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The epistemology of money production

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Résumé : Comment savons-nous qu'aujourd'hui la monnaie est créée ex nihilo par le crédit bancaire ? Richard A. Werner prétend être le premier à l'avoir démontré empiriquement. Mais sa méthodologie, supposément fondée sur l'inductivisme, est confuse et peu convaincante. Surtout, son affirmation concernant la façon dont la monnaie est produite de nos jours n'est pas censée constituer une loi économique universelle mais la description d'un phénomène contextuel. Une autre méthode est nécessaire pour l'étayer, combinant théorie et observation empirico-juridique, comme le recommandait Ludwig von Mises et comme l'appliquent les économistes autrichiens.

Abstract: How do we know that nowadays money is created by commercial bank credit out of nothing? Richard A. Werner pretends to be the first to prove it empirically. But his methodology, supposedly based on inductivism, is confused and unconvincing. Above all, his claim on how money is produced nowadays is not supposed to constitute a universal economic law but the description of a contextual phenomenon. Another method is necessary to support it, combining theory and legal empirical observation, as recommended by Ludwig von Mises and applied by Austrians economists.

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Introduction

How is money created nowadays? And, above all, how do we know how it is created? Most economists state that money is produced mainly by way of bank credit (we focus here on commercial banks). But what is the epistemological status of this statement? By which method have they reached this knowledge?

This paper offers some answers by analysing Richard Werner's claim to be the first to demonstrate empirically that "*each individual bank creates credit and money out of nothing, when it extends what is called a 'bank loan'*" (Werner, 2014a). Werner identified three main theories of money production and claimed to prove that the correct one is the "credit creation theory of banking" (a vision close to the endogenous theory of money and the old Banking school¹) by taking a loan in a bank and observing the accounting operations resulting from it.

Werner is widely and positively cited in the economic literature² and gained popular recognition in Tucker Carlson's show in August 2025³. However, there has been little analysis of his method. Is an empirical test the most appropriate method to prove that money is nowadays created out of thin air mainly by way of credit? And is Werner's test methodologically robust?

Newman (2025) showed that the three theories Werner identified are not mutually exclusive and in fact describe different aspects of money creation by way of credit. He also showed that Werner's empirical test is methodologically dubious. But Newman did not take Werner's second test into account (Werner 2016) nor his additional comments Werner (2014b). Moreover, he did not take Werner's previous works into account where he stated – without empirical test – that banks create money *ex nihilo* by way of credit. And finally, Newman did not address Werner's explicit rejection of deductive methodology (especially hypothetico-deductive) and his focus on inductive methodology (Werner 2011).

The aim of this paper is to complete Newman's analysis on these aspects. It is not to deal in great details with the issue of how money is created nowadays, a subject already widely covered by the literature. Section one synthetizes Werner empirical tests. Section two comments on them. Section three proposes another way to support the statement that money is created by way of credit out of nothing, based on the Austrian methodology and theory of money. Section four concludes.

1. Werner's empirical tests

1.1. Three theories of banking

Werner published three articles on his empirical tests. The first described his first empirical test (Werner 2014a). The second added a few comments (Werner 2014b). The third performed a supplementary empirical test (Werner 2016).

His methodology is as follows. Werner argues that there is no consensus on how money is created nowadays. He states that the only way to know the truth is to perform an empirical test.

¹ The proponents of this theory argue, for example in a book co-authored by Werner, that "*the amount of credit that commercial banks can issue is not controlled by the central bank ; on the contrary, according to them, the quantity of central bank reserves that the central bank must lend to the commercial banks is determined by the latter*" (Ryan-Collins et al., 2012, p. 27).

² He is the inventor of the expression "quantitative easing" and the author of *Princes of the Yen* (2003).

³ One million views as of November 2025. <https://www.youtube.com/watch?v=StTKHskg5Tg>

He identifies three different views on this matter in the literature on banking. He deduces three potential empirical monetary outcomes of a concrete bank credit transaction. He performs each empirical test by taking a loan in a bank. He observes the results and concludes on which vision is correct.

The three theories of banking Werner identifies are the “financial intermediation theory, the “fractional reserve theory” and the “credit creation theory”. According to him, they are mutually exclusive. For each of them, Werner identifies the main authors who supported the theory (focusing on banks that do not issue bank notes⁴) and provides many quotes from them.

1.1.1. The financial intermediation theory

The financial intermediation theory states that “*banks are mere financial intermediaries that gather resources and re-allocate them, just like other non-bank financial institutions, and without any special powers*” (Werner 2014a, p. 2). This implies that “*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)*” (Werner 2014b, p. 71).

