fact is that the costs of the banking problem are of course not zero: the costs of the significant resource-misallocation during the asset boom phase (during the operation of the Ponzi scheme) are substantial; the costs of the bursting of the bubble (the end of the Ponzi scheme) are substantial, as firms and individuals go bankrupt, as unemployment rises, as fiscal revenues decline and public services are cut back. The present proposal however ensures that no *further* unnecessary costs are added to these existing and unavoidable costs of the prior misguided monetary policy. Burdening the tax payer with the costs of a bank bail-out, when this is not necessary, must constitute a phenomenal waste of economic resources.

2. Preventing the recurrence of banking crises and resource misallocation due to asset boom-bust cycles

The ECB should introduce and operate a new 'credit guidance' regime, whereby the ECB via its national central banks (NCBs) requires banks to meet monthly and quarterly quotas concerning the growth of total credit outstanding AND the credit outstanding in each of the sub-categories of credit, on which banks have to report on a monthly basis as well, namely:

- A. bank credit for GDP transactions, divided into
 - mortgage credit to households
 - consumer credit
 - other credit to individuals
 - credit to the manufacturing industry (divided into further specific industries, though no sub-targets set)
 - credit to the construction sector
 - credit to the non-financial service sector (divided further into specific industries)
 - R&D, education
 - other categories
- B. bank credit for non-GDP transactions, divided into
 - credit to other banks
 - credit to non-bank financial institutions
 - credit to financial or property holding companies
 - other categories

whereby the ECB via its NCBs restricts credit to type B sectors and sets positive YoY% growth targets for credit of type A.

3. Kickstarting economic demand (and tax revenues) by expanding credit creation

The ECB should institute a loan guarantee scheme for the most desirable types of loans, i.e. to the manufacturing sector implementing new technology, to the environmentally enhancing and sustainable energy producing sector, as well as in R&D and education. Loans are guaranteed by the ECB. Secondly, until above credit

guidance schemes are fully operational, the ECB, via its NCBs introduces a new direct lending facility whereby the NCBs extend credit to type A sector borrowers.

4. Ensuring a steady supply of credit creation for productive purposes by improving monetary policy tools

The ECB should immediately re-introduce the Bundesbank's bill rediscounting operations, expanded to all NCBs and extended to firms in type A sectors, but Eurozone-wide, via the NCBs. This was a successful monetary policy tool, as old as modern central banking, which ensured that 'real bills', i.e. debt instruments linked to real sector economic activity, would be backed by credit creation, while financial credit was discouraged. Until its abolition in 2001, this mechanism contributed towards the close to 10% credit growth in Germany. When the ECB abolished the practice, credit growth in Germany experienced a secular shock, reducing the growth rate to the range between -1 and +2%, thereby reducing economic growth in Germany during the following decade.

5. Increasing the effectiveness of fiscal policy

The ECB should introduce a new scheme, whereby the ECB and NCBs meet with the national finance/treasury ministries and debt management offices in order to end the issuance of government bonds in the markets and instead fund all public sector borrowing requirements (that must meet unchanged Brussels budgetary requirements) through direct loan contracts from the national banks. As discussed above, this reduces borrowing costs sharply, as the prime rate is lower, helps banks as their business expands without further capital adequacy requirements (risk weights are zero), while the loans do not need to be marked to market, but can be used for ECB refinancing. (as discussed in greater detail above).

6. Counter-cyclical regulatory requirements

The ECB should meet with national bank regulators, the European Banking Authority and the BCBS in order to negotiate release of eurozone banks from the Basel capital adequacy standards for the coming three years, until bank credit growth and hence nominal GDP growth is back to full employment levels.

The implementation of these policies, most of which can be adopted immediately by the ECB without the need for any legislative changes, would ensure the quickest possible return to the path of high and sustainable economic growth without major boom-bust cycles.

4 Conclusions

Banking crises and the asset bubbles that precede them are avoidable, if the right financial and monetary policy architecture is implemented – namely one that discourages the creation of credit for transactions that do not contribute to GDP (financial and asset transactions). This can be done via regimes of 'credit guidance'

or, as shown in Germany, the design of the banking sector architecture: One of the implications for a country like Germany is that the particular structure of the banking sector, centred on not-for-profit, locally based banks (Sparkassen, Volksbanken), has been able to deliver stable growth without asset bubbles and banking crisis for a long time period, largely because the dominant banks have an inherent interest in lending to small, local borrowers, who are less likely to engage in financial speculation of the type that has fuelled financial credit in countries such as the UK, Iceland, Ireland, Spain, Portugal or Greece. Ironically, this German-style banking structure has been subject to much criticism from mainstream economic and financial analysts – but as we now know, on the basis of models that have failed. Our framework thus underlines the importance of maintaining and furthering the German-style financial architecture, even within a new framework for European or global financial architecture.

It is notable that the proposed course of action would not require the socialization of national debts through Eurobonds or other measures to further centralize authority and decision-making powers in Europe. The problems concerning the incentive structure that Eurobonds would create could thus be avoided. On the other hand, the proposal would make exit from the eurozone also unnecessary.

While this paper has emphasized the European perspective, the same mechanisms can be introduced on a global scale – by the relevant monetary authorities (whether in national settings or the setting of a currency union). Further research is however necessary for certain aspects of the global financial architecture and the implications of credit creation, such as the best ways to avoid debts among developing countries and ensuring that they are able to catch up with the industrialized countries effectively. Here it is merely noted that the IMF seems already aware of the role of credit creation on an international scale, as its lending conditionality is usually framed in quantitative and qualitative targets for credit creation.

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International Review of Financial Analysis



How do banks create money, and why can other firms not do the same? An explanation for the coexistence of lending and deposit-taking[☆]



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Monetary reform

ABSTRACT

Thanks to the recent banking crises interest has grown in banks and how they operate. In the past, the empirical and institutional market micro-structure of the operation of banks had not been a primary focus for investigations by researchers, which is why they are not well covered in the literature. One neglected detail is the banks' function as the creators and allocators of about 97% of the money supply (Werner, 1997, 2005), which has recently attracted attention (Bank of England, 2014a,b; Werner, 2014b,c). It is the purpose of this paper to investigate precisely how banks create money, and why or whether companies cannot do the same. Since the implementation of banking operations takes place within a corporate accounting framework, this paper is based upon a comparative accounting analysis perspective. By breaking the accounting treatment of lending into two steps, the difference in the accounting operation by bank and non-bank corporations can be isolated. As a result, it can be established precisely why banks are different and what it is that makes them different: They are exempted from the Client Money Rules and thus, unlike other firms, do not have to segregate client money. This enables banks to classify their accounts payable liabilities arising from bank loan contracts as a different type of liability called 'customer deposits'. The finding is important for many reasons, including for modelling the banking sector accurately in economic models, bank regulation and also for monetary reform proposals that aim at taking away the privilege of money creation from banks. The paper thus adds to the growing literature on the institutional details and market micro-structure of our financial and monetary system, and in particular offers a new contribution to the literature on 'what makes banks different', from an accounting and regulatory perspective, solving the puzzle of why banks combine lending and deposit-taking operations under one roof.

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1. Introduction

Thanks to the recent banking crises interest has grown in the details of how banks operate. In recent decades, the empirical and institutional micro-structure of how banks operate had not been a primary focus of attention by investigators. This lack of interest may partly be due to the predominance of the hypothetico-deductive research methodology in economics, which begins by posing axioms and assumptions. Such a theoretical and hypothetical framework has also been the basis for bank regulations. As is well known to historians, reality may be less logical and rational than the designers of theoretical constructs may envisage. This is known in other areas of finance, where market and investor behaviour often does not conform to the precepts of theoretically posed 'rational agents'. By contrast, an inductive approach begins by establishing the empirical facts.

Over the past century and a half, three competing theories of banking have been influential – the financial intermediation, the fractional

reserve and the credit creation theories of banking. Most current models, theories and textbooks in finance and economics assert the validity of the financial intermediation theory. According to it, banks do not have the ability to create money, neither individually (as the credit creation theory argues) nor collectively (as the fractional reserve theory maintains). Recently, two events have upset the status quo in this debate. The Bank of England has come forward clearly in support of the credit creation theory (Bank of England, 2014a, 2014b). Secondly, the first empirical tests of the three theories have been conducted (Werner, 2014a, 2014c). These tests showed that the financial intermediation and fractional reserve theories are not supported by the evidence: Banks do not gather deposits and then lend these out, as the financial intermediation theory assumes. Nor do they draw down their deposits at the central bank in order to lend, as the fractional reserve theory of banking maintains. The empirical facts are only consistent with the credit creation theory of banking. According to this theory, banks can individually create credit and money out of nothing, and they do this when they extend credit. When a loan is granted by a bank, it purchases the loan contract (legally considered a promissory note issued by the borrower), which is reflected by an increase in its assets by the amount of the loan. The borrower 'receives' the 'money' when the bank credits the borrower's account at the bank with the

[☆] The author would like to acknowledge conversations with Mr Wesley Wright, helpful comments from Mr John T. C. Cooke, as well as, and most of all, the source of all wisdom (Jeremiah 33:3).

amount of the loan. The balance sheet lengthens. Through the process of credit creation 97% of the money supply is created in the UK today (Werner, 2005), and similar proportions apply to most industrialised economies. Not surprisingly, the use to which bank credit is put to determines its effect, namely whether bank credit is extended for productive, consumptive, or speculative purposes (the Quantity Theory of Credit, see Werner, 1997, 2005, 2012a).

One reason for the neglect of the institutional and operational details of banks in the research literature in the past decades is likely the fact that no law, statute or bank regulation explicitly grants banks the right (usually considered a sovereign prerogative) to create and allocate the money supply. As a result, many economists, finance researchers, lawyers, accountants, even bankers, let alone the general public, have not been aware of the role of banks as creators and allocators of the money supply.

The establishment of these facts motivates a number of new research questions, many of which did not arise within the two alternative theories of banking. In this paper the question is considered of what exactly it is that enables banks to individually create credit and money out of nothing, and why or whether other financial firms and intermediaries, or ordinary corporations not active in the financial sector, cannot do likewise. Is what enables banks to create money a feature unique to banks, or is Minsky's (1986) claim more relevant that "everyone can issue money"? Being able to create money is a desirable ability, and if it was possible for other agents to do so, they would likely also engage in this activity. Are non-bank financial institutions, including so-called 'shadow banks', engaged in money creation? With financial deregulation and the development of hybrid financial instruments, the demarcation between banks and non-banks often is said to be elusive. Is it possible to pinpoint the difference?

Furthermore, there are a number of fundamental questions concerning banks that remain unanswered in the literature. "What are the defining characteristics of a bank?" ask Kashyap, Rajan, and Stein (2002). Specifically, it remains a conundrum to economists why banks combine what are effectively very different operations, namely deposit-taking and granting of loans, and why securities or capital markets cannot substitute these functions, despite in theory being capable of doing so separately:

"...commercial banks are institutions that engage in two distinct types of activities, one on each side of the balance sheet—deposit-taking and lending. ...A great deal of theoretical and empirical analysis has been devoted to understanding the circumstances under which each of these two activities might require the services of an intermediary, as opposed to being implemented in arm's-length securities markets. While much has been learned from this work, with few exceptions it has not addressed a fundamental question: why is it important that one institution carry out both functions under the same roof?" (Kashyap et al., 2002, p. 33f).

They also argue that it is of utmost importance to answer this question:

"The question of whether or not there is a real synergy between deposit-taking and lending has far-reaching implications" (op. cit., p. 34).

They cite the question of monetary reform as one of the reasons why the question needs to be answered. Their own answer is based on the provision of loan commitments by banks — a particular institutional feature that does not apply to all banks and does not usually dominate bank lending. It is hence difficult to argue that the question they raise has been answered fully. This is especially true, since the authors are adherents of the financial intermediation theory of banking which claims, erroneously, that banks gather deposits and then lend these deposits out.

It is the purpose of this article to offer new answers to these questions, which are in line with the empirical record. Joseph Schumpeter (1917/18) argued that banking is primarily accounting, and that banks

are the 'bookkeeping centre' of the economy and act as its 'social accountants' (1934, p. 124). Stiglitz and Weiss (1989) also consider banks as operating 'society's accounting system'. Werner (2014a, 2014c) shows that the three theories of banking are distinguished by their differing bank accounting and that the crucial difference of banks and firms without a banking licence revolves around the issue of lending. Werner (2005) had argued:

"Bank credit creation does not channel existing money to new uses. It newly creates money that did not exist beforehand and channels it to some use.... What makes this 'creative accounting' possible is the other function of banks as the settlement system of all non-cash transactions in the economy. ... Since banks work as the accountants of record – while the rest of the economy assumes they are honest accountants – it is possible for the banks to increase the money in the accounts of some of us (those who receive a loan), by simply altering the figures. Nobody else will notice, because agents cannot distinguish between money that had actually been saved and deposited and money that has been created 'out of nothing' by the bank" (p. 179).

However, surprisingly little has been written about the actual accounting details of bank operations, especially concerning their lending, and how precisely it differs from the accounting of non-bank firms. It is thus corporate accounting that we must turn to in order to analyse the questions at hand in a comparative analysis of the treatment of lending by different types of corporate lenders.

2. Comparative accounting of lending

Although the implementation of banking services relies heavily on accounting, hardly any scholarly literature exists that explains in detail the accounting mechanics of bank credit creation and precisely how bank accounting differs from corporate accounting of non-bank firms. There is also virtually no scholarly literature on the question of which regulations precisely enable banks to create money. These issues are however of great interest, especially since the function of banks as the creators and allocators of the money supply is not explicitly stated in any law, statute, regulation, ordinance, directive or court judgement.

From the absence of explicit statutory powers to create money it can be deduced that this ability of banks is likely derived from the operational, that is, accounting conventions and regulations of banking. These either differ from those of non-banks, so that only banks are able to create money, or else non-banks have missed out on the significant opportunities money creation may afford.

In order to identify the difference in accounting treatment of the lending operation by banks, we adopt a comparative accounting analysis perspective. For this purpose, we compare the accounting of a loan extended by (a) a non-financial corporation (NFC, such as a manufacturer extending a financial loan to a supplier), (b) a non-bank financial institution (NBFI, such as a stock broker extending a margin loan to a client) and (c) a bank. Table 1 shows the changes in balance sheets of a new loan of \$100 m, after its issuance and remittance.

When the non-financial corporation, such as a manufacturer, grants a loan to another firm, the loan contract is shown as an increase in assets: the firm now has an additional claim on debtors — this is the borrower's promise to repay the loan. The lender purchases the loan contract, treated as a promissory note. Meanwhile, when the firm disburses the loan (and hence discharges its obligation to make the money available to the borrower), it is drawing down its cash reserves or monetary deposits with its banks. As a result, one gross asset increase is matched by an equally-sized gross asset decrease, leaving net total assets unchanged.

In the second case, of a non-bank financial institution, such as a stock broker engaging in margin lending, the loan contract is the claim on the borrower that is added as an asset to the balance sheet, while the disbursement of the loan — for instance by transferring it to the client or

Table 1
Comparative accounting: taking out a loan and disbursing it.

