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A FUNCTIONAL ANALYSIS OF THE BANKING INDUSTRY

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Abstract: This paper proposes a functional analysis of input, output and capital of the banking sector in an endogenous money framework with the aim of determining the aggregates on which to calculate the bank profit rate. Although banks create bank money, State money is not producible by banks, which need it as an input. Deposits are the cheapest source of central bank money already in the system, so it can be argued that deposits are inputs to the banking industry.

Assuming that loans are the banking output, we investigate what role regulation plays in defining a banking production technique. The framework developed from Basel Accords imposes a level of equity proportional to the level of risk-weighted bank assets. Thus, a bank capital-to-output ratio defined by these rules is conceivable.

Keywords: Bank; deposit; capital; input-output analysis; post-Keynesian approach; MMT.

JEL: E510; E120; G210.

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INTRODUCTION*

The aim of this essay is to analyse the banking industry, investigating its functional structure through the use of categories such as input, output and capital, which are necessary in any type of industry, and determining the aggregates on which to calculate the bank profit rate.

The question is not simple, as evidenced by the review of studies on the subject (within neoclassical theory), with very different positions, reported by Hancock 1985, p. 192:

“Deposits have been regarded as inputs, being the base on which loans are made. These earning assets, either in unweighted or weighted form, are then classified as outputs (Sealey and Lindley 1977; Sealey 1980; Murray and White 1983; Clark 1984). Using a profit function, total loans constitute output in Mullineaux (1978). On the other hand, banks are argued as providing deposit services, the latter then being classified as outputs, either in dollar terms (Pesek 1970; Towey 1974) or in number of accounts (Horvitz 1963). A third approach is to treat both deposit and loan services as outputs (Benston 1965; Bell and Murphy 1968).”.

And again Klein, 1971, p. 205:

“Neoclassical microeconomic analysis is rarely invoked to explain bank behavior, primarily because there is so little agreement even as concerns fundamental concepts. For example, do stock or flow variables measure the relevant concepts of bank output and input? If neither input nor output can be appropriately defined it becomes presumptuous to speak of a production function relating the two.”.

We proceed to a functional examination of the category of deposits, which seem to constitute the input of the banking industry, although this may not appear immediately evident in a theoretical context such as that of endogenous money. A suggestion in this direction, moreover, derives from the idea of the *pyramid of liabilities*, shared in the post-Keynesian sphere and in particular by the Modern Monetary Theory (MMT) school. The liabilities of the central bank, i.e. simplifying State money,¹ constitute the input of the banking industry. This State money constitutes the liquid reserves held by the banks at the central bank, as well as the coins and banknotes circulating in the economic system. By means of customer deposits and liquidity loans from the central bank, banks are supplied with this input. Thus, customer deposits seem to fall into the input category, subject to some important clarifications and *caveats*. Therefore, they should not be considered as capital for the purpose of calculating the bank profit rate.

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¹ To be precise, the central bank's money does not necessarily belong to a state, as it is in the EU, for example. This topic is discussed on page 5.

The next step in the functional study of the banking system is to explore the notion of capital and what determines the amount of capital required. Regulation has a very important role in determining that.

Unlike other real manufacturing sectors, the amount of capital required for banking is governed by laws and regulations that set minimum requirements, proportional to risk-weighted assets. These define the industry's dominant "capital-to-product ratio" for each level of risk. Less capital than required by law would be sanctioned (although profitable), while more would be less profitable.

In addition, it is necessary to take into account the peculiarities of the banking sector, where only *own capital* is considered as *capital* for the calculation of the profit rate (thus excluding *debt capital*, as bank bonds, unlike the real productive sector).

In the first section the functional analysis of the banking sector is carried out, while the second investigates the relationship between capital, "banking production technique" and legal regulations. In the third section the role of bank bonds is explored. The conclusions follow. Appendix A, B, C offer some tables to better explain some of the reasoning in the text.

1 DEPOSIT AS AN INPUT

There are two main schools of thought on the functioning of the monetary system. The first assumes that the quantity of money depends on the supply of money and is determined *exogenously* with respect to the system (*exogenous money theory*); the second, on the contrary, assumes that the quantity of money is determined by the demand for money and is therefore *endogenous* (*endogenous money theory*).² The former is linked to the traditional marginalist economic theory (with some exceptions, such as Wicksell), while the latter is one of the pillars of the post-Keynesian economic approach. This paper adopts the perspective of the endogenous money theory, which best describe the monetary aspect of contemporary³ economics.