Werner claims that this view has been the dominant one since the late 1960s, thanks, among other factors, to the active support by most central banks. In his first paper in 2014, Werner indicates that this theory was supported by Keynes’ (in his *General Theory*), Gurley, Shaw, Tobin, Branson and many more recent authors⁵. In his 2016 paper, Werner adds the following authors: Riordan, Sheard, Cecchetti, Krugman, Admati.

He also mentions Mises: on one hand, Mises seemed to favour the financial intermediation theory⁶; on the other hand, Mises thought that banks could also function as creators of credit and money – paving the way for the fractional reserve theory, according to Werner; but how Mises’ view “*should be reflected in terms of bank accounting remains unclear and doubtful*” (Werner, 2016, p. 2).

1.1.2. The fractional reserve theory

The fractional reserve theory “*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’*” (Werner, 2016, p. 4). “*Individual banks cannot create credit, but only the banking system in aggregate*” (Werner, 2014a, p. 6). “*The banking system is ‘unique’, since banks, unlike other financial intermediaries, can collectively create money, based on the fractional reserve or ‘money multiplier’ model of banking. Despite their collective power, however, each individual bank is in this view considered to be a mere financial intermediary,*

⁴ Since “*during time periods when in the authors’ countries banks issued promissory notes (bank notes) that circulated as paper money, writers would often, as a matter of course, mention, even if only in passing, that banks create or issue money*” (Werner, 2014a, p.2).

⁵ Among which : Klein, Monti, Sealey, Lindley, Diamond, Dybvig, Eatwell, Milgate, Newman, Gorton Pennacchi, Bencivenga, Smith, Bernanke, Gertler, Rajan, Myers, Rajan, Allen, Gale, Santomero, Stein, Hoshi, Kashyap, Matthews, Thompson, Casu, Girardone, Dewatripont, Rochet, Tirole, Gertler, Kiyotaki, Mayer, Hellwig, Baltensperger, Goodhart, Carletti, Gale.

⁶ “*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, 1953, p. 262).

gathering deposits and lending these out, without the ability to create money” (Werner 2014a, p. 2).

According to Werner, this view was dominant between approximately the 1930s and the late 1960s. It started with Alfred Marshall in 1888 and became more dominant after the First World War thanks to authors like Phillips, Crick, Robertson, Lutz, Samuelson, and even (on some aspects) Keynes in his *Treaty on Money* (1930). In his 2016 paper, Werner adds the following authors: Culbertson, Aschheim, Warren Smith, Solomon, Paul Smith, Guttentag, Lindsay, Stiglitz, Whittlesey and Alhadeff. He also mentions Hayek, whose book *Monetary Theory and the Trade Cycle* (1933) “revealed him to be also a supporter of the fractional reserve theory of banking” (Werner, 2016, p. 4)⁷.

1.1.3. The credit creation theory

“Unlike the financial intermediation theory and in line with the fractional reserve theory it maintains that the banking system creates new money. However, it goes further than the latter and differs from it in a number of respects. It argues that each individual bank is not a financial intermediary that passes on deposits, or reserves from the central bank in its lending, but instead creates the entire loan amount out of nothing” (Werner 2014a, p. 2).

Werner claims that this view was dominant until about the mid- to late 1920s: it started with Henry Dunning Macleod’s book *The Theory and Practice of Banking* (1855) and was then supported by authors like Wicksell, Withers, Schumpeter, Moeller and Hahn. The early Keynes seems to also have been a supporter of this view, in his *Tract on Monetary Reform* (1924)⁸. According to Werner, this theory has recently experienced a revival after the Japanese banking crisis in the early 1990s and with the European and US financial crises since 2007. In his 2016 article, Werner adds the following authors: Cassel, Hawtrey, Davenport, Howe, James, Fisher, Benes, Kumhof, some post-keynesian writers (Rochon, Rossi and Moore) and three Austrian economists (Block, Hoppe and Hülsmann, 1998).

Werner argues that the controversy on which theory is correct has never been settled, which is detrimental not only for modelling the role of banks correctly within the economy⁹, but also for designing appropriate bank regulation¹⁰.

1.2. First empirical test

Werner claims to have implemented the first empirical study testing the three main hypotheses. His empirical test consists in examining a bank's internal accounting during the process of granting a bank loan and compare it with the expected accounting implications of each theory. The key aspect to check is whether, in order to grant the loan and record it in its account, the

⁷ Hayek “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” (Werner, 2016, p. 4).