Contract signed (\$m) & money made available (changes in B/S)	NFC		NBFI		BANK	
	A	L	A	L	A	L
Loan		+100	Loan	+100	Loan	+100
Deposit	-100		Deposit	-100	Client Deposit	+100
	0	0	0	0	100	100

This table shows how accounting conventions handle the granting and disbursing of a loan by different types of firms: a non-financial corporation (NFC), a non-bank financial institution (NBFI, e.g. a stock broker), and a bank. In this and the following tables, only the change in balance sheet items is shown. As can be seen, something is different in the case of the bank.

the stock exchange to settle the margin trade conducted by its client – reduces the firm’s monetary balances (likely held with a bank). As a result, total assets and total liabilities remain unchanged.

While the balance sheet total is not affected by the granting and disbursement of the loan in the case of firms other than banks, the picture looks very different in the case of a bank. While the loan contract shows up as an increase in assets with all types of corporations, in the case of a bank the disbursement of the loan takes a different form from that of the other firms: it appears as a positive entry on the liability side of the balance sheet, as opposed to being a negative entry on the asset side, as in the case of non-banks. As a result, it does not counter-balance the increased gross assets. Instead, both assets and liabilities expand. The bank’s balance sheet lengthens on both sides by the amount of the loan (see the empirical evidence in Werner, 2014a, 2014c). Thus it is clear that banks conduct their accounting operations differently from others, even differently from their near-relatives, the non-bank financial institutions.

What precisely, however, causes this very different treatment of lending on bank balance sheets as opposed to its treatment by all other types of firms? In order to answer this question, the comparison of the above accounting information is insufficient. It is necessary to gain further, more detailed insight into the accounting operations shown in Table 1. Specifically, what is it that enables banks to discharge their loan without drawing down any assets (as both the financial intermediation and fractional reserve theories of banking had indeed maintained, erroneously)?

In order to answer this question, the device is chosen to break down what currently is one set of double-entry operations, into smaller steps in order to be able to analyse them in greater detail. Specifically, the lending process is broken down into two steps, whose accounting representations are shown separately and in sequence. Assume, for instance, that the borrower asked out of convenience to proceed with signing the loan contract, but for the disbursement of the loan to be delayed by a week, while all other paper work and accounting are completed. In other words, the act of signing a loan contract and both borrower and lender contractually agreeing to their respective obligations is analytically and practically

separated from the act of disbursing the loan and thereby the lender discharging the lender’s obligation to pay out the funds.

Step 1 shows the loan upon signing, committing both parties to their respective obligations (the bank to pay soon, the borrower to repay with interest much later). At this stage the loan funds are not yet made available by the lender. So the lender has an open liability, namely the disbursement of the loan to the borrower. In corporate accounting this is identified as a liability of the category ‘accounts payable’. (Step 2 will then describe the situation when the lender has in fact made the loan money available to the borrower and thus discharged the liability arising from its accounts payable item to the borrower.) Table 2 shows Step 1 of this disaggregated lending operation, by recording the changes in balance sheet items.

The same operation is shown for the non-financial corporation, the non-bank financial institution and for the bank (Table 2). In all cases, in Step 1 the loan contract creates an asset for the lender, as the money will be repaid in the future, and a liability in the form of the ‘accounts payable’, as the loaned money will have to be made available to the borrower at some stage. Therefore, for all types of firms, including banks, the balance sheet lengthens, as both an asset and a liability is added to the balance sheet. What emerges is, therefore that, surprisingly, in Step 1, the accounting is identical for all types of firms, including the bank. In other words, whatever makes banks different and special from non-banks is not visible in the act of agreeing to and implementing a loan contract without disbursing it. Moreover, we see what lengthens the balance sheet of firms – any firm, not just banks – namely agreeing to lend money, while not (yet) paying out the funds to the borrower.

That banks and non-banks are identical in their operations at this stage is an interesting finding. Upon reflection, it is not surprising, as it makes legal and regulatory sense: The act of granting a loan by one legal person to another is not a regulated activity. Business lending in the UK does not require authorisation of any supervisory or regulatory authority. Thus any firm can specialise in lending to other companies at interest, without requiring any authorisation from the financial regulators (Financial Conduct Authority or Prudential Regulatory Authority) or a banking licence in general. Hence it would indeed be surprising to see accounting differences in the operations conducted so far.

Table 2
Disaggregating lending: Step 1 – lender and borrower agree.

Contract signed (\$m) but no money disbursed (changes in B/S)	NFC		NBFI		BANK	
	A	L	A	L	A	L
Loan		+100	Loan	+100	Loan	+100
			AC payable	+100	AC payable	+100
	+100		+100		+100	

This table shows Step 1 of the loan operation, now disaggregated into two steps. All parties have signed the loan contract, but the borrower has asked, out of convenience, to delay the disbursement of the loan, which happens in Step 2. Interestingly, at Step 1 it is seen that the accounting treatment is the same for all lenders, including the bank. Banks are not different in any way concerning Step 1.

Table 3
 Disaggregating lending: Step 2 – loan funds paid out.

Money disbursed (\$m) (changes in B/S)	NFC		NBFI		BANK		
	A	L	A	L	A	L	
Loan	+100	AC payable 0	Loan	+100	AC payable	0	
Deposit	-100		Deposit	-100	Client Deposit	+100	
	0	0	0	0	+100	+100	

This table shows Step 2 of the loan operation, disaggregated into two steps. All lenders now disburse the loan and thus discharge their liability. For firms without a banking licence, the balance sheet contracts and thus reverts back to the original position. For banks only the balance sheet remains unchanged in its expanded position – banks remain stuck in Step 1. In other words: banks do not discharge their liability.

It is thus time to proceed to Step 2, the disbursement of the money from the lender to the borrower. We now already know that whatever it is that enables banks to create money out of nothing, it must take place in the act of making loan funds available to the borrower.

Considering the comparative accounting in Step 2, we observe that for the firm (NFC) and the broker (NBFI) to make the funds available to the borrower, so that the borrower can use them for transactions, involves drawing down the lender's monetary funds (cash at hand, or the lender's deposit balances held with a bank): firms need to give something up, when they pay out the loan (Table 3). Hence, as the money is made available, the cash or deposit balance (an asset) is drawn down and simultaneously the accounts payable item disappears from the firm's liabilities: the firm has paid its account payable and thus discharged its obligation. *For firms without a bank licence, the disbursement of the loan is from funds elsewhere within the firm. Thus there is an equal reduction in balance of another account from which the lent funds came from.* Therefore, the balance sheet shrinks again. There is no overall change in the total size of the balance sheet as a result of Steps 1 and 2 together.

However, as can be seen in Table 3, the story is quite different for the bank. Surprisingly, we find that unlike the other firms whose balance sheets shrank back in Step 2, the bank's accounts seem in standstill, unchanged from Step 1. The total balance sheet remains lengthened. No balance is drawn down to make a payment to the borrower.

So how is it that the borrower feels that the bank's obligation to make funds available are being met? (If indeed they are being met). This is done through the one, small but crucial accounting change that does take place on the liability side of the bank balance sheet in Step 2: the bank reduces its 'account payable' item by the loan amount, acting as if the money had been disbursed to the customer, and at the same time it presents the customer with a statement that identifies this same obligation of the bank to the borrower, but now simply reclassified as a 'customer deposit' of the borrower with the bank.

The bank, having 'disbursed' the loan, remains in a position where it still owes the money. In other words, the bank does not actually make any money available to the borrower: No transfer of funds from anywhere to the customer or indeed the customer's account takes place. *There is no equal reduction in the balance of another account to defray the borrower.* Instead, the bank simply re-classified its liabilities, changing the 'accounts payable' obligation arising from the bank loan contract to another liability category called 'customer deposits'.

While the borrower is given the impression that the bank had transferred money from its capital, reserves or other accounts to the borrower's account (as indeed major theories of banking, the financial intermediation and fractional reserve theories, erroneously claim), in reality this is not the case. Neither the bank nor the customer deposited any money, nor were any funds from anywhere outside the bank utilised to make the deposit in the borrower's account. Indeed, there was no depositing of any funds.

In Step 1 the bank had a liability – an obligation to pay someone. How can it discharge this liability? A law dictionary states:

*"The most common way to be discharged from liability ... is through payment."*¹

And yet, no payment takes place in Step 2 (and hence in the entire 'lending' process), which is why the bank's balance sheet in total remains stuck in Step 1, when all lenders still owe the money to their respective borrowers. The bank's liability is simply re-named a 'bank deposit'. However, bank deposits are defined by central banks as being part of the official money supply (as measured in such official 'money supply' aggregates as M1, M2, M3 or M4). This confirms that banks create money when they grant a loan: they invent a fictitious customer deposit, which the central bank and all users of our monetary system, consider to be 'money', indistinguishable from 'real' deposits not newly invented by the banks. Thus banks do not just grant credit, they create credit, and simultaneously they create money.

While other non-bank firms can also grant credit, in their case it would be misleading to speak of 'credit creation', since their granting of a loan results in a gross increase in credit (and temporary lengthening of their balance sheet; Step 1), but the discharging of their accounts payable liability arising from the loan contract results in an equal reduction in another credit balance, resulting in a reduction of the overall balance sheet and thus no change in total net credit or money in the economy (Step 2). There is no money creation in the case of firms that are not banks.

The bank, on the other hand, creates gross credit, just like non-banks, but this is not counter-balanced by an equal reduction in credit balances elsewhere, leaving a net positive addition to credit and deposit – hence money – balances: net credit creation. This credit creation is visible in the permanent expansion in the bank's balance sheet, and is executed through the operation that makes banks unique, namely that instead of discharging their liability to pay out loans, the banks merely reclassify their liabilities originating from loan contracts from what should be an 'accounts payable' item to 'customer deposit' (in practise of course skipping Step 1 entirely and thus neglecting to record the accounts payable item). The bank issues a statement of its liability to the borrower, which records its liability as a 'deposit' of the borrower at the bank.

We have gained important insights, which raise new questions: Why are non-banks not able to do the same, and what precisely is it that allows banks to act differently in Step 2? Could non-banks also create credit in this way? A necessary condition for being able to create an imaginary deposit in the name of the borrower is that the lender ordinarily maintains customer deposits and thus is solely in charge of the record-keeping of customers' deposits. In this case, this controlling power over customers' deposit account records can be used to invent make-belief customer deposits that did not in fact originate from any new deposits (and hence cannot honestly be called 'deposits').

Maintaining customer deposits is not part of the regular business operations of non-financial institutions, so we cannot expect them to be

¹ <http://legal-dictionary.thefreedictionary.com/Discharge+from+Liability>.

able to engage in credit and money creation. However, there are a number of non-bank financial institutions that in the course of ordinary business do maintain deposit accounts for their customers – for instance, stock broking firms. Why, then, are stock brokers which receive client funds and deposits, not able to create credit and money out of nothing, just like banks?

3. Regulation: the little-known ‘client money rules’

It is necessary to move beyond corporate accounting rules to the wider field of regulations of business conduct. Tobin (1963) argued about banks that

“Any other financial industry subject to the same kind of regulations would behave in much the same way” (p. 418).

This is likely true, but the question remains precisely *which* regulations are crucial to allow banks to engage in the activity that makes them unique, and likewise, *which* regulations, if applying equally to non-banks, would allow non-banks to behave in the same way as banks. As noted, lending to other firms is unregulated. It is necessary to examine the regulations of the business of taking customer deposits. An examination of the regulations concerning this reveals that, unlike the lending business, it is a highly restricted type of activity. Regulations differ starkly between banks and non-banks.

In the UK, the cradle of modern banking, financial regulations, specifically, the so-called ‘Client Money Rules’ (FCA, 2013), require all firms that hold client money to segregate such money in accounts that keep them separate from the assets or liabilities of the firm itself:

“Depositing Client Money

7.4.1. R

A firm, on receiving any client money, must promptly place this money into one or more accounts opened with any of the following:

- (1) a central bank;
- (2) a CRD credit institution²;
- (3) a bank authorised in a third country;
- (4) a qualifying money market fund” FCA (2013).

For firms that do not have a banking authorisation, client deposits must be held in segregated accounts with banks or money market funds. This means the client assets remain off-balance sheet for the firm, including non-bank financial intermediaries, and the depositor remains the legal owner. This is why the extension of a bank loan by a stock broker cannot result in any addition to the balance sheet: the stock broker will owe the borrower the money (an increase in accounts payable), but since any account of the borrower is not held directly with the stock broker, it is not possible for the stock broker (or other non-bank entities) to mix the clients’ deposit accounts with the other liabilities that the broker has towards the clients (such as an accounts payable item arising from loan contracts). So it would be impossible for the stock broker to engage in the re-classification exercise of referring to accounts payable items as (imaginary) customer deposits.

However, things are different, if one has a banking licence:

“Depositaries

1.4.6 R *The client money chapter does not apply to a depositary when acting as such” ...*

“Chapter 7 Client Money Rules

Credit Institutions and Approved Banks

7.1.8 R *The client money rules do not apply to a CRD credit institution in relation to deposits within the meaning of the CRD held by that institution. ...*

7.1.9. G *If a credit institution that holds money as a deposit with itself is subject to the requirement to disclose information before providing services, it should, in compliance with that obligation, notify the client that: (1) money held for that client in an account with the credit institution will be held by the firm as banker and not as trustee (or in Scotland as agent); and (2) as a result, the money will not be held in accordance with the client money rules”* (FCA, 2013).

It follows then that what enables banks to create credit and hence money is their exemption from the Client Money Rules. Thanks to this exemption they are allowed to keep customer deposits on their own balance sheet. This means that depositors who deposit their money with a bank are no longer the legal owners of this money. Instead, they are just one of the general creditors of the bank whom it owes money to. It also means that the bank is able to access the records of the customer deposits held with it and invent a new ‘customer deposit’ that had not actually been paid in, but instead is a re-classified accounts payable liability of the bank arising from a loan contract.

Whether the Client Money Rules were designed for this purpose, and whether it is indeed lawful for banks to reclassify general ‘accounts payable’ items as specific liabilities defined as ‘customer deposits’, without the act of depositing having been undertaken by anyone, is a matter that requires further legal scrutiny, beyond the scope of this paper.

We conclude that by disaggregating bank lending into two steps we have identified precisely how banks create credit, and we have solved a long-standing conundrum in the literature, namely why banks combine what at first appear to be two very different businesses: lending on the one hand, and deposit-taking on the other. The answer is that banks are not financial intermediaries, but creators of the money supply, whereby the act of creating money is contingent on banks maintaining customer deposit accounts, because the money is invented in the form of fictitious customer deposits that are actually re-classified ‘accounts payable’ liabilities emanating from loan contracts. Banks could not do this if they did not combine lending and deposit taking activities. But, as we saw, combining these activities is a necessary yet insufficient condition for being able to create credit and money. The necessary and sufficient condition for being able to create credit and money is *being exempt from the Client Money Rules*.