Within the framework of the theories of endogenous money, we will now try to analyse the main categories of the *traditional banking industry* (i.e. linked to funding and lending), in order to identify *input*, *output* and *capital*. However, we have to be careful to not approach the issue from a purely definitional point of view: the difference between input, output and capital has to be *functional*, to make economic sense and not be purely linguistic.

² On this subject, see among others: Lavoie, 1984; Moore, 1988a, 1988b; Rousseas 1989; Palley 1987, 1991, 2002; Wray, 1992; Rochon and Vernengo, 2003; Deleidi and Levrero, 2019, Cesaratto, 2021.

³ As this webpage reports, many central bankers have confirmed the validity of this approach: <https://rwer.wordpress.com/2012/01/26/central-bankers-were-all-post-keynesians-now/>. See also McLeay M., Radia A. and Thomas R. (2014), Bank's Monetary Analysis Directorate of the Bank of England.

It seems quite obvious to consider loans as the main output of the banking industry. Deposits are less obvious. Following the theory of endogenous money, banks create money without previous savings, lend it to customers and in doing so create deposits. From this perspective, deposits would seem to be an output of production that is generated whenever a loan is created. However, it must be admitted that banks pay an interest rate on deposits. Unless we assume that this interest is a negative price that the bank puts on its output, it seems more logical to consider it a cost. Thus, the fact that the bank pays a cost to obtain deposits seems to indicate that they belong to the category of input.

Let us look at this issue in more detail. Let us assume the existence of a single bank making loans to enterprises, and assume that each payment is made electronically (to exclude banknotes and coins from the reasoning)⁴. For each loan made by bank α to firm A , a deposit of a certain amount will be created in favor of A by α . At a certain point A will use that credit, i.e. he will extinguish that deposit, giving it to B , in exchange, let's suppose for example, for raw materials. But if the only existing bank is α , both A and B are customers of α and the transfer of the deposit from A to B will take place by means of a simple bookkeeping entry, without the need for anything else. On the contrary, if α had a single customer, when A buys from B , A 's deposit at α would be transferred to bank β , and it becomes a B 's deposit. When α transfers the sum to β , α will not be able to use simple bookkeeping entries, *reserves* will be necessary. In other words, if there were only one bank, the need for reserves would be zero and it would be equal to the entire amount of deposits if each bank had one and only one customer (Graziani, 2003, p. 91).

In the real world there are many banks with a large number of depositors, which implies a need for reserves of an intermediate volume between zero and a volume equal to that of deposits (see Graziani, 2003, p. 91). In order to fully understand the functioning of the real economy (volume of reserves between 0% and 100% of deposits), it is necessary to understand what generates the difference between the two extreme cases. As MMT theorists claim, the use of a *pyramid of financial liabilities* has been established in the economy to regulate payments (Minsky, 1986; Foley, 1987; Wray, 1998; Bell, 2001; Mehrling, 2012; Cesaratto, 2016; Nersisyan and Dantas, 2017, 2018; Kelton, 2020).

At each level of the pyramid, exchanges are regulated through liabilities of the upper subject, who in fact has a higher level of acceptability than the lower one. To say it simply, at the lowest level we have the real economy, which settle its payments through banks, the banks in turn settle their payments through the central bank, which is at the top of the pyramid.⁵ Firm A in the previous example can pay

⁴ Note that inserting banknotes and coins does not change the picture. It simply has to be taken into account that each bank has cash reserves to supply, for example, ATM services. Certainly, payments between banks do not take place via cash, nor do large payments in the real sector.

⁵ Nersisyan and Dantas, 2017, 2018, place the financial sector at an intermediate level between the real sector and the banking sector. Moreover, the MMT authors point out that at the top of the pyramid can only be the central bank of a country that has *monetary sovereignty* (or, to be more precise, a high level of it, which varies from country to country).

the supplier B by a cheque. Once he has signed and delivered the cheque, his obligations to B are over. The cheque is nothing more than an IOU (*I Owe You*) from bank α . Bank β will credit the sum to B , making possible the use of α 's promissory note, but will demand from α something *more* than its promissory note, i.e. it will demand *money of the State*. Each level uses the upper⁶ level as a clearing house for payments. But the State's currency is nothing but an IOU of the State. Today it has no intrinsic value (coins being neither gold nor silver) but is accepted by the State as payment for taxes. This privilege of the State to impose its own currency within its borders as a means of payment to satisfy any debt is called *seigniorage*. B may refuse to accept the cheque of A , the IOU of the bank, but B cannot refuse the currency, the IOU of the State.