⁸ “Keynes did little to enhance clarity in this debate, as it is possible to cite him in support of each of the three hypotheses, through which he seems to have moved sequentially” (Werner, 2014, p. 12).

⁹ “Banks have thus been dropped from economics models, and finance models have not suggested that bank action has significant macroeconomic effects” (Werner, 2014a, p. 12).

¹⁰ “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” (Werner, 2016, p. 14).

bank needs to withdraws the same amount from another account. If this is not the case, then the credit creation theory is supported and the two other theories are rejected.

In the credit creation theory, the bank needs to be able to “*credit the borrower's account with the loan principal without having withdrawn money from any other internal or external account, or without transferring the money from any other source internally or externally*” (Werner, 2014a, p. 12). Indeed, in this situation, “*when extending bank credit, banks create an imaginary deposit, by recording the loan amount in the borrower's account, although no new deposit has taken place (credit creation out of nothing). The balance sheet lengthens. Cash, central bank reserves or balances with other banks are not immediately needed, as reserve and capital requirements only need to be met at particular measurement intervals*” (Werner, 2014a, p. 12).

As regards the financial intermediation theory, the bank balance sheet should not lengthen as a result of the bank loan: the funds for the loan should be drawn from the bank's reserve account at the central bank.

As regards the fractional reserve theory, the bank would be supposed, in order to make the loan, to check its excess reserves: it cannot lend more money than its excess reserves, and it has drawn down the reserve balance to lend. If the bank was found not to have checked or not to have drawn down its reserve balances, this would “*constitute a rejection of the fractional reserve theory*”.

Werner indicates that it was not easy to find a bank willing to participate in this test. Large banks in the UK and Germany declined the offer. A small bank in Germany with eight full-time staff finally accepted. Werner borrowed €200,000 on 7 August 2013. All the bank's bookkeeping operations were scrutinized. The whole operation was filmed, and the screens of the bank's internal IT terminal were photographed.

The overall credit transaction until funds were available in his account, took about 35 min. Werner noticed that the funds were credited to his account immediately; the bank's reserves did not change; the staff did not ascertain the available deposits or funds within the bank; they did not give instructions to transfer funds from various sources to the borrower's account; the balance sheet expanded by the same amount as the loan, once the other transactions of the day were subtracted.

According to Werner, the fact that the bank did not transfer the money away from other internal or external accounts leads to reject both the fractional reserve theory and the financial intermediation theory. And the fact that the bank created the funds by crediting the borrower's account with deposit, although no such deposit had taken place, is in line with the credit creation theory.

Werner concludes that “*it can now be said with confidence for the first time— possibly in the 5000 years' history of banking - that it has been empirically demonstrated that each individual bank creates credit and money out of nothing, when it extends what is called a 'bank loan'. The bank does not loan any existing money, but instead creates new money. The money supply is created as 'fairy dust' produced by the banks out of thin air*” (Werner, 2014a, p. 16).

Werner added some comments regarding his test in a second article in the same journal issue. He stated his conclusion more clearly: “*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*”. (Werner, 2014b, p. 71),

1.3. Second empirical test

Werner (2016) explains that his first test did not allow a fully controlled environment, as it was a “live” empirical test of a bank in operation. Since, thanks to modern IT, bank operations are taking place virtually 24 hours a day, it was not possible to be sure that there was no interference during the test due to other transactions taking place during the same time period.

That is why a second test was performed as a robustness check, testing the three theories of banking in a fully controlled environment, without the potential interference from other transactions. Using the relevant banking software, Werner and the bank simulated a bank loan transaction of the same amount as in the first test (€200,000) and the bank booked it as if it was a real transaction.

According to Werner, the result of the test is consistent with the prediction of the credit creation theory: the total balance sheet of the bank, the assets (claims on customers) and the liabilities (claims by customers, i.e. current account deposits) all have increased by the loan amount. The two other theories are rejected: the fractional reserve theory, since no actual deposit (or reserve increase) took place, and the financial intermediation theory, as customer deposits are shown on the balance sheet (Werner, 2016, p. 12).

2. Comments on Werner’s empirical tests

2.1. Internal inconsistencies

First, Werner claims that the three theories he identified are mutually exclusive (and several authors have used his typology afterwards¹¹). But there are not, as Newman (2025) shows. Each one describes a different aspect of the system, a different situation in a different context¹². As a result, as he explains, one should not try to guess which one is right or wrong but which one is the most explanatory, the most comprehensive, giving us the most accurate vision of the reality (and, as he demonstrates, it is the fractional reserve theory). Other authors have criticized Werner’s typology in similar ways¹³.