Kashyap et al. (2002) argued that what makes banks unique and the reason why they engage in the two tasks of lending and deposit-taking simultaneously was the granting of loan commitments and the resulting need for liquidity provision. However, loan commitments are a subset of lending activity, and we have found that what makes banks unique and requires them to combine lending with deposit-taking does not derive from the lending function per se – since business lending is not even regulated, so that anyone can engage in it without a licence, and, as we saw, the impact of signing a loan contract is common to all firms (Step 1 in the disaggregated accounting of lending).

What makes banks unique and explains the combination of lending and deposit-taking under one roof is the more fundamental fact that *they do not have to segregate client accounts, and thus are able to engage in an exercise of ‘re-labelling’ and mixing different liabilities, specifically by re-assigning their accounts payable liabilities incurred when entering into loan agreements, to another category of liability called ‘customer deposits’*.

What distinguishes banks from non-banks is their ability to create credit and money through lending, which is accomplished by booking what actually are accounts payable liabilities as imaginary customer deposits, and this is in turn made possible by a particular regulation that renders banks unique: their exemption from the Client Money Rules.

² FCA Handbook Glossary: “CRD credit institution means a credit institution that has its registered office (or, if it has no registered office, its head office) in an EEA State...” (FCA, 2013).

4. Some implications

The argument that it is bank regulation that makes banks special has been used to justify deregulation of interest rates and reserve requirements. The logic was that it was the regulation of interest rates and reserve requirements that made banks different and hindered a level playing field. However, this argument has not focused on what really makes banks different from other firms. It is in the business of taking deposits that the regulations make a crucial difference for banks and non-banks. It would appear that those who argue that bank regulations should be liberalised in order to create a level playing field with non-banks have neglected to demand that the banks' unique exemption from the Client Money Rules – a regulation benefitting only banks – needs to be deregulated as well, so that banks must also conform to the Client Money Rules. Indeed, it would appear that monetary reformers (see, for instance, [Benes and Kumhof, 2012](#)) could very simply achieve their goal of revoking the banks' ability to create money through credit creation, by simply scrapping banks' exemption from the Client Money Rules. In the case of UK regulation, deleting CASS 7, 1.4.6 and 7.1.8. should be sufficient.³ A reasonable justification for cancelling the banks' exemption would be the fact that (a) no reasonable grounds for their exemption have been made, and (b) banks have routinely abused this exemption in order to misrepresent other liabilities as 'customer deposits'. While the latter would not have been possible if the Client Money Rules had applied to banks, it is not obvious that the Client Money Rules were designed for this purpose.

Alternatively, one could argue that it would level the playing field, if the banks' current exemption from the Client Money Rules was also granted to all other firms – in other words, if the Client Money Rules themselves were abolished. This would allow all firms to also engage in the kind of creative accounting that has become an established practise among banks. It would certainly ensure that competition between banks and non-bank financial institutions would become more meaningful, since the exemption from the Client Money Rules, together with the banks' deployment of this exemption for the purpose of re-labelling their liabilities, has given significant competitive advantages to banks over all other types of firms: banks have been able to create and allocate money – virtually the entire money supply in the economy – while no other firm is able to do the same. However, apart from the new risks for the public arising from such deregulation, even in this case banks would maintain their advantage and their monopoly on money creation, if the state maintained the rule that taxes need to be paid in privately created bank money only: Today, tax payments cannot be made in legal tender (Bank of England notes), but only in bank credit money, which is private company credit, created by banks' re-classification of their accounts payable liabilities as imaginary customer deposits. By forcing all tax payers to acquire bank money in this way, the state effectively transfers sovereignty over money creation to the banks. The importance of the denomination of taxes has long been recognised. Adam Smith commented on it as follows:

“A prince, who should enact that a certain proportion of his taxes should be paid in a paper money of a certain kind, might thereby give a certain value to this paper money” (1776, p. 328).

The findings are important also for other types of reforms, including the reform of bank regulation. So far, bank regulation has emphasised capital adequacy requirements in order to manage bank activity. This has failed spectacularly, as Basel I could not prevent, and likely contributed to the propagation of the Japanese and Asian crises in the 1990s, and Basel II is similarly implicated in the 2008 financial crisis. As

³ For a more detailed discussion of how to implement monetary reform by changing the Client Money Rules, please see [Werner \(2012b\)](#), which was submitted upon invitation to the Althing, Iceland's Parliament.

[Werner \(2005, 2010, 2014a, 2014c\)](#) argues, Basel rules were doomed to failure, since they consider banks as financial intermediaries, when in actual fact they are the creators of the money supply. Since banks invent money as fictitious deposits, it can be readily shown that capital adequacy based bank regulation does not have to restrict bank activity: banks can create money and hence can arrange for money to be made available to purchase newly issued shares that increase their bank capital. In other words, banks could simply invent the money that is then used to increase their capital. This is what Barclays Bank did in 2008, in order to avoid the use of tax money to shore up the bank's capital: Barclays 'raised' £5.8 bn in new equity from Gulf sovereign wealth investors – by, it has transpired, lending them the money! As is explained in [Werner \(2014a\)](#), Barclays implemented a standard loan operation, thus inventing the £5.8 bn deposit 'lent' to the investor. This deposit was then used to 'purchase' the newly issued Barclays shares. Thus in this case the bank liability originating from the bank loan to the Gulf investor transmuted from (1) an accounts payable liability to (2) a customer deposit liability, to finally end up as (3) equity – another category on the liability side of the bank's balance sheet. Effectively, Barclays invented its own capital. This certainly was cheaper for the UK tax payer than using tax money. As publicly listed companies in general are not allowed to lend money to firms for the purpose of buying their stocks, it was not in conformity with the Companies Act 2006 (Section 678, Prohibition of assistance for acquisition of shares in public company). But regulators were willing to overlook this. As [Werner \(2014b\)](#) argues, using central bank or bank credit creation is in principle the most cost-effective way to clean up the banking system and ensure that bank credit growth recovers quickly. The Barclays case is however evidence that stricter capital requirements do not necessary prevent banks from expanding credit and money creation, since their creation of deposits generates more purchasing power with which increased bank capital can also be funded. To manage bank credit creation more effectively, the differing consequences of different types of lending need to be recognised (bank credit creation for financial transactions affects asset prices and is in aggregate unsustainable, bank credit for consumption affects consumer prices, and bank credit for productive investment purposes is sustainable and non-inflationary, as the Quantity Theory of Credit, [Werner, 1997](#), maintains). Given the reality of market imperfections and rationing, more direct interventions in the credit market, in the form of 'guidance' of bank credit (for instance by curtailing costly and dangerous financial credit creation) need to be re-considered ([Werner, 2005](#)). They have a good track record for preventing credit and hence asset boom-bust cycle. Alternatively, the structure of the banking system needs to be designed such that it is dominated by banks that mainly lend for productive investments in the ordinary course of their business, such as local banks lending to SMEs ([Werner, 2013](#)).

5. Conclusion

In this paper a number of fundamental questions concerning banks have been answered. This includes the old questions of why banks combine what are effectively very different operations, namely deposit-taking and granting of loans under one roof, what are the “defining characteristics of a bank”, and “why securities markets and non-bank firms cannot do the same” ([Kashyap et al., 2002](#)). It also includes new questions predicated on the recognition that banks create credit and money, namely what exactly it is that enables banks to create credit and money out of nothing, and whether or why other financial firms and intermediaries, or ordinary corporations cannot do the same. This includes the question of whether non-bank financial institutions, including so-called 'shadow banks', can engage in money creation as well, the question whether “everyone can issue money” ([Minsky, 1986](#)), and the questions of how bank regulation should and how monetary reform could be structured.

To answer these questions, the accounting details of banks' credit and money creation were examined in a comparison of corporate accounting for lending. Breaking the act of lending into two steps, it was possible to isolate just what makes bank accounting different from the accounting of non-financial firms and non-bank financial institutions, and precisely how banks manage to create money newly. The act of signing the loan contract and purchasing it as a promissory note of the borrower without yet making the borrowed funds available to the borrower (Step 1) has the same accounting implications for banks, non-banks and non-financial corporations alike. In all cases, the balance sheets lengthen, as an asset (the loan contract) is acquired and a liability to make money available to the borrower is incurred (accounts payable). In Step 2, the lender makes the funds available to the borrower. The fact that in Step 2 the bank is alone among firms in showing the same total impact on assets and liabilities as everyone else at Step 1, when the money had not yet been made available to the borrower, demonstrates that the bank did not actually make any money available to the borrower. This means that the bank still has an open 'accounts payable' liability, as it has not in fact discharged its original liability. What banks do is to simply reclassify their accounts payable items arising from the act of lending as 'customer deposits', and the general public, when receiving payment in the form of a transfer of bank deposits, believes that a form of money had been paid into the bank. As a result, the public readily accepts such 'bank deposits' and their 'transfers' to defray payments. They are also the main component of the official 'money supply' as announced by central banks (M1, M2, M3, M4), which is created almost entirely through this act of re-classifying banks' accounts payable as fictitious 'customer deposits'. No wonder an expert in bank accounting has warned me, upon presentation of my analysis, that I must never use the concept of 'accounts payable' in the context of bank accounting! In my view, the only reason why one would not wish to use it as presented in this paper is because through this device the truth is revealed for all to see.

The 'lending' bank records a new 'customer deposit' and informs the 'borrower' that funds have been 'deposited' in the borrower's account. Since *neither the borrower nor the bank actually made a deposit at the bank* – nor, in connection with this transaction, anyone else for that matter, it remains necessary to analyse the legal aspects of bank operations. In particular, the legality of the act of reclassifying bank liabilities (accounts payable) as fictitious customer deposits requires further, separate analysis. This is all the more so, since no law, statute or bank regulation actually grants banks the right (usually considered a sovereign prerogative) to create and allocate the money supply. Further, the regulation that allows only banks to conduct such creative accounting (namely the exemption from the Client Money Rules) is potentially being abused through the act of 'renaming' the bank's own accounts payable liabilities as 'customer deposits' when no deposits had been made, since this is also not explicitly referred to in the banks' exemption from the Client Money Rules, or in any other statutes, laws or regulations, for that matter.

This raises the broader problem that much of the terminology in banking appears to mislead the public. An innocent bank customer could be forgiven for believing that money 'deposited' with a bank was still the property of the depositor and hence safe in the case of a bankruptcy of the institution, while money deposited with a stock broker with the intention to speculate in the markets was at risk of being lost should the stock broker go bust. That the legal reality is precisely the opposite – money deposited with stock brokers is unencumbered by the broker's bankruptcy since it remains the property of the depositor, held in safe custody as segregated Client Money, while money deposited with a bank, exempt from the Client Money Rules, is no longer the property of the depositor and thus in principle goes under together with the bank – is testament to the misleading character of banking terminology.

In this paper it was found that banks combine what are effectively very different operations, namely deposit-taking and granting of loans

under one roof, because in this way they can invent new money in the form of fictitious 'customer deposits' when purporting to engage in the act of 'lending'. It was found that the defining characteristic of banks is that they are exempt from the Client Money Rules, which prevent other firms from creating money in the same way. It was found that, in practise, only banks can issue money in this way. It was also found that bank regulation needs to be reconsidered, as focusing on capital adequacy, already proven ineffective by the many banking crises since its introduction in the 1980s, is likely to remain unable to prevent credit booms and subsequent banking crises. Finally, a simple way was found to implement monetary reform, should the sovereign – the people – decide to introduce a more transparent way of creating and allocating the money supply: one only needs to revoke the one-sided exemption from the Client Money Rules granted to banks (and combine this with Client Money custody services offered to all banks by HM Treasury). Having said this, since the privilege to create money is a public prerogative, it can be justified if it is used for the benefit of the public. How can this be achieved? I have come to be convinced that probably the best method to implement monetary reform realistically – since possible without waiting for grand top-down reforms and since in this way breaking power up into small, manageable units – is to establish many small, local, not-for-profit community banks, as the success of the German economy has demonstrated over the past 170 years.

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A lost century in economics: Three theories of banking and the conclusive evidence[☆]



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ABSTRACT

How do banks operate and where does the money supply come from? The financial crisis has heightened awareness that these questions have been unduly neglected by many researchers. During the past century, three different theories of banking were dominant at different times: (1) The currently prevalent *financial intermediation theory of banking* says that banks collect deposits and then lend these out, just like other non-bank financial intermediaries. (2) The older *fractional reserve theory of banking* says that each individual bank is a financial intermediary without the power to create money, but the banking system collectively is able to create money through the process of 'multiple deposit expansion' (the 'money multiplier'). (3) The *credit creation theory of banking*, predominant a century ago, does not consider banks as financial intermediaries that gather deposits to lend out, but instead argues that each individual bank creates credit and money newly when granting a bank loan. The theories differ in their accounting treatment of bank lending as well as in their policy implications. Since according to the dominant *financial intermediation theory* banks are virtually identical with other non-bank financial intermediaries, they are not usually included in the economic models used in economics or by central bankers. Moreover, the theory of banks as intermediaries provides the rationale for capital adequacy-based bank regulation. Should this theory not be correct, currently prevailing economics modelling and policy-making would be without empirical foundation. Despite the importance of this question, so far only one empirical test of the three theories has been reported in learned journals. This paper presents a second empirical test, using an alternative methodology, which allows control for all other factors. The financial intermediation and the fractional reserve theories of banking are rejected by the evidence. This finding throws doubt on the rationale for regulating bank capital adequacy to avoid banking crises, as the case study of Credit Suisse during the crisis illustrates. The finding indicates that advice to encourage developing countries to borrow from abroad is misguided. The question is considered why the economics profession has failed over most of the past century to make any progress concerning knowledge of the monetary system, and why it instead moved ever further away from the truth as already recognised by the credit creation theory well over a century ago. The role of conflicts of interest and interested parties in shaping the current bank-free academic consensus is discussed. A number of avenues for needed further research are indicated.

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1. Introduction

The failure by leading economists to incorporate banking in their economic theories has been identified as a significant and costly weakness (Werner, 1997, 2005; Kohn, 2009). Likewise, it has been pointed out that the macro-economic feedback of banking activity had been

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neglected in finance research (Werner, 2012). Recognition of these shortcomings has led to the emergence of 'macro finance' as a new discipline, nested within the finance research agenda. The present paper contributes to this growing literature by addressing a long-standing central dispute about the role and function of banks, which has major implications for monetary and macroeconomics, finance and banking, as well as government policy: it is the question whether a bank lends existing money or newly creates the money it lends.

As Werner (2014b) showed, during different time periods of the 20th century, one of three distinct and mutually exclusive theories of banking has been dominant: The oldest, the *credit creation theory of banking*, maintains that each bank can individually create money 'out of nothing' through accounting operations, and does so when extending a loan. The *fractional reserve theory* states that only the banking system as a whole can collectively create money, while each individual bank is a

mere financial intermediary, gathering deposits and lending these out. The *financial intermediation theory* considers banks as financial intermediaries both individually and collectively, rendering them indistinguishable from other non-bank financial institutions in their behaviour, especially concerning the deposit and lending businesses, being unable to create money individually or collectively.