It is important to note that nowadays the central bank is not compulsorily part of the State or the Government (for further discussion see Gnos and Rochon, 2002; Cesaratto 2016). The example of the European Union with many States and only one central bank is perfect. Although we are familiar with this issue, in this paper we will leave out it for the sake of simplicity. Indeed, this issue does not seem to alter the analysis developed in these pages.

Following the endogenous money theory, it was stated above that the bank can create *credit* (or *bank money*) but cannot create (State) *money*, which can only be created by the State which has the seigniorage. The bank can create its own liabilities (by the mechanism whereby each credit is matched by a deposit), accepted at the lower level of the pyramid, but it cannot create the liabilities of the upper level. For this reason, if there were a single bank, it could settle every payment by book entry, because it would virtually have seigniorage power; on the contrary, if there were several banks, each with a single customer, each one would have to hold liabilities of the upper level equal to every liability of its own (Graziani, 2003, p. 91),⁷ because in this case essentially the banks would be in the pyramid at the same level as the real sector. The possibility of a multiplicity of deposits makes banking possible and secures its place in the pyramid.

So, banks need the State's liabilities, i.e. money. In turn, they can create bank money, which is useful for payments in the real economy.

Where can banks get money? There are three possibilities. The first is money is already in circulation. For example, bank α could pay bank β through a part of the deposits of C .⁸ The second is that the central bank finances α 's cash outflow: bank α borrows from the central bank. The third possibility is bank α

⁶ To intuitively understand the concept, consider that in a not too distant time the State issued only metallic money and that *banknotes* were nothing more than 'bank notes', records of what the bank owed to the bearer of that note, practically standardised cheques issued by the banks. Only later the State took control of the issue of banknotes, which ended up having the same nature as coins (usually with a higher nominal value). So, bank liabilities have been used as methods of payment for centuries.

⁷ If the customer asks for his money, the bank must have it.

⁸ C may have obtained, for example, the money deposited in his deposit by the State as wage as a civil servant. It is not discussed here the relationship between State and central bank.

borrow from a third bank (γ) to finance the cash outflow to β (α could also theoretically borrow from β to repay it, turning the cash outflow into a debt; at that point there might not even be a real money transfer, but only an accounting entry that shifts the cash outflow to a future time). It is clear the original source is in every case the central bank, the only institution that can create State money. But once State money has been put in circulation, exchanges (or loans) between operators are possible. In t_0 the central bank is the only source of money, from t_1 it is only the source of *new* money, while all the money previously created and not destroyed (going back to the central bank) remain in the system.

Let us look at an example (in which we exclude the inter-bank market, which at an aggregate level cannot explain the functioning of the banking system), shown in Appendix A. Bank α lends 100 euros to firm A. Firm A will sell its product for 120 euros (with a profit rate of 20%). 100 will repay the loan received (used to pay workers' wages and all capital goods necessary for production), 10 will pay 10% interest on the borrowed capital, and 10 will remain with the producer as his net profit. To recapitulate, α credits 100 to A *ex nihilo* and at the same time creates a deposit of 100 of A in α ; bank α borrows 100 from the central bank, or uses a deposit of C, in view of the transfer of the sum; the deposit of 100 is transferred to bank β (and/or other banks) when A buys capital-goods and pays wages; A put 120 in his account to the bank α , repaying its debt of 110 (100 + 10% of interest) and adding a surplus of 10; α returns 100 to the deposits of C or to the central bank, paying perhaps a small interest rate, for example 3%, and keeping the rest as profit (thus supposing that the bank gets a profit of 7 and has no other expenses, with a capital of 35, the bank would get a profit rate of 20%, equal to the gross profit of firm A).

The bank has effectively provided purchasing power out of nothing, it has created bank money that has circulated in the system and allowed production to start. However, bank α has not created *value*, surplus, but only anticipated⁹ it. If this advance is not covered by a *real* creation of *value* through production, the bank must in some way cover the sum advanced with *real value* already existing. If firm A failed to sell the product and went bankrupt, bank α would find itself with an uncollectable credit and therefore with a *loss*, having given to bank β State money, which was obtained from one of the three sources indicated above. The loss of bank α will reduce its profit. If uncollectible credits are too many, the bank could go bankrupt.¹⁰

Of course, in the real world, lending, buying, selling, production, etc. take place continuously and at varying and overlapping times. Payments between banks take place via reserve transfers at the central

⁹ As Yanis Varoufakis states with a bold metaphor in Varoufakis, 2013, p. 63.