Second, the way Werner defines these three theories is debatable. For example, as Selgin (2024, p. 11) explains, “*no subscriber to the Intermediary theory doubts that bank lending involves the “writing up” of deposit credits*”¹⁴. Presenting the intermediation theory other way would be caricatural and Werner is “*an especially egregious example of this*”: his presentation allows him to pretend “*to establish for the first time (...) something that few economists can ever have doubted*” (the fact that a bank can credit the borrower's account without having withdrawn money from elsewhere).

¹¹ For example: Ábel et al. (2016), Gross and Siebenbrunner (2019), Bossone (2025).

¹² “*The financial intermediation view looks at one depositor, one bank, and one borrower. The fractional reserve view looks at what happens when another bank receives funds borrowed from the original bank and then makes another loan—multiple depositors, multiple banks, and multiple borrowers are in view. (...) the credit creation view has the narrowest field of vision—it only looks at the extension of a loan*” (Newman, 2025).

¹³ For example, Ravn (2022, p. 12): “*the three theories derive from historically extant monetary regimes; they remain relevant in the proportion that historical or contemporary economies contain these elements; and hence, they should not be discarded as falsified, as Werner’s otherwise decisive experiments could lead us to conclude*”.

¹⁴ Also: “*although banks are money creators, they are also intermediaries. Arguments that assume that banks must either be one thing or the other are fundamentally unsound*” (Selgin, 2024, p. 43).

Third, Werner claims that if the bank can lend money without withdrawing money from any other account, or without getting it from any other source, this would prove that it can create the loan out of nothing. But, as Newman (2025) shows, this can be the case in each of the three theories, depending on additional external factors that, unfortunately, Werner does not take into account: the bank's policies regarding withdrawal demands, interbank clearing, reserves rate, borrowers selection, etc. For example, Werner limited his own experimentation by promising that he would immediately repay the loan; this allowed the bank to not care about reserves, withdrawal demands or interbank clearing¹⁵ (this problem was noted by other authors¹⁶). As a result, Werner's proposed factor does not test the theories, contrary to his claims¹⁷.

As Newman (2025) concludes, "*Werner's experiment is dubious at best. He strawmanned the alternative theories and set up the experiment in such a way that only his preferred theory would be confirmed*".

2.2. Induction or deduction?

According to Werner, if the debate on how money is created has still not been settled, and if economists cannot agree on this important issue, it is likely because of "*the methodology dominant in 20th century economics, namely the hypothetico-deductive method. Unproven 'axioms' are 'posed' and unrealistic assumptions added, to build a theoretical model. This can be done for all three theories, and we would be none the wiser about which of them actually applied*". This is why, according to him, "*the only way the facts can be established is to leave the world of deductive theoretical models and consider empirical reality as the arbiter of truth, in line with the inductive methodology. In other words, it is to empirical evidence we must turn to settle the issue*" (Werner, 2014a, p. 12).

In 2011, he already argued in favour of the inductive methodology, criticizing the dominant economic models for not including any realistic role for money and banking ("*money-less and bank-less macroeconomics*"), due to "*the prevalence of the hypothetico-deductive approach, which places little emphasis on empirical facts*" (Werner, 2011, p. 26). In this article, he accuses the dominant deductive methodology to be suited to manipulation or political abuse and argued that "*the sciences use the inductive methodology, and there is no good reason why economics should not also*". He claims that banks' creating money is "*an institutional quirk*" that cannot be detected by deductive economics but only by careful empirical observation (Werner, 2011, p. 33).

Five comments can be made on this.

First, Werner has done two empirical tests. Real inductivism would require more empirical observations. And even if had performed more tests, how could he be able to generalize his results to all the economy (as per Hume's classical argument against induction).

¹⁵ Ironically, as Newman (2025) discovered, Werner conveniently removed from a quote by Samuelson an excerpt explaining that if people receiving money from the bank promised not to cash their check, the bank "*could buy all it wants to without losing any cash*".

¹⁶ For example Vivian and Spearman (2016, fn.17, p. 27): "*Werner's field study to demonstrate that banks create money out of nothing is not an accurate reflection of the actual process of granting a personal loan (...); Werner's experiment does not involve any intended expenditure. The standard loan process therefore remains incomplete*".