Although various economists support each of the three theories, and despite the pivotal significance for research and policy, the question which of the three theories is accurate has until recently not been empirically examined. The first empirical test published in a learned journal on this issue was [Werner \(2014b\)](#), in which the author obtained the cooperation of a bank to examine the actual operations and accounting entries taking place when a 'live' bank loan is granted and paid out. It was found that only the credit creation theory was consistent with the observed empirical evidence. However, as a 'live' empirical test of a bank in operation, the test design did not allow a fully controlled environment: Advances in IT and service offerings mean that bank operations take place continuously, even 'after hours' and during holidays (thanks to online banking and round-the-clock banking IT systems). As a result, during the observation interval of one day, other transactions took place in addition to the test transaction. While the final results of the test were unambiguous, a number of aggregated uncontrolled factors had to be jointly evaluated. Therefore as a robustness check it would be desirable to test the three theories of banking using a different methodology, in a fully controlled environment, without the potential interference from other transactions.

The main contribution of the present paper is to provide such an alternative empirical test, allowing complete control of all other factors. For this purpose, use is made of the fact that modern banking and its constituent accounting operations take place entirely within the IT systems of banks. In this paper a controlled test design is proposed that uses the relevant banking software to simulate a bank loan transaction and booking it as if it was a real transaction. While humans may change their behaviour in such simulation situations when they become aware of the nature of the test, such potential bias does not apply to software code. The test of booking a bank loan in banking software yields the finding that the credit creation theory of banking alone conforms to the empirical facts, providing a separate and different corroboration of the findings in [Werner \(2014b\)](#).

The results from the test on bank lending are used to throw new light on capital adequacy-based bank regulation (such as the Basel III/CRR approach) and its alleged ability to prevent banking crises, illustrated through the case of the capital raising by Swiss bank Credit Suisse in 2008. It is found that capital adequacy-based bank regulation cannot prevent banking crises. Instead, it is noted that central bank guidance of bank credit and banking systems dominated by small banks have a superior track record in generating stable growth without crises.

Furthermore, the question is asked why the economics profession has singularly failed over most of the past century to make any progress in terms of knowledge of the monetary system, and instead moved ever further away from the truth as already recognised by the credit creation theory well over a century ago. The role of conflicts of interest is discussed and a number of avenues for needed further research are indicated.

The paper is structured as follows: The second section will briefly survey the literature on the three theories of banking and their differing accounting implications. [Section 3](#) presents the new empirical test. [Section 4](#) analyses and interprets the results. [Section 5](#) applies the insights to examining capital adequacy-based bank regulation, considering the case of Credit Suisse. [Section 6](#) discusses the implications for development policies, and specifically, the advice for developing countries to borrow from abroad in order to stimulate economic growth. [Section 7](#) considers the failure by academic and central bank economists to make progress for a century concerning the role of banks. Closing words are recorded in [Section 8](#).

2. A brief overview of the three main theories of banking and their accounting

Like [Werner \(2014b\)](#), this brief literature review is confined to works by authors who are concerned with banks that cannot issue bank notes. With a few exceptions, the citations differ from those in [Werner \(2014b\)](#) and are meant to complement them. Several authors of the 'Austrian' and 'post-Keynesian' schools of thought are included, which had not been cited by [Werner \(2014b\)](#).

2.1. The financial intermediation theory of banking

The presently dominant *financial intermediation theory* holds that banks are merely financial intermediaries, not different from other non-bank financial institutions: they gather deposits and lend these out ([Fig. 1](#)). In the words of recent authors, "Banks create liquidity by borrowing short and lending long" ([Dewatripont, Rochet, & Tirole, 2010](#)), meaning that banks borrow from depositors with short maturities and lend to borrowers at longer maturities.

The financial intermediation theory of banking is publicised by highly ranked economics journals, and also includes some well-known economists. Examples are [Keynes \(1936\)](#); [Gurley and Shaw \(1955\)](#); [Tobin \(1963, 1969\)](#); [Sealey and Lindley \(1977\)](#); [Diamond and Dybvig \(1983\)](#); [Baltensperger \(1980\)](#); [Diamond \(1984, 1991, 1997\)](#); [Eatwell, Milgate, and Newman \(1989\)](#); [Gorton and Pennacchi \(1990\)](#); [Bencivenga and Smith \(1991\)](#); [Bernanke and Gertler \(1995\)](#), [Rajan \(1998\)](#), [Myers and Rajan \(1998\)](#), [Allen and Gale \(2004a, 2004b\)](#); [Allen and Santomero \(2001\)](#); [Diamond and Rajan \(2001\)](#); [Kashyap, Rajan, and Stein \(2002\)](#); [Matthews and Thompson \(2005\)](#); [Casu and Girardone \(2006\)](#); [Dewatripont et al. \(2010\)](#); [Gertler and Kiyotaki \(2011\)](#) and [Stein \(2014\)](#).

Earlier proponents of this theory include [von Mises \(1912\)](#), who wrote:

"The activity of the banks as negotiators of credit is characterised by the lending of other people's, that is, of borrowed, money. Banks borrow money in order to lend it; ... Banking is negotiation between granters of credit and grantees of credit. Only those who lend the money of others are bankers; those who merely lend their own capital are capitalists, but not bankers"

([Mises, 1980, p. 294f](#)).

While Mises argued that this was only one of the functions of banks,¹ [Keynes \(1936\)](#) in his *General Theory* clearly states that for investments to take place, savings first need to be gathered. This view has also been reflected in the Keynesian growth models by [Harrod \(1939\)](#) and [Domar \(1947\)](#), which are based on the *financial intermediation theory of banking*, although not explicitly modelling banks. Indeed, this theory provides the justification for failing to incorporate banks and the way they operate in economic models. Harrod and Domar's conclusions have had a significant influence on economic policy in the post-war era, as their work has been interpreted to the effect that developing countries could be helped by international banks who could provide missing domestic savings through their

¹ Von Mises also pointed out that

"...those banks that issue notes or open current accounts... have a fund from which to grant loans, over and above their own resources and those resources of other people that are at their disposal"

([Mises, 1980, p. 304](#)).

Mises (1912) thought that banks could act either as financial intermediaries, in which case they would not create money, or at times stop being financial intermediaries and function as creators of credit and money. How this should be reflected in terms of bank accounting remains unclear and doubtful. This line of thinking may, on a high level, however have prepared the ground for the idea that banks could be financial intermediaries on the one hand and on the other, somehow, create money – a position that the *fractional reserve theory* maintains.

The Financial Intermediation Theory of Banking

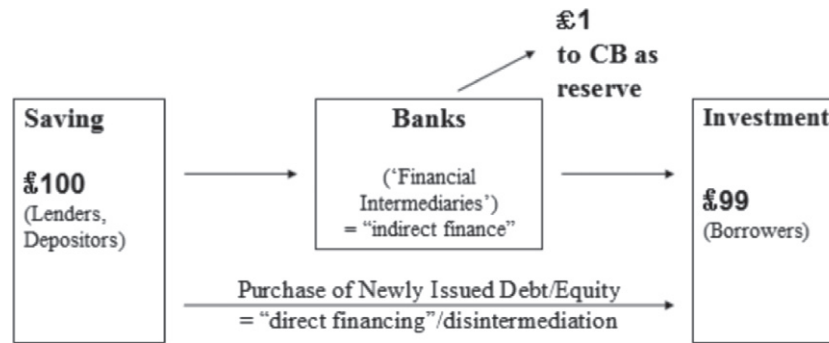


Fig. 1. The financial intermediation theory of banking.
Source: Werner (2005).

lending from abroad in order to fund economic growth. This logic has resulted in a significant increase in foreign borrowing and indebtedness by developing countries since the second world war.

Gurley and Shaw (1955, 1960) argue that banks and non-bank financial institutions largely share the function of being financial intermediaries, thus arguing that there is nothing special about banks. Tobin (1963) backed this view in his influential work. He argued:

“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).

Since in many countries, such as the UK, today there are neither interest rate ceilings nor reserve requirements for banks, Tobin’s classification of banks as financial intermediaries should hold true more than ever, since he staked any differences between banks and non-bank financial intermediaries on these.

Sealey and Lindley (1977) develop a production theory for depository institutions:

“The transformation process for a financial firm involves the borrowing of funds from surplus spending units and lending those funds to deficit spending units, i.e. financial intermediation” (p. 1252).

“...the production process of the financial firm, from the firm’s viewpoint, is a multistage production process involving intermediate outputs, where loanable funds, borrowed from depositors and serviced by the firm with the use of capital, labor and material inputs, are used in the production of earning assets” (p. 1254).

Baltensperger (1980) also believes banks are merely financial intermediaries, unable to create money, and instead engaging in a somewhat vague process of ‘risk transformation’:

“The main economic functions of financial firms are those of consolidating and transforming risks on the one hand, and of serving as dealers or ‘brokers’ in the credit markets... on the other hand” (p. 1).

Riordan (1993) holds that

“Banks serve as financial intermediaries between borrowers and lenders. More precisely, banks borrow from depositors and lend

to investors.... In a capitalist economy most investment projects are owned and managed by private entrepreneurs and firms. Generally these investors lack enough equity fully to finance their projects and consequently seek loans to complete financing. Banks, on the other hand, aggregate deposits to make these loans” (p. 328).

Kashyap et al. (2002) believe that banks are pure financial intermediaries, presenting a model of banking in which a bank purchases assets with funds it had acquired in the form of deposits or the issuance of equity or bonds. The authors seem to be envisaging a cash-based economy, whereby deposits constitute amounts of cash paid in:

“The total assets to be financed at date 0 are $L + S_0$. They are financed partly by demandable deposits.... In addition to deposits, the bank can also issue claims in the public market.... These claims mature at date 2, and can be thought of as either bonds or equity” (p. 41).

The more recent and substantial ‘credit view’ literature (such as Bernanke and Blinder, 1988; Bernanke and Gertler, 1995), the monitoring literature on financial intermediation (Diamond, 1984; Sheard, 1989), and the sizeable literature on the various other theories of financial intermediation, do not distinguish banks from other non-bank financial institutions (see, for instance, Casu et al., 2006). The authors in these branches of the literature hold that banks are just another type of financial intermediary among many, without the power to create credit in any way.

Influential textbooks on money and banking are also proponents of the *financial intermediation theory*, such as that by Cecchetti (2008), who does not consider banks able to create credit or money:

“...an institution like a bank stands between the lender and the borrower, borrowing from the lender and then providing the funds to the borrower” (p. 39)

...or the banking textbook by Casu et al. (2006):

“Banks, as other financial intermediaries, play a pivotal role in the economy, channelling funds from units in surplus to units in deficit. They reconcile the different needs of borrowers and lenders by transforming small-size, low-risk and highly liquid deposits into loans which are of larger size, higher risk and illiquid (transformation function)” (p. 18).

Matthew and Thompson (2005) state that banks first need to obtain deposits in order to be able to lend:

“Financial intermediation refers to borrowing by deficit units from financial institutions rather than directly from the surplus units themselves. Hence, financial intermediation is a process which involves surplus units depositing funds with financial institutions who in turn lend to deficit units” (p. 33).

“An exogenous increase in the demand for loans shifts the LL schedule up to LL' and increases the loan rate. The bank (or banking system in the case of a non-monopoly bank) will respond by supplying more loans and deposits. To attract more deposits, the bank (banking system) will bid for deposits by increasing the deposit rate” (p. 110).

As there is no clear distinction of banks from non-banks in such models, economists also see no reason why banks need to be singled out for special treatment or indeed included in their macroeconomic theories at all. Thus it came to pass that the seminal articles in leading journals and widely-used macroeconomics and monetary economics textbooks have long dropped out banks entirely: banks do not feature at all in ‘advanced macroeconomics’ or ‘advanced monetary economics’ textbooks, such as the influential 785-page tome by Woodford (2003), the 820 pages of Heijdra and Van der Ploeg (2002) or the 751 pages of Sorensen and Whitta-Jacobsen (2010).

Finally, even recent popular discussions of banking, written by finance or economics professors with the hindsight of the financial crisis of 2008, continue to present banks as mere financial intermediaries:

“...banks make their profits by taking in deposits and lending the funds out at a higher rate of interest”
(Krugman, 2015).

“The bank acts as an intermediary, channeling money from thousands of depositors and other investors to its loan clients”
(Admati and Hellwig, 2012, p. 50).

“The use of deposits to fund loans has been a standard practice in banking for centuries”
(op. cit., p. 51).

“...the use of deposits and short-term debt to fund loans has gone on for centuries and is enshrined in banking textbooks...”
(op. cit., p. 51).

“...banks benefit the economy by taking deposits and making loans. Of these two activities, deposit taking is unique to banks. Loans can also be made by any other institution that has the capacity to assess the loan applicants' creditworthiness and to monitor their performance. The concentration of banks on lending is due to ready availability of funds from deposits”
(op. cit., p. 148).

2.2. The fractional reserve theory of banking

This theory of banking also argues that each bank is a financial intermediary. However, it disagrees with the former theory concerning the collective, macroeconomic role of banks: it argues that, together, the banking system creates money, through the process of ‘multiple deposit expansion’. Thus when Gurley and Shaw (1955) argued that banks and non-bank financial institutions are largely similar in that they were both financial intermediaries able to ‘create financial claims’, they were challenged during the 1950s and 1960s in influential journals by, among others, Culbertson (1958), Aschheim (1959), Warren Smith (1959), Solomon (1959), Paul Smith (1966) and Guttentag and Lindsay (1968), many of whom were supporters of

the *fractional reserve theory*.² 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.³ According to Phillips:

“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).

Crick (1927) is another supporter of this theory. He argues that while each bank is a financial intermediary, the system as a whole can create money. Like later Keynes and Tobin, Crick adopted the habit of placing the concept of creation in inverted commas (‘credit “creation”’). This implies scepticism, if not even derision and ridicule for those who believe in the ability of banks to create credit. While not entirely denying the potential for banks to create credit and money, Crick (1927) and colleagues succeeded in downplaying the significance of any such action and re-assuring the public – or academia – that all was under control, as the money creation was the result of a kind of diffuse process, a technical detail that experts might debate, but which was of little direct consequence for the economic model builder.

Friedrich von Hayek's first book revealed him to be also a supporter of the *fractional reserve theory of banking* (Hayek, 1929, p. 90): He argued that with a reserve of 10%, every bank would lend out 90% of any deposit, which would increase deposits with other banks, resulting in a multiple creation of deposits in the banking system.

Meanwhile, Keynes (1930) supports the *fractional reserve theory*, citing both Phillips (1920) and Crick (1927) approvingly (p. 25). But he then discusses the concept of money ‘creation’ by referring to any increase in bank deposits as the ‘creation’ of deposits:

“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).

Keynes may have been referring to bank transfers as the kind of deposit that allows a bank to ‘create’ a deposit, while remaining a mere financial intermediary, since Keynes (1930) deploys 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).

² Smith (1959), for instance, argues 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”. ...

“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” (p. 535).

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).

³ Earlier authors include Marshall (1890).