¹⁷ In his second test, (Werner, 2016) tries to neutralize the potential influence of other transactions on the test (which answers indirectly another criticism of Newman as regards the first test) but the same observation is valid: the parameter he proposes to test the theories is in fact not sufficient to test them.

Second, Werner states that his two empirical papers have rejected the “*axiomatically deduced financial intermediation and fractional reserve theories of banking*” (Ivanov, Werner, 2023, p. 5). But if these two theories are axiomatically deduced, the proper way to refute them is not to test them empirically but to prove theoretically that they are wrong. As Mises (1998, p. 66) explained: “*From the unshakable foundation of the category of human action praxeology and economics proceed step by step by means of discursive reasoning. (...) With regard to the results thus obtained only two attitudes are possible: either one can unmask logical errors in the chain of the deductions which produced these results, or one must acknowledge their correctness and validity*”.

Third, in Werner’s 2014 and 2016 articles, does he really follow an inductive methodology, as he pretends? He identifies three theories; he formulates three testable predictions; he designs an experiment; he tests his predictions; he uses the results to rule out two of the three theories. This looks like more Popperian falsificationism and hypothetico-deductivism than induction.

Fourth, this is paradoxical, as in his previous works, Werner never proposed to test falsifiable predictions based on theories. He always supported the credit creation theory based on a kind of axiomatico-deductive method.

In 2005, he stated that “*contrary to the standard depiction of the credit creation process in most textbooks, each individual bank creates credit and money when it extends a loan*” (Werner, 2005, p. 177). And he supported this claim not by collecting empirical data but by combining definitions, logical deductions and theoretical examples¹⁸.

In 2012, he did the same in a co-authored book, by stating and explaining how “*new money is principally created by commercial banks when they extend or create credit, either through making loans, including overdrafts, or buying existing assets. In creating credit, banks simultaneously create brand new deposits in our bank accounts, which, to all intents and purposes, is money*” (Ryan-Collins et al., 2012, p. 24).

Even in 2014, in his second article where he comments on his first empirical test, Werner reconstructs the credit creation view by using a theoretical approach combined with an analysis of accounting regulations applicable to banks. In this way, arguably more axiomatico-deductive than inductive, he finds 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’*”. (Werner, 2014b, p. 77).

In 2016, he acknowledges that theoretical accounting analysis is sufficient to rule out some theories on banking and money, implicitly demonstrating that there is no need for inductivism. He explains that “*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. (...) There are three theories of banking, with differing claims about how bank accounting*”. As a result, “*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*” (Werner, 2016, p. 12) (see Section 3.2 on the content of his accounting analysis).

¹⁸ For example : “*What makes this ‘creative accounting’ possible is the other function of banks as the settlement system of all non-cash transactions in the economy. If they so wish, they can extend loans to agents not in the form of withdrawals of funds from elsewhere in the financial system, but by creating the accounting fiction that the borrower has deposited sums with the banking system*” (Werner, 2005, p. 179).

In all these works, Werner used logical deductions based on explicit definitions of concepts, combined with an analysis of accounting methods and financial regulations applicable to banks. Contrary to what he claims, this method looks more like axiomatico-deductivism than anything else. It may mean that, contrary to what he explained, his tests were not necessary, because this is not the kind of knowledge one reaches through empirical testing.

Fifth, more generally speaking, what is at stake (*ex nihilo* money creation by bank credit) is not a universal economic law. The issue is to reach the most accurate description of the situation in a specific context, including specific types of organizations, specific law and regulation, and specific accounting.

3. Another way to support the claim that money is created by way of credit out of nothing

3.1. Aprioristic theory and the interpretation of historical phenomena intertwined

3.1.1. Overview

Some commentators of Werner's work have denied his conclusion, explaining that money is not created out of thin air. For example, Rendahl and Freund (2019) explain that "*banks do not create money out of thin air. From an economic viewpoint, commercial banks create private money by transforming an illiquid asset (the borrower's future ability to repay) into a liquid one (bank deposits); they would quickly be insolvent otherwise*".

Selgin (2024) also criticizes what he calls the "Thin Air Theory". He recalls that borrowers tend to spend the money they borrowed, and that the banks who receive the lending bank's IOUs tend to return them for payment. If the lending bank keeps granting loans without having any reserves or borrowing any funds for the settlement, it will not remain in business very long¹⁹. In this sense, according to him, it is misleading to pretend that commercial banks create money "out of nothing": they need to have or borrow some funds. This is a kind of intermediation where the intermediary sometimes arranges the loan before funding (a common practice in banking, though, for example, last-minute wholesale funding).

But here we will focus on the proponents of the idea that banks create money out of nothing by way of credit.

To understand the link between commercial banking and money creation, several steps are necessary. Any analysis of the system prevailing nowadays must rely on a correct theory of money, banking and State interventionism.

Four elements can be distinguished.

First, define concepts in a precise manner. That is what Mises (2009) did by making a difference between "money in the narrow sense" (including commodity money, credit money and fiat money) and "money in the broad sense", including money substitutes (money certificates and fiduciary media). Mises also insisted on the difference between "commodity credit" and "circulating credit". Based on these definitions, it can be argued that "*banks cannot create*

¹⁹ "To appreciate how bank lending must usually be funded by real savings, it's necessary to go beyond recognizing that banks don't require such savings to credit borrowers' accounts with their loan proceeds. One must understand what happens after they do this, and that means understanding how payments are accomplished using bank deposits" (Selgin, 2024, p. 12).

money” (Hülsmann, 2000) but in this paper we use the term money in the broad sense, including money substitutes.

Second, describe how money and banking would be produced in a free market, without any intervention by the government or a central bank, as Rothbard (1990, 2008) does. A key aspect is the two essentially different and separated banking activities: on one hand, the custodian business; on the second hand, the financial intermediation business – or *deposit banking* and *credit banking*, as per Hülsmann (2000).

Third, describe theoretically what happens when the government interferes with these natural mechanisms. That is what Huerta de Soto (2006) does, in addition to Rothbard (1990, 2008). In particular, the confusion between the two types of banking, combined with special privileges granted by the government, allow banks to create money. In this situation, various actors think they have a legitimate claim on the same monetary asset at the same time.

Fourth, observe the historical evolutions and the current situation in terms of institutions, law, banking regulations, accounting obligations, etc. and analyse to what extent they correspond to the characteristics observed at step three (monopoly of notes issue, legal tender, emergence of central banks, etc.). That is what Hülsmann (2008), Rothbard (1990, 2008) and Huerta de Soto (2006) do. One key aspect is the legal privileges granted to banks in terms of accounting obligations, compared to other financial institutions that extend credit to their clients.

The integration of all these elements leads to understand that, nowadays, money (fiduciary media) is created bank through credit. In terms of methodology, the analysis combines, on one hand, elements of praxeology (axiomatico-deductive method to build a correct theory of money and banking) and, on the other hand, historical observations on the legal and institutional context and its evolution.

This is what Mises (1998, p. 66) explains: “*Economics does not follow the procedure of logic and mathematics. It does not present an integrated system of pure aprioristic ratiocination severed from any reference to reality. (...) It does not strictly separate in its treatises and monographs pure science from the application of its theorems to the solution of concrete historical and political problems. It adopts for the organized presentation of its results a form in which aprioristic theory and the interpretation of historical phenomena are intertwined*”.

3.1.2. The example of Rothbard’s presentation in *The Mystery of Banking*

This method is followed by Rothbard (2008) who incorporates theory, history, accounting and law to show that nowadays, commercial banks create money out of nothing because “*modern banking mixes and confuses two different operations with different effects: loan and deposits*” (p. 75).

His demonstration can be synthetized in four main steps.

First, Rothbard describes two theoretical models of banking: “loan banking” and “deposit banking”.

Loan banking (or “intermediary-banking”) channels savings into loans: the bank borrows money (in addition to raising funds from its owners) and channels these resources into productive loans. This is non-inflationary: no money is created. Loans are only tapping savings from the existing money stock. In the bank’s balance sheet, total assets increase only by the amount of the expected interests (as does equity, on the liabilities side); and the assets structure is modified by decreasing cash and adding IOU from the borrower for to the amount of the loan plus interests. Historically, loan banking began in Venice in the late Middle Ages and developed

in England in the early seventeenth century with the “scriveners” (who were replaced by more advanced forms of banking by the beginning of the eighteenth century) (p. 75-84).

Deposit banking is a money safekeeping service. The depositor is charged a fee for the safeguarding service. He receives warehouse receipts. These receipts can be – and have been – used as money by transferring them directly as a surrogate for the deposited gold coins. Deposit banking is noninflationary. No money is created. Deposits do not show up in the bank’s balance sheet. They remain the property of the depositor. They are not a loan to the bank but a bailment. The depositor is not the bank’s creditor. The bank does not owe him money. The depositor can redeem it any time. Deposit banking is older than loan banking: it emerged in ancient Greece and Egypt, and developed in the early thirteenth century in Damascus, in the fourteenth century in Venice, and in the seventeenth century in Amsterdam and Hamburg (p. 85-87).