So ‘deposit creation’ “in the most convenient use of language” here is simply the act of recording a deposit in the bank’s account, i.e. a bank accounting entry. If the adjustment of an account is 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. Thus Keynes’ terminology does not serve to clarify.

The widely read contemporary textbook by Stiglitz (1997) also favours the *fractional reserve theory*, and mirrors Keynes’ 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).

Again, the ‘creation’ of deposits and loans is defined by the creation of an accounting record. Such terminology distracts from the question whether individual banks can uniquely create new purchasing power out of nothing, and hence cause an increase in total balances without a commensurate decrease. But at least Stiglitz’s adherence to the *fractional reserve theory of banking* is clear-cut.

What must be the most influential post-war textbook in economics – that by Samuelson (1948) – squarely addresses the question at hand: The original first edition deals with the third theory of banking, the *credit creation theory* and dismisses it. Under the heading “Can banks really create money?”, Samuelson argues against “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).

Samuelson also supports the *fractional reserve theory of banking* and holds that a bank needs to gather the funds first, before it can extend bank loans. At the same time he 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 considers the balance sheet accounts of the bank. If this bank receives a new cash deposit of \$1000, “What can the bank now do?”, Samuelson asks (p. 325).

“Can it expand its loans and investments by \$4000 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....	+\$4,000		
Total.....	+\$5,000	Total.....	+\$5,000

Samuelson (1948, p. 325)

“The answer is definitely ‘no’. Why not? Total assets equal total liabilities. Cash reserves meet the legal requirement of being 20% 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).

Samuelson argues that 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 \$1000 will look as follows (Table 4c):

Table 4c
Original bank in final position.

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

Samuelson (1948, p. 326)

Thus Samuelson argues that an individual bank cannot create credit out of nothing, while the banking system can do so:

“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).

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

namely create money. Samuelson then describes the iterative process of a new loan by one bank becoming another bank’s deposits, and so forth. He calls this a “chain of deposit creation”, which shows total deposits in the banking system of \$5000 having come about from an initial \$1000 loan, with a reserve requirement of 20%, implying a ‘money multiplier’ of 5 times. As a result the consolidated balance sheet of the banking system is shown by Samuelson as follows (Table 4i):

Table 4i
Consolidated balance sheet showing final positions of all banks together.

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

(Samuelson, 1948, p. 329)

“If the reader will turn to Table 4b 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).

Samuelson calls this “multiple deposit expansion”. This description has survived over the decades of new editions of his textbook, with the same heading: “All banks can do what one can’t do alone” (p. 493), reiterated in the fifteenth edition of his book (Samuelson and Nordhaus, 1995), although the reserve requirement cited as example had been lowered to 10% (still an overstated number). 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 4i re-appears, with the same title (“*Consolidated Balance Sheet Showing Final Positions of All Banks*”).

Comparing these two versions of this likely most influential economics textbook of the 20th century (1948 vs. 1995) a number of differences can be seen: The amount of space devoted to the topic of bank money creation is much smaller in 1995 compared to 1948. In the

1995 textbook the *fractional reserve theory* is stated more clearly and unambiguously: the central bank-created reserves are said to be used by banks “as an input” and then “transformed” “into a much larger amount of bank money” (p. 490). The alternative *credit creation theory* is not mentioned: There is no equivalent of Table 4b. The idea that an individual bank might create deposits is not mentioned at all.⁴ Each bank is clearly represented as a pure financial intermediary, collecting deposits and lending out this money (minus the reserve requirement)⁵:

“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).

So in this world, where does money (our modern bank deposit money) come from? We are told that it is “supplied” by “the financial system” in a diffuse process that each individual bank has little control over (p. 494).

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

The author is 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, also invokes Phillips (1920) in supporting the *fractional reserve theory of banking*:

“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 Committee, 1931), 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).

The *fractional reserve theory of banking* is proposed in many textbooks, especially for undergraduate students (interestingly, it tends to

⁴ 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*.

⁵ 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.

be left out of books for postgraduates, where the *financial intermediation theory* holds sway). For instance, Stiglitz (1997) writes:

“In this way, any new deposit into the banking system results in a multiple expansion of the number of deposits. This is the ‘miracle’ of the fractional reserve system. Deposits increase by a factor of 1/reserve requirement. ... Note that as the deposits increased, so did the supply of outstanding loans” (p. 736). “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).

2.3. The credit creation theory of banking

The third theory of banking is at odds with the other two theories by representing banks not as financial intermediaries – neither in aggregate nor individually. Instead, each bank is said to create credit and money out of nothing whenever it executes bank loan contracts or purchases assets. So banks do not need to first gather deposits or reserves to lend. Since bank lending is said to create new credit and deposit money, an increase in total balances takes place without a commensurate decrease elsewhere. Therefore according to this theory, over time bank balance sheets and measures of the money supply tend to show a rising trend in time periods when outstanding bank credit grows – unlike with the financial intermediation theory, where only existing purchasing power can be re-allocated and the money supply does not rise. Supporters include Macleod (1856), Withers (1909, 1916), Schumpeter (1912), Wickell (1898), Cassel (1918), Hahn (1920), Hawtrey (1919) and others. There were more supporters of this theory in the era of widespread bank note issuance by commercial banks, but our concern here is with writers that considered individual banks to be creators of credit and money even if they do not engage in note issuance.

The most authoritative writer supporting this theory is Henry D. Macleod (1856), who was a banking expert and barrister at law. His influential work, published in many editions until well into the 20th century (the quotes are from the 6th edition of 1906), emphasises the importance of considering accounting, legal and financial aspects of banking together. Based on an analysis of the legal nature of bank activity he concluded:

“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 (Macleod, 1906, vol. 2, p. 311, italics added).⁶”

⁶ 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, 1906, p. 338).

“...the Credit [the banker] creates in his customer's favour is termed a Deposit. (p. 406).

“These banking Credits are, for all practical purposes, the same as Money. They cannot, of course, be exported like money: but for all internal purposes they produce the same effects as an equal amount of money. They are, in fact, Capital created out of Nothing ”

(Macleod, 1906, p. 408).

Macleod's message was spread far and wide by Withers (1909, 1916), who was a prolific writer about this topic and for many years editor of the *Economist*:

“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”⁷

(Withers, 1916, p. 42).

According to the *credit creation theory* then, banks create credit in the form of what bankers call ‘deposits’, and this credit is money. Another influential proponent of this theory was Schumpeter (1912):

“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 denying this to another”⁸

(Schumpeter, 1912, p. 225).

Schumpeter (1954) argued against the alternative theories of banking:

“this alters the analytic situation profoundly and makes it highly inadvisable to construe bank credit on the model of existing funds

⁷ “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 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)

⁸ “Die Funktion des Bankiers, des Produzenten von und Händlers mit Kredit, ist in der Fülle der sich anbietenden 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.

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).

US supporters of this theory include Davenport (1913) and Howe (1915):

“...banks do not lend their deposits, but rather, by their own extensions of credit, create the deposits”

(Davenport, 1913, p. 263).

“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% on all State Bank Currency....

“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% of all the business done in the United States, the payments are made in bank checks and in only 5% is any cash used; and of this 5% an infinitesimal fraction only is gold

(Howe, 1915, 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.

“The banks have created fifteen billions of dollars of credit by discounting the notes of merchants and manufacturers, and crediting the proceeds to the borrower's account under the head of Deposits. As a result, the borrower is enabled to draw checks and pay his debts with them

(Howe, 1915, p. 25).

Swedish economist Gustav Cassel (1923) pointed out that

“In practice, deposits are also created and constantly fed by the bank's granting advances to its customers, either by discounting bills or by making loans and then crediting the clients with the amount in

their accounts” (p. 414).⁹

An important difference to the *fractional reserve theory of banking* is the use of singular in the above sentence: it is one bank that is able to create deposits. [Hawtrey \(1919\)](#), mirroring [Macleod's \(1856\)](#) exposition, also argued that banks create money out of nothing. The early Keynes was another prominent supporter of the *credit creation theory*, praising it enthusiastically in the early 1920s as an

“almost revolutionary improvement in our understanding of the mechanism of money and credit and of the analysis of the trade cycle, recently effected by the united efforts of many thinkers, and which may prove to be one of the most important advances in economic thought ever made”

([Keynes and Moggridge, 1983, p. 419](#), as quoted by [Tily, 2012](#)).

Keynes gives the impression of a recent convert whose eyes had been opened. In his *Treatise on Monetary Reform (1924)* Keynes was also unambiguous about the ability of banks to expand or diminish “the volume of credit quoted” (p. 137):

“The internal price level is mainly determined by the amount of credit created by the banks, chiefly the Big Five; ... 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 variations in the total of their investments, bill-holdings, and advances” (op. cit., p. 178).

Yet, his later support for the other theories indicates that Keynes was not settled in his views on the *credit creation theory of banking*. Indeed, there is some evidence that he may have been open to the implication of the fractional reserve banking theory that high powered money is a key driving factor:

“Thus in one way or another the banks generally adjust their total creation of credit in one form or another (investments, bills, and advances) up to their capacity as measured by the above criterion; from which it follows that the volume of their ‘cash’ in the shape of Bank and Currency Notes and Deposits at the Bank of England closely determines the volume of credit which they create” (op. cit., p. 179).

A clearer statement coming from Keynes' pen can be obtained from the final report of the Committee on Finance and Industry, commonly known as the [Macmillan Committee \(1931\)](#), after its chairman, Hugh Macmillan.¹⁰ The Committee gathered much evidence, mainly in the

⁹ This quote is from the English translation of the fifth German edition of the 1918 book, both published in 1932.

¹⁰ 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 internationally active banking insiders as Otto Ernst Niemeyer and Henry Strakosch.

form of first-hand eye-witness testimonies, and quickly identified bank credit creation as a central focus of their inquiry.¹¹ 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. The following statement expressly refers to bank accounting of an individual bank:

“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” (op. cit., 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...” (op. cit., p. 12).

The *credit creation theory of banking* also featured prominently in textbooks, training a new generation of economists and policy makers well into the 1930s: 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](#))

While the star of the *credit creation theory* was on the descent in the mid-1930s, as the *fractional reserve theory* became dominant, a leading – if not the leading-monetary economist of his day, Irving Fisher, still insisted on the veracity of the *credit creation theory*:

“When a bank grants me a \$1000 loan, and so adds \$1000 to my checking deposit, that \$1000 of ‘money that I have in the bank’ is new. It was freshly manufactured by the bank out of my loan and

¹¹ 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).

written by pen and ink on the stub of my check book and on the books of the bank... Except for these pen and ink records, this 'money' has no real physical existence"

(Fisher, 1935, p. 3).

Despite being dominated by the other two theories in subsequent decades, pockets of adherents to the *credit creation theory of banking* continued to exist and even thrive, most notably among so-called 'Austrian' economists (since the post-war era largely active in the US), post-Keynesian economists and the inductive-empiricist school.

Examples of the Austrian writers whose views appear consistent with the credit creation theory of banking are Hoppe, Hülsmann and Block (1998). Post-Keynesian writers that have postulated the ability of banks to create credit and money include Rochon and Rossi (2003) and Basil Moore. The latter wrote:

"When a bank grants a loan to one of its customers, it simply credits the amount to the borrower's account"

(Moore, 1988, p. 51).

Moore (1988) also argued against the *fractional reserve theory*, although his choice of the word 'bank intermediation' is not ideal:

"Contrary to conventional wisdom, changes in reserve requirements imposed by the central bank do not directly affect the volume of bank intermediation"

(op. cit., p. 65).

Since the early 1990s, the methodological approach to base economic research not on preconceived theories (the deductive method), but on empirically gained knowledge (the inductive method), has gained credence (see Werner, 1992, 1997, 2005). Employing this approach, Werner (1997) writes:

"...banks create new purchasing power by the extension of loans" (p. 282).

Consistent with this insight, it was also suggested to deploy bank credit information in macroeconomic models:

"Using total bank credit as the measure of the 'money supply' in [the] equation [of exchange] has the advantage that (a) credit always represents *effective* purchasing power, as no borrower will take out a loan if there is no loan to use the money for transactions; (b) it becomes possible to define effective purchasing power clearly – namely not bank liabilities, but bank assets or private sector liabilities to the bank sector; and (c) credit aggregates are available by economic sector and hence provide us with additional information about the direction of purchasing power – something deposit aggregates cannot tell us" (op. cit., p. 283).

The empirical evidence in favour of this disaggregated Quantity Theory of Credit was overwhelming, when a general-to-specific downward reduction from a general model of a major economy was conducted, which included variables from competing theories:

"We found that key economic variables, namely nominal GDP, asset prices and Japanese foreign investment, could be explained single-handedly with quantity variables – the quantity of disaggregated credit – while interest rates and exchange rates dropped out in parsimonious reductions as insignificant. ... This opens a whole new avenue of promising work in the new research programme of the macro-economic role of credit" (Werner, 1997, p. 305).

Werner (2005) asks where a bank gets the money from which it credits a borrower's account with:

"The money was not withdrawn by the bank from other uses. It was not diverted or transferred from any other part of the economy. Most of all, although it is shown as a deposit, it was not actually deposited by anyone. The bank simply created the money by writing the figures into its books and the customer's account book. In effect, the bank pretends that its borrower has made a deposit that was not actually made. Unlike the textbook representation, we see that each individual bank can thus create money when it extends a loan. *Showing this truth in textbooks would not only be more memorable, but it would also teach students about what banks really do: they create money out of nothing. The bank just pretends it has the [loan amounts], credits someone's books with them, and nobody knows the difference*" (p. 178).

Finally, it should be repeated that the *credit creation theory* does not feature in most contemporary economics, finance or banking textbooks.¹²

2.4. Assessment

From the above review of the literature, together with that in Werner (2014b), it can be said that despite today's dominance of the *financial intermediation theory*, the question whether banks create money and are thus 'unique' still "remains unsettled". That was the conclusion by Guttentag and Lindsay (1968, p. 992) almost half a century ago in their *Journal of Political Economy* article, and it has remained true until recently. The situation has not been helped by the fact that many influential economists have been sidestepping the issue, while some eminent authors that addressed it, such as Keynes, supported all three mutually exclusive theories at one point or another. A new standard of ambiguity is set by the Bank of England, which currently appears to be supporting all three theories at the same time:

Most central banks have been active proponents and supporters of the *financial intermediation theory of banking*, helping it become dominant also in the academic world over the past forty years or so. Senior staff at the Bank of England continue to endorse it: Governor Mark Carney (2014) in his Mais Lecture at the Cass Business School cited the monetary theory of Brunnermeier and Sannikov (2015) in support of his arguments. The abstract of this paper makes clear that they believe banks are financial intermediaries that

"take deposits from ...households to extend loans..." so that banks "finance themselves by borrowing from households" (p.1).¹³

In late March 2014, external member of the Financial Policy Committee of the Bank of England, Dame Clara Furse, explained:

"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, 2014c).

The FPC member 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 via channels other than banks. Other economists at the Bank of England also seem supporters of the *financial intermediation* or the *fractional reserve theory of banking*, as can be seen from the Bank's forecasting models, which do not include banks (Bank of England, 2014d).