Rothbard insists on the conceptual difference between these two forms of banking. In loan banking, there is a *credit transaction*, i.e. the exchange of a present good (the loan) for a future good (an IOU). The money is due at some future date. The debtor must pay an interest premium since present goods are more valuable than future goods. In deposit banking, there is a *claim transaction*. The depositor may present the ticket and claim his funds not at some precise date in the future but anytime he wishes. He pays the bank a fee for this service (p. 87).

Second, Rothbard shows that the logical and natural difference between loan banking and deposit banking was artificially broken by a series of judicial decisions, paving the way for money creation through fractional reserve banking.

In a warehouse activity, there is a natural temptation to embezzle the deposited goods (appropriating them fraudulently to one’s own use). It is even more so with fungible commodities since the depositor may want to recover a certain quantity and kind of product, not the specific objects he deposited. Instead of using the goods, the warehouseman may be tempted to print fake warehouse receipts. The temptation may logically be even greater as regards money deposits, since money certificates can play exactly the same role as money proper. The deposit bank may be tempted to lend out some fake money certificates in excess to the deposited funds, as the goldsmiths did in England. The bailment law was late in addressing this problem. As regards grain warehousing, the law finally clarified (in a logical way) that the warehouseman is a bailee, not a debtor, thus prohibiting embezzlement. But as regards deposit banking, a series of judicial decisions in England concluded the opposite: a money deposit is a debt, not a bailment. The redemption is due as a supposed debt, albeit instantly on demand²⁰ (p. 90-93).

These judicial decisions implies that a money deposit becomes the property of the bank. The banker may use it as he wishes. And this deposit can now take its place in the balance sheet of the bank. From this point, there are two possibilities. If the bank does not extend any loan, the deposit is recorded in the assets and liabilities of the bank and no money is created: the warehouse receipts circulate as currency equivalents, fully backed by the deposit (100 percent reserve banking). But if the banker issues and lends out fake warehouse receipts in addition to the ones he rightly issued for the deposits, “*the deposit banker has suddenly become a loan banker*” (p. 96). Except that he has not channeled any existing savings into loan. He has created money. This process of fractional reserve banking is inflationary. The money supply has increased. The balance sheet of the bank has increased by the amount of the credit. IOUs have been recorded as assets; additional warehouse receipts have been recorded as liabilities and are

²⁰ *Carr v. Carr* (1811), *Devaynes v. Noble* (1816), *Foley v. Hill and Others* (1848).

part of the money supply²¹. The process is the same whatever is considered as money (gold, government fiat paper money, etc.) and whatever the form of money warehouse receipts (bank notes or demand deposits). As a result, modern commercial banks engage in a mix between deposit banking and loan banking, which allow them to create money, contrary to investment banks (p. 94-110)²².

Third, Rothbard shows that, in a free banking system, there would be natural limits to money creation by fractional reserve banking.

If banks are treated like any other business, without any specific regulation, they must pay their debt or be declared insolvent. They are free to engage in fractional reserve banking but they must promptly redeem their notes or demand deposits on demand. In that case, four factors may limit their credit expansion: i) the need to build trust over the years as a prerequisite; ii) the extent to which people are willing to use bank notes and deposits (vs gold or government paper); iii) the risk of bank runs; iv) the limited clientele of each bank. The fourth factor (the “redemption weapon” depending on the existence of bank competition) is a major reason why, according to Rothbard, “free banking” would be little inflationary²³. Banks could suppress this constraint by forming a cartel to decrease the redemption pressure and act as if only one bank existed. But, as Rothbard shows, such cartels would be unstable and would be unlikely succeed (p. 111-124).

Fourth, Rothbard shows that central banking is a cartelizing device imposed by the government to remove the natural limits to money creation by fractional reserve banking²⁴.

With a central bank granted with the monopoly privilege for issuing bank notes or cash (usually made legal tender for all debts in money), “*the more the public is willing to hold checking accounts rather than cash, the greater the inflationary potential of the central banking system*” (p. 132) (because the increasing deposit/ratio of the banks is allowing them to expand their loans and issue new deposits). Moreover, the central bank plays a role of lender of last resort that decreases the risk of bank run on commercial banks. Finally, commercial banks can expand their loans without fearing excessive redemption requests by other banks, since “*under central banking, all banks can expand together, on top of new reserves that are pumped in, across the board, by the benevolent Central Bank (...). The redemption of each will cancel the other redemption out*” (p. 133). They can do it in the proportion of the money multiplier, which is the inverse of the minimum reserve requirement (p. 125-139).