¹² Ryan-Collins et al. (2011) is being used as textbook, and is thus an exception.

¹³ As a result, in their model banks are pure intermediaries: "Intermediaries can take deposits from unproductive households to extend loans to entrepreneurs" (p. 6). In this model, banks could not be anything but intermediaries, because there is no money creation whatsoever ("Assume there is a fixed supply of infinitely divisible money", p. 5). Whether such a model is appropriate for a central bank engaged in 'quantitative easing' is an interesting question.

Yet, possibly triggered by the recent inroads of the *credit creation theory of banking* (Werner, 1992, 1997, 2005, 2012, 2014b; Ryan-Collins et al., 2011, Benes and Kumhof, 2012), the Bank of England in March 2014 suddenly came to additionally endorse this alternative theory (Bank of England, 2014a, b).

This means that staff at the Bank of England currently support all three of the theories of banking at the same time (see also Zoltan and Kumhof, 2015). Since each theory implies very different approaches to banking policy, monetary policy and bank regulation, the Bank of England's credibility is at stake.

One reason why the dispute still remains unsettled after such a long time is that discussions had been based on assertions, implying different accounting operations of banks. But the respective merit of the three theories cannot be settled in theoretical models designed from first principles: theoretical worlds might be conceivable in which each theory is plausible. Instead, the dispute can be settled through empirical evidence on the actual operations and accounting practices of banking. Surprisingly, in the observation period – from the mid-19th century until 2014 – no scientific empirical test had been reported in the peer reviewed journals.

The first empirical test published in a learned journal on this issue was Werner (2014b): With the cooperation of a bank, the operations and accounting entries were examined that take place when a 'live' bank loan is granted and paid out. Only the credit creation theory was consistent with the observed accounting records. The test design however did not allow a fully controlled environment: With bank operations taking place virtually 24 hours a day, it was unavoidable that other transactions would be booked in addition to the test transaction (although no other bank loan was granted). Thus a number of aggregated uncontrolled factors had to be jointly evaluated. Therefore as a robustness check it would be desirable to test the three theories of banking using a different testing procedure, in a fully controlled environment, without the potential interference from other transactions.

In order to allow complete control of all other factors, the IT system at the heart of banking operations – which incorporates bank accounting and operational rules – could be taken off-line and a loan transaction could be booked in the system. While humans may change their behaviour in such simulations when they become aware that a 'mere' test is taking place, there is no such problem when using the regular banking software.

3. A controlled empirical test

3.1. Predictions of the three theories

Before the test is conducted, the predictions of each theory about how the extension of a new €200,000 bank loan would be recorded are stated for convenience:

3.1.1. Accounting implications of the financial intermediation theory

According to this theory, banks are not different from non-bank financial institutions, such as stock brokers or asset management companies, except concerning reserve requirements, capital adequacy or interest rate regulations, as the case may be. Non-bank financial institutions are required by Client Money rules (see CASS in FCA and PRA, 2014) to hold deposits in custody for customers (a form of warehousing or bailment), by placing them with other banks or the central bank. Banks are said by this theory to be in the same position in this respect as non-bank financial institutions. In this case customer deposits are not shown on the balance sheet as liabilities (see Werner, 2014c). All funds are central bank money that can be held in reserve at the central bank or deposited with other banks or financial intermediaries (where they are also held off-balance sheet).

When a loan is granted, the claim on the borrower arising from the loan contract is shown as an increase in assets. However, the payment of the loan involves the drawing down of funds, such as reserves held at central banks, or client money held at other banks. According to this

theory, the bank balance sheet does not lengthen as a result of the bank loan, just as is the case with non-bank financial intermediaries (Table 4).

Table 4
Account changes due to a €200,000 bank loan (Financial Intermediation Theory).

Assets		Liabilities	
Excess Reserves...	-€ 200,000	
Loans and investments....	+€ 200,000	
Total.....	0	Total.....	0

3.1.2. Accounting implications of the fractional reserve theory

According to this theory each individual bank is a financial intermediary. Funds are being treated as equivalent to cash or precious metals in the sense that they are thought to have the ability to flow between banks and the central bank. Following Samuelson's description of the *fractional reserve theory*, new loans are granted based on new deposits. With a reserve requirement of 1%, a bank would thus first need to receive a new deposit of €202,000 in order to extend a loan of €200,000. The bank's balance sheet should first show an increase in deposits large enough to accommodate the loan and the reserve requirement (Table 5).

Table 5
Account changes due to a €200,000 bank loan (Fractional Reserve Theory, Samuelson Version).

Assets		Liabilities	
Cash reserves.....	+€ 2,000	Deposits.....	+€202,000
Loans and investments....	+€200,000	
Total.....	+€202,000	Total.....	+€202,000

As the table shows, the balance sheet increases. This is however not due to the extension of the loan, but due to the receipt of a new deposit. This becomes clear when breaking Samuelson's description up into two steps – the receipt of the deposit, and the extension of the loan (Table 6).

Table 6
Account changes due to a €200,000 bank loan (Fractional Reserve Theory, Samuelson Version).

Step 1: Receipt of new cash deposit of €202,000

Assets		Liabilities	
Cash reserves.....	+€202,000	Deposits.....	+€202,000
Loans and investments....
Total.....	+€202,000	Total.....	+€202,000

Step 2: Extension of new loan of €200,000

Assets		Liabilities	
Cash reserves.....	-€ 200,000	Deposits.....	+€ 0
Loans and investments....	+€200,000	
Total.....	+€ 0	Total.....	+€ 0

Adding up the changes in step 1 and step 2, we obtain the total change of Table 5 above.

As can be seen, for this fractional reserve model to work, Samuelson is assuming that the new deposit is a cash deposit, and the extension of the loan takes the form of paying out cash. This is hardly realistic, since bank loans are rarely paid out in cash. A more fundamental flaw is that if each individual bank was merely a financial intermediary, as is claimed according to this theory, it could not actually hold client deposits on its balance sheet – but this is what proponents of this theory have maintained (see the discussion of Samuelson or others above, or as shown in Tables 5 or 6): in the UK, according to the Client Money rules, financial intermediaries have to hold client money off-balance sheet (Werner, 2014c). This already makes it clear that banks could not possibly be mere financial intermediaries and that their accounting would

have to be different from that of non-banks – contradicting Tobin's claim that only reserve requirements and interest rate regulations (and even if updated to include capital requirements) distinguish banks from non-banks.

3.1.3. Accounting implications of the credit creation theory

According to this theory, banks do not separate customer funds from own funds. Thus when lending, banks are able to credit the borrower's account with the borrowed amount, although no new deposit has taken place (credit creation out of nothing, Werner, 2014c). The balance sheet lengthens due to the extension of the loan, while neither cash, nor central bank reserves nor balances with other banks are needed (reserve and capital requirements only need to be met at particular measurement intervals and are not a physical precondition of granting a loan). In other words, a bank can extend a new loan, even though it has not received any new deposit money or reserves. The borrower's account is credited with the amount of the loan, although there has been no commensurate equal reduction in balance of any other account, as would be the case had the funds been transferred. Thus bank loans create new deposits, not the other way round (Table 7).

Table 7
Account changes due to a €200,000 bank loan (Credit Creation Theory).

Assets		Liabilities	
Loans and investments....	+€ 200,000	Deposits (borrower's A/C).	+€ 200,000
Total.....	+€ 200,000	Total.....	+€ 200,000

To test the veracity of the three theories, the balance sheet of a bank needs to be examined before and after the extension of a bank loan, ideally under fully controlled circumstances. If the bank loan increased the balance sheet, while no further reserve or deposit movement took place, then the credit creation theory would be shown to be consistent with the evidence, while the other two theories would be rejected.

3.2. The test

The first empirical test of the three theories of banking, reported by Werner (2014b), involved taking out an actual bank loan from a bank that was co-operating with the investigation and shared its internal records, so that it was possible to reconstruct how the loan extension was accounted for. Raiffeisenbank Wildenberg e.G., a cooperative bank in Lower Bavaria, Germany, co-headed by director Marco Rebl, kindly cooperated in the conduct of this empirical test. As this was a 'live test' and not a controlled experiment, other transactions by bank customers continued to take place during the observation period. Due to the facilities offered by modern 24-hour electronic banking, it is very difficult for researchers to control such a test, as other transactions are likely to take place during the same time period.

Considering this issue, bank director Rebl suggested a method of testing which would allow the researcher to control for all other transactions without fail. Mr. Rebl explained 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 even for senior bank staff, given the high security requirements of bank IT systems that are themselves usually offered by external providers reluctant to allow outsiders access to details of the software. However, Mr. Rebl then pointed out that there are in fact two parallel IT systems in operation at all Bavarian cooperative banks, and both contain the accounting information of each bank. The daily balance sheet and reporting software used in the first empirical test is based on the software called 'BAP Agree' (Bankarbeitsplatz Agree). This software is however not used for the compilation of the formal annual accounts of the banks, 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). Mr. Rebl pointed out that the HJAP system contains all the bank accounting rules and functions, and that it conforms with all bank supervisory, prudential and legal requirements, regulations and procedures (which may not necessarily be relevant or enforceable on a daily basis as applied by BAP Agree in day-to-day use). Meanwhile, HJAP meets the more stringent annual reporting requirements and features functions that are useful for the compilation, checking and submission of these accounts to regulators.

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

Thus Mr. Rebl suggested the following test design: using the latest annual accounts (at the time of conducting the test these were the 2013 annual accounts) and using the latest HJAP software (at the time of writing, 2.0.2013/5), a test bank loan of €200,000 can be booked as if it was a missed trade that had to be booked manually 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 undertaken by other bank customers. In other words, all other factors are controlled for. Meanwhile, since the software is designed to allow such a possibility, all standard procedures and regulations are applied and this manual entry function in no way overrides the system, but is a regular part of it. Since the bank loan can be entered into the HJAP system by the researcher after the end of 2013 in exactly the same way as a genuine, actual missed trade, as indeed happens on occasion with standard loans, this does constitute a realistic empirical test. This test design was adopted and the procedure was implemented as suggested by Director Rebl in 2014, using the audited accounts of 2013.

Appendix 1 shows the original audited and formally submitted accounts of Raiffeisenbank Wildenberg for the year 2013. Appendix 2 shows the same accounts after the simulation bank loan of €200,000 has been transacted via the same annual reporting bank IT software (HJAP). The summary accounts are shown (assets in Table 8 and liabilities in Table 9), whereby the first column represents the original 2013 annual accounts, the second column the new accounts after the loan has been added, and the third column shows the Difference items between the first two columns.

Table 8
Raiffeisenbank Wildenberg e.G.: Annual Accounts 2013, Assets.

Assets in EUR	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	24,266,899.94	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	188,977.92	
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

Table 9
Raiffeisenbank Wildenberg e.G.: Annual Accounts 2013, Liabilities.

Liabilities in EUR	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 of liabilities	51,049,504.92	51,249,504.92	200,000.00

In the assets listed in Table 8, 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 €200,000.

Considering liabilities in Table 9, we see that customer deposits (‘claims by customers’) increased by €200,000 (i.e. current account deposits – daily liabilities), as well as the balance sheet total. Thus we conclude that the variation in accounts before and after the loan has been extended is identical with the a priori expectation according to the *credit creation theory*. As no actual deposit (or reserve increase) took place, the *fractional reserve theory* is rejected. As customer deposits are shown on the balance sheet, the *financial intermediation theory* is also rejected.¹⁴

Mr. Rebl, himself a trained bank auditor, confirmed that standard procedures had been followed and no other transaction or operation was necessary to complete the booking of the loan and finalise the accounts.

4. Evaluation: Lack of rigour as a cause of confusion

The core activity of banking, what is commonly called ‘receiving deposits’ and ‘lending’, are in actual fact the creation and maintenance of accounting records and thus can be considered a form of applied accounting. However, this feature of banking has been unduly neglected in the treatment of banks and their impact on the economy by academic authors, whether in journal articles, books or text books.

There are three theories of banking, with differing claims about how bank accounting, and hence banking, operates. In this paper the results of an empirical test were presented, whereby a loan from a bank was booked in the bank’s accounting IT system under controlled conditions that excluded unrelated transactions. It is found that the *credit creation theory of banking* is consistent with the empirical observations, while the other two theories are not.

4.1. Flaws of the financial intermediation theory

The financial intermediation theory argues that banks are indistinguishable in their accounting from non-bank financial intermediaries (Tobin or others have argued that reserve requirements, regulations of interest rates, and capital requirements are the sole distinguishing feature of banks).

Stock brokers do not show their clients’ assets, even if invested by them on a discretionary basis, as part of their own balance sheets. The assets owned by mutual fund management firms and the assets of their

¹⁴ The test outcome is in line with the assessment by the Macmillan Committee (1931), which predicted what such a controlled experiment would yield:

“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).

fund investor clients are kept completely separately. Stock brokers’ assets are boosted by their own investments, but not those of their clients. Thus an insolvency of a stock broker or fund management firm 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 ahead of shareholders (although smaller amounts may be covered by deposit insurance schemes, which is a separate issue). However, due to the new Bail-In regime agreed by the G20 in 2010, depositors may rank below other creditors. Thus a comparative analysis of stock brokers (as representative examples of non-bank financial intermediaries) and banks reveals that banks are different from non-banks, because they do not segregate client assets (Werner, 2014c).

Since non-bank financial intermediaries, which can also gather deposits, have to follow the Client Money rules and keep customer deposits off their balance sheet, deposited safely with custodians, an equal treatment for banks would mean that banks would also have to conform to Client Money rules. As a result, bank deposits would not appear on the bank’s balance sheet. In reality they do, however, appear on bank balance sheets with their creation, contributing to the phenomenal growth in bank assets in the recent decades. Thus the critical distinguishing feature of banks is their exemption from Client Money rules and hence ability to control the accounting records of customers’ deposits, enabling them to add fictitious deposits when extending a loan (Werner, 2014c). A rigorous application of basic accounting and financial regulation would have provided ample notice to supporters of the *financial intermediation theory*, so dominant over the past half-century, that this theory has always been 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? Alas, it seems researchers in banking, finance and economics have woefully neglected basic accounting realities and easily observable facts.

4.2. Flaws of the fractional reserve theory

The fractional reserve theory maintains that banks are financial intermediaries that can only lend out money previously deposited with them. According to this theory, a prior customer deposit or an increase in reserves are the necessary step for a bank to be able to extend a loan, and this is effectively assumed to take the form of a cash deposit by a customer. This produces an excess cash reserve, which is then used to fund a loan. The borrower is then assumed to receive the loan in the form of cash, drawing down the excess cash balance.

As it turns out, 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’, on the implicit assumption that the loan is paid out in cash. But normally banks will not extend a loan to a customer who has not opened an account with the bank. Loan applicants typically first have to apply for a bank account. The due diligence and credit checks that are always applied before a loan is extended are usually linked to the vetting procedures for opening a bank account. Even borrowers that wish to receive their loan in cash will normally first have to open a bank account, and will first receive the loan as a credit in their bank account.

Let us therefore consider the standard case that the borrower receives the loan as credit to the borrower’s cheque account at the bank. We now revisit the scenario laid out by Paul Samuelson, receiver of the Swedish Central Bank Prize in Economic Sciences in Honour of Alfred Nobel: As shown in Table 10, Step 1, the receipt of the assumed cash deposit causes the accounting entries as shown by Samuelson. However, in Step 2, the bank customer receiving the loan causes a further increase in assets, as the loan contract is signed and acquired by the bank, and in liabilities, as the borrower’s account is credited with the sum of the loan (instead of the cash payment shown by Samuelson).

Table 10
Reconsidering Samuelson's description of the *Fractional Reserve Theory*.

Step 1: Receipt of new cash deposit of €202,000

Assets		Liabilities	
Cash reserves.....	+€202,000	Deposits.....	+€202,000
Loans and investments....	+€ 0		
Total.....	+€202,000	Total.....	+€202,000

Step 2: Extension of new loan of €200,000, but not in the form of cash

Assets		Liabilities	
Cash reserves.....	+€ 0	Deposits.....	+€200,000
Loans and investments....	+€200,000		
Total.....	+€200,000	Total.....	+€200,000

Total: Receipt of cash deposit, as shown by Samuelson, and extension of standard loan

Assets		Liabilities	
Cash reserves.....	+€202,000	Deposits.....	+€402,000
Loans and investments....	+€200,000		
Total.....	+€402,000	Total.....	+€402,000

As can be seen, the balance sheet lengthens further. It becomes apparent that the cash deposit of Step 1 is entirely irrelevant, and can be eliminated in an exposition of a bank's extension of loans. And then it becomes clear that Samuelson's example collapses to Step 2, which is identical with the *credit creation theory of banking*.

So by simply dropping the highly unrealistic assumption that loans are paid out in cash, we are back at the *credit creation theory*: the asset side expands by the amount of the loan (reflecting the loan contract) and so does the liability side, as the borrower's account is credited.

Samuelson based his exposition on a misleading and incorrect representation of bank procedures. In addition, his theory is inconsistent: while each bank is said to be just a financial intermediary, deposits with banks appear on the banks' balance sheet, although non-bank financial intermediaries, as discussed, do not own deposits by customers, and hence these cannot be shown on their balance sheet. Since however Samuelson shows the deposits on the bank's balance sheet, they cannot be a bailment or held in custody – off-balance sheet items – but are the property of the bank. This means that each bank is not a financial intermediary. Bank deposits, unlike deposits with non-banks, are merely a record of a loan to the bank. Thus a further inconsistency is that it is *a priori* not clear why customer deposits or reserves should be any constraint on bank lending as claimed by the *fractional reserve theory*: since deposits are a record of the bank's debt to customers, the bank is not restricted to lending only as much as its excess reserves or prior customer deposits allow. It can extend a loan and record further debts to customers, shown as newly created deposits (as the *credit creation theory* states).

So despite Samuelson's (1948) protestation that "A bank cannot eat its cake and have it too" (p. 325f), we see that in Table 10 (Total) the bank still has all its reserves and deposits at the moment it has granted the bank loan and credited the borrower's account. In other words, instead of being a necessary requirement as claimed by Samuelson's theory, the prior receipt of new funds is unnecessary in order for the bank to extend the loan. A careful examination of the relevant accounting and regulations involved should have made this clear to supporters of the *fractional reserve theory* and the many lecturers who over the past decades have been teaching economics using the Samuelson tract. The argument that the newly created deposit entry of the borrower will 'soon leave the bank' also does not change the results: in this case, in practice, the bank simply swaps a liability to the borrower (the newly created deposit) with a liability to a bank (the

bank of the receiver of the payment made by the borrower from their newly created deposit) or the central bank (e.g. in case new central bank promissory notes, a.k.a. paper money or bank notes, are ordered). In either case, the balance sheet total remains unchanged, in its lengthened form.

Thus the accounting representations of both the *fractional reserve* and the *financial intermediation theories of banking*, whereby each bank is considered an intermediary, are deeply flawed: either each lender is a bank and hence able to create money due to the very fact that it does not have to hold client funds outside the firm, or the firm is a financial intermediary and not a bank, in which case the client funds do not appear on the firm's balance sheet at all.

For over a century no proponent of the fractional reserve or financial intermediation theories seems to have ever thought through the accounting implications – and contradictions – of these theories. We conclude that a greater emphasis on bank accounting and a more careful consideration of its implications should have raised serious doubts about the theoretical viability and consistency of both the *fractional reserve* and the *financial intermediation theories* much earlier, even without our conclusive empirical test.

Given the above analysis we can confidently say that the *fractional reserve theory of banking* in its textbook application, including the 'money multiplier' approach, is wrong. This may explain why it has been quietly dropped in textbooks over the past decade or so.¹⁵ But the *financial intermediation theory of banking* is equally wrong, despite being supported by the many leading economists cited in the literature review above, who use it as the foundation of their work in this area, and for their policy recommendations.

4.3. Accounting for the steps after the loan has been spent

"Bank credit creation does not matter, since banks will gradually lose the deposits." – This argument is often used to defend the *fractional reserve* or *financial intermediation* theories. However, banking operates within a closed accounting system: Deposits are bank liabilities and thus can only stay bank liabilities, on the balance sheet of a bank, even after transfer. They are a record of what Bank A owes, and the creditor (in this case, ironically, the borrower of the loan) can re-assign this debt of Bank A to some other bank. But of course it stays the debt of bank A (see Werner, 2014c). So deposits 'lost' can only go to other banks, and thus become an inter-bank liability. In other words, once a deposit has been created and transferred to another bank (Bank B), in this instance the first bank (Bank A) has received a loan from Bank B. If the receiver bank B is willing to 'accept' the transfer of the deposit, this is equivalent to the receiver Bank B giving credit to the first Bank A. So the balance sheet of the first Bank A only reflects a swap of a 'customer deposit' for a liability to another bank. Sorting out and netting such interbank liabilities is the original *raison d'être* of the interbank market. As long as banks create credit at the same rate as other banks, and as long as customers are similarly distributed, the mutual claims of banks on each other will be netted out and may well, on balance, cancel each other out. Then banks can increase credit creation without limit and without 'losing any money'. This has been recognised even by supporters of the *fractional reserve theory of banking*: Samuelson (1948) mentions – though fails to emphasise – that banks do not lose any reserves when they all create credit at the same pace and have equally dispersed customers. It is a mystery why Samuelson did not recognise this as approximating the standard case, and instead chose to highlight a hypothetical and highly unusual special case where a bank will pay out a

¹⁵ Authors that had recognised the flaws in the fractional reserve theory include Charles Goodhart (1984): "The use of the money multiplier identity obscures, rather than illuminates..." (p. 199); Basil Moore (1988): "the notion of a money-multiplier identity is seriously deficient as an analytical concept" (p. 70); Richard Werner (2005): "...we conclude that the textbook representation of the actions of each bank is inaccurate" (p. 176).

loan in cash to someone who does not hold an account at the bank.¹⁶ It is even more mysterious why later editions of this most influential textbook dropped out this section on the netting of interbank liabilities and consequent money creation by the banking system without direct restraint from reserves.

5. Implications for bank regulation

The implications of our empirical findings are far-reaching for bank regulation and the design of official policies. Bank regulation is based on the prevailing understanding of the role of banks. During the past forty years when the *financial intermediation theory of banking* has been dominant, bank regulation has focused on capital adequacy. During the earlier thirty years or so, when the *fractional reserve theory of banking* was dominant, reserve requirements featured as the main way to regulate bank activity. Neither has been successful.

5.1. Regulation via reserve requirements

Bank regulation centred on reserve requirements was based on, and theoretically supported by, the *fractional reserve theory of banking*. It was found, however, that this regulatory policy was impracticable for central banks to operate (Goodhart, 1989). In this paper we have identified just why this had to be the case: the *fractional reserve theory of banking* is wrong. An analysis of bank accounting shows that banks' reserves with the central bank never leave the accounts of the central bank: like 'deposits' of the public with banks (which in reality are simply records of units of accounting money owed by banks to the public), 'reserves' by banks at the central bank are simply accounting records of money units owed by the central bank to the banks. Such indebtedness does not directly result in money circulating in the economy, except when it is due to a demand for legal tender cash (Ryan-Collins et al., 2011). To make central bank expansionary monetary policies more effective, it would thus be sensible to expand the role of cash – although, surprisingly, today central bankers are calling for its abolition (Haldane, 2015). As reserve requirements were not an effective policy tool, they have gradually been de-emphasised. Some central banks, such as the Bank of England and the Swedish Riksbank, have abolished reserve requirements altogether.

5.2. Regulation via capital adequacy

In parallel with the policy to de-emphasise reserve requirements in bank regulation, central banks, via their influence on the Basel Committee on Banking Supervision, have shifted towards regulating banks using capital ratios. This approach is predicated on the veracity of the *financial intermediation theory*, which had been increasingly supported by central banks. As financial intermediaries, banks cannot, individually or in aggregate, increase the money supply available as potential bank capital. Hence imposing capital requirements on banks appears to be a viable way to keep their actions within limits. The contradiction is that, if banks were only financial intermediaries, their actions could hardly have a significant macroeconomic impact in any case, rendering such regulation unnecessary. It seems, once again fundamental facts concerning banking have been overlooked.

In reality the money supply is “created by banks as a byproduct of often irresponsible lending”, as journalist Martin Wolf called it (Wolf, 2013). Thus the ability of capital adequacy ratios to rein in expansive bank credit behaviour is limited: imposing higher capital requirements on banks will not necessarily stop a boom-bust cycle and prevent the

subsequent banking crisis, since even with higher capital requirements, banks could still continue to expand the money supply, thereby fuelling asset prices: Some of this newly created money can be used to increase bank capital (Werner, 2010). This was demonstrated during the 2008 financial crisis.

5.2.1. How to create your own capital: the Credit Suisse case study

The link between bank credit creation and bank capital was most graphically illustrated by the actions of the Swiss bank Credit Suisse in 2008. This incident has produced a case study that demonstrates how banks as money creators can effectively conjure any level of capital, whether directly or indirectly, therefore rendering bank regulation based on capital adequacy irrelevant: Unwilling to accept public money to shore up its failing capital, as several other major UK and Swiss banks had done, Credit Suisse arranged in October 2008 for Gulf investors (mainly from Qatar) to purchase in total over £7 billion worth of its newly issued preference shares, thus raising the amount of its capital and thereby avoiding bankruptcy. A similar share issue transaction by Barclays Bank was “a remarkable story of one of the most important transactions of the financial crisis, which helped Barclays avoid the need for a bailout from the UK government”. The details remain “shrouded in mystery and intrigue” (Jeffrey, 2014) in the case of Barclays, but the following facts seem undisputed and disclosed in the case of Credit Suisse, as cited in the press (see e.g. Binham et al., 2013):

The Gulf investors did not need to take the trouble of making liquid assets available for this investment, as Credit Suisse generously offered to lend the money to the Gulf investors. The bank managed to raise its capital through these preference shares. Table 11 illustrates this capital bootstrapping (not considering fees and interest).

Table 11
How to create your own capital: Credit Suisse in 2008.
£bn.

Step 1: Loan to Gulf Investor
Assets

Loans and investments....	+ 7
Total.....	+ 7

Liabilities

Deposits.....	+ 7
Capital.....	+ 0
Total.....	+ 7

Step 2: Capital Raising: A Liability Swap

Assets

Loans and investments....	+ 7
Total.....	+ 7

Liabilities

Deposits.....	+ 0
Capital.....	+ 7
Total.....	+ 7

Since it is now an established fact that banks newly invent the money that is 'loaned' by creating it out of nothing, the loan to the Gulf investor created (in step 1) a simultaneous asset and liability on the bank's balance sheet, whereby the customer's borrowed money appears as the fictitious customer deposit on the liability side, of £7bn. Considering the same change in step 2, but now after the liability swap, we see that the newly issued preference shares boost equity capital: They are paid for with this fictitious customer deposit, simply by swapping the £7bn from item 'customer deposit' to item 'capital'. Credit Suisse is then able to report a significant rise in its equity capital, and hence in its capital/asset ratio. Where did the additional £7bn in capital come from? Credit Suisse had lent it to the investor, using its own preference shares as collateral, and hence had invented its own capital. The risk to the borrower was also limited if the Credit Suisse shares, not other assets, served as collateral.

As has been pointed out (Werner 2014c), in the UK such actions would be illegal, as they violate Section 678 of the Companies Act

¹⁶ In the words of Moore (1988):

“While an individual bank will gradually lose the primary deposits created by its loan, provided that it just keep pace with the rate of loan expansion of its competitors it will gain secondary deposits from the recipients of their borrowers, so that no net outflow of funds at clearing need result” (p. 68).

2006 (Prohibition of assistance for acquisition of shares in public company). However, the Swiss regulators were happy to tolerate this. The transgression is clearly graver in the case of a bank, compared to an ordinary firm lending to an investor to purchase the firm's shares: Credit Suisse had not merely lent a prospective shareholder the funds to buy its shares, but it created the funds out of nothing. A very similar transaction involving similar amounts and also Qatar as investor is alleged to have been undertaken by Barclays Bank in the UK, allegedly also involving an upfront 'fee' paid to Qatar of £322m, which could be a refund of the interest on the loan. The role of interest is a topic not discussed in detail in this article. In such a transaction, Barclays would likely need to charge interest on the loan, in order for it to appear as a regular deal. If the Gulf investor was acting as a strawman for what amounts to an internal accounting exercise to create the bank's own capital out of thin air, a part or all of this fee could have been the refund of the interest on the loan, so that the investor would not even have to pay interest for receiving the newly created money and with it the preference shares.

According to analysts at Italian bank Mediobanca, such bank loans to new bank share investors were a "fairly common practice... during the crisis", whereby Credit Suisse may have been unusual in disclosing this and obtaining regulatory approval. Either way, banks in this way created their own capital out of nothing, thus making nonsense of capital adequacy regulations.

We learn from this that under the right circumstances it is possible even for an individual bank to show almost any amount of capital to regulators. It is even more easily possible for the whole banking system collectively to do likewise, without directly contravening the Companies Act. Since during boom times an increasing amount of money is created by banks (hence the boom), some of that can be siphoned off by banks to bolster their capital by issuing new equity. The regulators seem unaware of this fact, as their descriptions of banking reveal them to be adherents of the erroneous *financial intermediation theory of banking*.