²¹ “Where did the money come from? It came – and this is the most important single thing to know about modern banking – it came out of thin air. Commercial banks – that is, fractional reserve banks – create money out of thin air” (Rothbard, 2008, p. 98).

²² “In contrast to the commercial bank, whose deposit liabilities exchange as equivalent to money and hence add to the money supply, the liabilities of the investment bank are simply debts which are not “monetized” by being a demand claim on money” (Rothbard, 2008, p. 107).

²³ “Free banking, even where fractional reserve banking is legal and not punished as fraud, will scarcely permit fractional reserve inflation to exist, much less to flourish and proliferate. Free banking, far from leading to inflationary chaos, will insure almost as hard and noninflationary a money as 100 percent reserve banking itself” (Rothbard, 2008, p. 117).

²⁴ “The Central Bank functions as a government cartelizing device to coordinate the banks so that they can evade the restrictions of free markets and free banking and inflate uniformly together. The banks do not chafe under central banking control; instead, they lobby for and welcome it. It is their passport to inflation and easy money” (p. 134).

3.2. Werner's disordered intuitions

Werner has identified some of elements of these steps, but he does not always conceptualize them rigorously and he does not integrate them in a consistent way.

For example, he seems to grasp the difference between commodity credit and circulating credit in Mises' sense, but without formulating the concepts²⁵.

Likewise, he identifies the current confusion between two essentially different activities of banking, but without explaining where it comes from²⁶.

Finally, he identifies the key legal and accounting specificity of banks that allow them to create money (and pretends to be the first one to do so²⁷). Comparing banks and other kinds of firms, he concludes that banks *"do not just grant credit, they create credit, and simultaneously they create money"*. He correctly states that *"no law, statute or bank regulation explicitly grants banks the right (usually considered a sovereign prerogative) to create and allocate the money supply"* Werner (2014b, p. 72-75). He shows that this ability comes from the fact that, contrary to other financial firms, thanks to their banking licence, they are not subjected to the Client Money Rules (requiring 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)²⁸.

Rothbard and Huerta de Soto have presented all these elements and many others in a more systematic and rigorous way. But Werner' does not mention them in his massive literature review on banking and money (2014a, 2014b, 2016). It is all the more regrettable given that he mentioned these authors in the book he co-authored a few years earlier (Ryan-Collins et al., 2012)²⁹.

4. Conclusion

Werner's methodology is confusing, not only because his empirical tests are weakened by various internal inconsistencies. He claims that, to solve the age-old debate on banking and money, it is necessary to reject the dominant hypothetico-deductive method and adopt inductivism. But his claim to refute axiomatic deductions by an empirical test is contradictory.

²⁵ *"The standard use of the concept of lending implies that an item is physically removed from use by A and instead transferred to the use by B. Lending thus describes a transfer, a diversion of an existing commodity to the exclusive use somewhere else. Given the laws of physics, this usage is only natural. However, the credit extended by banks does not remove purchasing power or claims on resources from anywhere else in the economy. Therefore, strictly speaking, it cannot be described as 'lending'. Banks do not lend money, they create it"* (Werner, 2005, p. 176).

²⁶ *"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"* (Werner, 2014b, p. 72).

²⁷ *"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"* (Werner, 2014b, p. 72).

²⁸ *"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"* (2014b, p. 75).

²⁹ Huerta de Soto is mentioned for a *"thorough ranging review"* of fractional reserve banking (ftn. 67) and, along with Rothbard, on fraud committed by the goldsmiths (ftn. 69).

Moreover, his empirical tests look more in line with the hypothetico-deductive method. And, paradoxically, his previous works on this issue seem to rely on a form of implicit axiomatico-deductive method.

However, *ex nihilo* money creation by way of commercial bank credit is not a universal law of human action. It is a contextual phenomenon, a mechanism taking place in a specific time and a specific institutional and legal context. That is why supporting this vision does not require any empirical test but a combination of theory and empirical legal observations, as Mises recommended and as Rothbard did, for example, in *The Mystery of Banking*. His approach is more comprehensive, as it takes into account the history leading to the current context and the role of specific organizations and practices such as central banking.

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