5.3. Empirically successful bank regulation

Having briefly discussed historically unsuccessful bank regulation, it remains to be stated that there is a form of bank regulation that has been empirically successful. Not surprisingly, this form of bank regulation was based on a recognition of the veracity of the *credit creation theory of banking*: Many central banks have successfully avoided banking crises for several decades by imposing regulations on banks concerning the quantity and allocation of bank credit. Known as 'credit guidance' or 'window guidance', such policies have also been at the heart of the high growth in the successful East Asian economies such as Japan, Korea, Taiwan and China (Werner, 2002, 2003, 2005). Using such guidance, bank credit for non-GDP (i.e. asset) transactions could be suppressed, so that asset bubbles and subsequent banking crises were avoided. When instead bank credit was guided towards productive use, high, stable and non-inflationary economic growth could be achieved, as the Quantity Theory of Credit (Werner, 1997, 2005) suggests. An alternative approach to avoiding asset bubbles and banking crises and stimulating high and stable growth has been demonstrated in Germany, where the structure of the banking sector – consisting largely of many small not-for-profit banks – produced this result.

6. Implications for development policies

The findings also have broader implications for policies to ensure economic growth and minimise unemployment, as well as policies for developing countries concerning the question of how to maximise sustainable growth.

As was noted above, the Keynesian growth models by Harrod (1939) and Domar (1947), following the *financial intermediation theory of banking*, argue that savings are necessary for investment and hence economic growth. These theories have, together with more recent

theories, been deployed by the IMF and the World Bank in their policy advice to developing countries to obtain the allegedly 'necessary' savings for investment and economic growth from foreign lenders, and to substitute for their lacking 'domestic savings'. The international banks usually came on the heels of the Washington institutions and, whenever a developing country had resources or attractive assets, were keen to lend.

As a result, a large number of developing countries, as well as transition economies and emerging markets have accumulated large amounts of foreign debt. This debt was invariably denominated in foreign currency and needs to be serviced at interest. This suggests that the sophisticated international banks felt that the developing countries are far better at hedging currency risk than they are.

This was not the case: since most of the indebted countries are commodity exporters, in the long-run (over a century or so) their terms of trade tend to fall (as the relative price of their exports declines over time compared to the relative price of their imports – since relative prices are a function of value added, with high value added exports over time becoming more expensive in relative terms and low value added exports becoming cheaper, see Prebisch, 1950, and Singer, 1950). Thus over time their currencies can be expected to decline, compared to the US dollar or European currencies. Therefore the advice to borrow in foreign currency was not in the interest of the borrowers. In domestic currency terms their foreign debt and payments to service them hence rose over time. Meanwhile, fixed exchange rate systems are not likely to remain sustainable, if there is substantial foreign borrowing, as the Asian crisis has shown.

The large and rising amounts of payments to service their foreign debt may explain what otherwise is a puzzle in economic theory, namely why international financial flows seem to be directed from poor countries to rich countries (theory predicts the opposite, due to the yield differential, see Lucas, 1990). As a result, a transfer of net resources from the less well-off countries to the rich countries has been taking place, putting the former ever more at the mercy of the latter. (As long as this process continues the residents of the less well-off countries have an incentive to vote with their feet, and migrate to the richer countries, if they are allowed to).

This article and Werner (2000, 2014b) have demonstrated that the justification for this approach to economic development is flawed. Worse, when considering the bank accounting reality of such international borrowing it emerges that it has been one cruel trick on developing countries: In many, if not most cases, the countries would have been better off by not borrowing from abroad at all. The foreign money never entered their economies: the accounting reality of international banking shows that US dollars stay in the US banking system, and euros stay in the European banking system. Bank money stays within the respective banking system of the currency of denomination. (This is also true for foreign currency accounts or mortgages offered by banks: in these cases, respective balances are recorded in accounts with overseas correspondent banks.) In other words, the dollars that created the 'Third World Debt' problem never even entered the borrowing countries. If and when such foreign currencies are exchanged by developing countries into domestic currency, they will merely result in an increase in credit creation by the domestic banking system, denominated in domestic currency. However, this is something any developing country can arrange for without the need to borrow from abroad at all (Werner, 2000, 2003a).

So the advice to borrow from abroad was largely against the interests of the developing countries: it exposed these countries to foreign currency risk, often resulting in mounting debt and interest outflows in excess of any loans received. But it triggered such 'solutions' to the problem as debt for equity swaps, handing over national assets to the foreign lenders. Bankers suggesting debt relief, such as Alfred Herrhausen, head of Deutsche Bank, were unpopular with their colleagues. To add insult to injury, it is now established that the foreign loans were not necessary for domestic growth, after all: the foreign

lenders merely created the money out of nothing through bank credit creation, something the borrowers could have done themselves at home without the foreign loans.

The alternative to this Washington Consensus approach to ‘aiding’ developing countries has been showcased in East Asia. The highly successful economies of Japan, Taiwan, Korea and China all used mechanisms to guide domestic bank credit to productive use, funding import substituting domestic and exporting industries, as discussed above in section 5.3. The findings in this paper provide fundamental support for this argument.

The findings are of equal relevance for developed economies. Countries such as Japan, Spain or Greece have been experiencing low nominal GDP growth. Applying the knowledge of bank credit creation to fiscal policy, an important lesson is that the method of funding government expenditure can have a significant impact on the effectiveness of fiscal policy. As Werner (2014a) shows, governments can enhance the degree of stimulation achieved by any given fiscal policy, if the source of government funding is changed from bond issuance to borrowing from banks. The latter expands the money supply and results in growth of nominal GDP and tax revenues.

7. Implications for economics

How is it possible that for the largest part of the past century erroneous and misleading theories have dominated the economics discipline? This is a topic for future research, and only two avenues will be briefly explored here: the role of research methodology, and the role of interested parties.

7.1. Methodology in economics

Classical and neo-classical economics, as dominant today, has used the deductive methodology: Untested axioms and unrealistic assumptions are the basis for the formulation of theoretical dream worlds that are used to present particular ‘results’. As discussed in Werner (2005), this methodology is particularly suited to deriving and justifying preconceived ideas and conclusions, through a process of working backwards from the desired ‘conclusions’, to establish the kind of model that can deliver them, and then formulating the kind of framework that could justify this model by choosing suitable assumptions and ‘axioms’. In other words, the deductive methodology is uniquely suited for manipulation by being based on axioms and assumptions that can be picked at will in order to obtain pre-determined desired outcomes and justify favoured policy recommendations. It can be said that the deductive methodology is useful for producing arguments that may give a scientific appearance, but are merely presenting a pre-determined opinion.

Werner (2005) argues that research in economics and finance should instead be based on a rigorous application of the scientific inductive methodology. This will ensure that empirically-based and scientific research is produced, which is far less prone to be influenced by prior political views of the authors than is the case with research based on the deductive methodology. Needless to mention, it is the inductive methodology that has led to the research presented in this paper.

7.2. Information management

Progress in economics and finance research would require researchers to build on the correct insights derived by economists at least since the 19th century (such as Macleod, 1856). The overview of the literature on how banks function, in this paper and in Werner (2014b), has revealed that economics and finance as research disciplines have on this topic failed to progress in the 20th century. The movement from the accurate *credit creation theory* to the misleading, inconsistent and incorrect *fractional reserve theory* to today’s dominant, yet wholly implausible and blatantly wrong *financial intermediation theory* indicates that economists and finance researchers have not

progressed, but instead regressed throughout the past century. That was already Schumpeter’s (1954) assessment, and things have since further moved away from the *credit creation theory*.

The analysis of the fractional reserve and financial intermediation theories in this paper and in Werner (2014b) provides indications that attempts were made to obfuscate, as if authors were at times wilfully trying to confuse their audience and lead them away from the important insight that each individual bank creates new money when it extends credit. An examination of his 1948 textbook suggests that Samuelson was more aware of the power of individual banks to create money than later authors, but he chose to distract from this fact with unrealistic special cases. But also Keynes did much to regress the discipline, with his followers Tobin and others spearheading the promulgation of the *financial intermediation theory of banking*, so that even the *fractional reserve theory* disappeared from sight, and banks became mere financial intermediaries also in aggregate. Many economists appear to have been aware of the fact that banks create money out of nothing, but chose to de-emphasise it, or even produce analysis that contradicts it. Joseph Stiglitz, whose textbook emphasises the fractional reserve theory, in 2003 conceded - only briefly and almost hidden at the very end of his co-authored book - that

“When a bank extends a loan, it creates a deposit account, increasing the supply of money. ... the creation of money and the creation of credit occur together”

(Stiglitz and Greenwald, 2003, p. 295).

Yet, this insight was not visibly applied in their book. Moreover, on the same page the authors appear to erroneously believe that this ability to create money is not unique to banks:

“Attempts to restrict banks may simply divert more of the credit creation activities to non-bank sources of credit”

(op. cit., p. 295).

That such important insights as bank credit creation could be made to disappear from the agenda and even knowledge of the majority of economists over the course of a century delivers a devastating verdict on the state of economics and finance today. As a result, the public understanding of money has deteriorated as well. Today, the vast majority of the public is not aware that the money supply is created by banks, that banks do not lend money, and that each bank creates new money when it extends a loan.

The question whether the sequential introduction of the incorrect fractional reserve and financial intermediation theories of banking – leading the student ever further away from the truth – was intentional or not requires further research. Such research should focus on the role of interested parties, especially that of internationally active banks, central banks and privately funded think tanks, in influencing academic discourse. It is worrying, for instance, that the topic of bank credit creation has been a virtual taboo for the thousands of researchers of the world’s central banks during the past half century. As Cheng and Werner (2015) show, among the 3882 research papers produced and made available online by five major central banking research outlets (Federal Reserve Board Washington, Federal Reserve Bank of New York, Bank of Japan, European Central Bank, Bank of England) in the two decades to 2008, only 19 articles even included the words ‘credit creation’. Of these, only 3 seemed to use the term in the correct sense of bank creation of credit and money. On the other hand, experienced central bankers aware of the importance of bank credit creation have spoken out about this topic after leaving the central bank (Kure, 1975; Werner, 2003a). Why have central banks – where the largest number of experts on this topic could be expected to work – singularly failed to even research this topic, let alone formulate and crystallise useful policy recommendations from it? A former central banker in a rare frank interview discusses this issue (Werner, 2003b, Ishii and Werner, 2003) and suggests that central banks have been engaging in ‘information management’, by purposely

controlling and shaping the research they publish. Senior staff approve the research topics and check, modify and censor articles written by the central bank researchers before delivering them to the public. In this process, what is considered a 'harmful truth' gets weeded out, while what is considered useful for the central bank remains. In other words, the publications of central banks must be considered biased. Considering these facts, one is left to wonder whether the actual goals of central banks are the right ones, and whether the research they publish is useful.

It is also a relevant subject of future research to investigate how central banks have exerted influence over the research conducted by academics. For instance, the Swedish central bank established a pseudo-'Nobel Prize' by awarding substantial sums of money to selected economists – none of them supporters of the credit creation theory of banking – and calling this prize the 'Riksbank [Swedish central bank] prize in economic sciences in honour of Alfred Nobel'. The fact that journalists would abbreviate this as a 'Nobel Prize' in their reporting of the award could neither have been a surprise nor unwelcome to the Swedish central bank, which lobbied for the involvement of the Nobel Foundation in the award of this prize. Through the award of this central bank prize, a particular branch of economics, usually based on the deductive methodology, received a significant boost internationally. It is noticeable that a number of authors implicated in leading the public away from the credit creation reality of banking have been receivers of this Swedish central bank prize (including Samuelson, Tobin and Krugman).

Meanwhile, investigative journalists have pointed out that the editorial boards of leading journals in economics and especially monetary economics are staffed by current or former employees of and consultants to central banks, particularly the US central bank.¹⁷

More research on the 'information management' policies of central banks, think tanks and even universities is called for.

8. Conclusion

In this paper the reason why bank regulation based on the *fractional reserve* and on the *financial intermediation theories of banking* have not been successful could be identified. On the other hand, having no bank regulation is also not likely to be successful, as the 2008 financial crisis has shown: Bank credit derivatives had been entirely unregulated on the advice of Alan Greenspan and other supporters of unregulated markets. They have since concurred with their critics that regulation would have been better. But what type of bank regulation is likely to be more successful?

In the era when the *credit creation theory of banking* was dominant, its proponents pointed out that bank credit creation and growth in economic activity are connected, and credit for different types of transactions has a diverging effect on the economy. They have thus favoured bank regulation that directly targets bank credit, both its quantity and its quality (i.e. the type of transaction that gets funded by bank credit), whereby economically desirable bank credit is encouraged, and economically harmful credit creation is forbidden or restricted quantitatively. The relationship between disaggregated bank credit creation on the one hand and nominal GDP growth, real GDP growth and asset prices on the other was identified by the Quantity Theory of Credit (Werner, 1992, 1997, 2005, 2012, 2013), which can serve to guide the direction of credit. In particular, guidance could be used to restrict credit for transactions that do not contribute to nominal GDP: such credit for financial transactions creates asset boom-bust cycles and instability in the banking system. Before the use of reserve requirements, capital adequacy or interest rate targeting became dominant in the second half of the 20th century, central banks focused more on controlling bank credit directly. This policy was pioneered by the Reichsbank in 1912, but has been tried and tested by most central banks sometime between the

1920s through to the 1960s (with some continuing the practise until the 1980s, such as the Bank of Japan and the Banque de France with their 'window guidance' and *encadrement du credit* techniques, respectively). Credit guidance has an excellent track record in achieving the targeted credit growth and sectoral allocation (Werner, 2005). This is especially relevant in the era of post-crisis monetary policy (see Lyonnet and Werner, 2012, Werner, 2013).

The fact that banks create credit and money out of nothing which, if used productively, results in non-inflationary growth, is important for developing countries. Often it will not make sense to borrow from abroad in order to stimulate domestic growth: the foreign money does not enter the economy, and the country gets ensnared in spiralling foreign currency debt, when actually the foreign banks just created the money out of nothing, something the developing country could have arranged for through its own domestic banks. It also has implications for the question of who should pay for bank bailouts, shifting the pendulum from burdening tax-payers towards central bankers (Werner, 2012).

The question why economics seems to have made no progress in the 20th century concerning a pivotal issue, namely the role of banks, is important and troubling. The thesis that conflicts of interest and indeed vested interests may have been at play (especially emanating from central banks and large banks) was discussed and requires further research.

Overall it can be said that one of the implications of this study is that it does not make much sense to build economic theories of the financial sector, if these are not based on institutional (and accounting) realities. The role of accounting and law in economics should 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), which have to be reconciled with those records of the banks. These are not only the "central settlement bureau, a kind of clearing house or bookkeeping centre for the economic system" (Schumpeter, 1934, p. 124), but also the creators and allocators of the money supply. The reflection of empirical bank reality within theories and textbooks surely must become the 'new normal' in finance and economics.

Finally, the confirmation of the results reported in Werner (2014b) further strengthens the call for a new, interdisciplinary research agenda on the role of banks and the central bank in particular, and the monetary system in general, which should be firmly rooted in the inductive, empirical research methodology to produce scientific economics. While many authors have proclaimed a continuous blurring of the division between banks and non-bank financial institutions, Werner (2014c) showed precisely what allows banks to create money (and capital) out of nothing, while non-banks are unable to do so. Interdisciplinary work with researchers in politics, law, accounting, management, operational research, information technology, engineering and systems research is called for to ensure that economics and finance on their own cannot continue to ignore empirical reality and embark on another lost century for economic sciences.

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