¹⁰ It is, of course, possible for the bank to settle a debt by taking out another debt, or by taking out another debt with a less immediate maturity. Nevertheless, in the end, an uncollectible credit must correspond to a smaller profit or a loss.

bank net of mutual debts and credits at the end of the day. With the knowledge of the daily on average liquidity needs, the bank can safely use the liquidity, paying a little more on the *overnight* market if it would miscalculate. So, normally banks do not risk insolvency problems. This means that banks can manage their business more calmly and confidently, as well as managing (usually) any losses. The result is that the State's money reserves, or liquid reserves correspond only to a small part of the bank's deposits: if all depositors withdrew their deposits at the same time, the bank would undoubtedly go bankrupt, as it did not have enough liquid reserves to cover all deposits.

Returning to deposits, they can be divided into two types: the first corresponds to a real injection of liquidity for the bank, the second corresponds to internal accounting entries of the bank which indicate to what extent the borrower can obtain liquidity at the agreed¹¹ interest rate. If α were to credit 100 to A by creating a deposit and A were to use only 30, leaving 70 as a deposit in α , at the time of repayment of the loan A would have to find 30 of liquid resources to repay the bank (irrespective of the interest on the loan; we can assume a rate of 10% and a larger sum to be repaid, but this is not relevant to the example); the other 70 would be removed from the bank's accounts under the item 'deposits' (liabilities) of A and at the same time from the item 'credits' from A (assets), with a simple *accounting entry* (see Appendix B). But the liquid resources which have come out of α must go back into α . If A has only used 30, the value of 100 is only what it can at most use under the conditions already contracted. The money that has really financed the economic system amounts only to 30. Once these 30 were returned, α could use them in many ways, either by repaying the debt to the central bank that may have advanced those 30 cash in the first place (or to the bank γ), or by financing the cash outflow of 20, e.g. of a loan made to E , or even if it did not have these needs, by increasing the *voluntary cash reserves* at the central bank, anticipating a future need for liquidity.

As mentioned above, the central bank provides the banking system with all the liquidity it needs, usually through repo market with a fixed maturity. Moreover, if a bank has a sudden need for liquidity, it can turn to the interbank market or to the central bank in the *overnight* market. On the other hand, if it finds itself in a situation of excess liquidity, it can lend liquidity in the interbank market, or build up voluntary reserves with the central bank, or at least deposit them *overnight* to the central bank: it depends on its strategy. Alternatively, banks can use liquidity to buy securities: banks are among the main buyers of

¹¹ Shaikh, 2016, pp. 180-182, discusses the functioning of the banking sector and his reasoning has points in common with what is discussed in these pages. In particular, Shaikh, 2016, p. 181, distinguishes between "initial" deposits and "new deposits [which] arose from new loans", obviously both of which are included in the total count of the system's money supply. Moreover, in footnote 5, p. 181, he adds (emphasis added): 'While loans create deposits, not all deposits are created by loans. For instance, a deposit of cash raises deposits independently of loans. Also, for an individual bank, increased lending will lead to a loss of reserves as some portion of the newly created deposits are transferred to other banks or taken out in cash. Thus, while lending enhances the profitability of individual banks, it also strains their viability, since a higher sum of deposits is backed up by a lower sum of reserves'.

government bonds. Banks resell then part of these bonds on the market, but it can also be convenient to hold them. *First*, because these securities (usually government bonds and securities considered very safe) are required as collateral by the central bank to provide liquidity in repo operations. *Second*, because they can be a profitable and safe investment (and very useful for risk diversification). Let us consider (see Appendix C) a bank that has a demand for loans of 100 and customer deposits of 400 (perhaps a special case representing a low demand for credit, but useful for making sense). Let us further suppose that the 100 demanded for loans were given out and then all immediately used. So, the bank has loans for 100, deposits for 300 (100 of deposits went out when the loan was used and the sum transferred to another bank), 200 cash on hand (300 of 'real' deposits, minus 100 used for the cash outflow of the loan). It is certainly not convenient for the bank to keep all those 200 in voluntary¹² reserves without using them. If it places a part of them in reserve according to the law, let us assume 10% of the deposits, i.e. first 40 and then 30, it will have 170 at its disposal. So, the bank can use these 170 by buying securities that yield more than the remuneration of the liquid reserves at the central bank (the bank could create loans, but only if there were demand for them, which in the example is blocked at the initial 100 for the sake of argument).

Some conclusions can be drawn from this reasoning. The bank creates bank money and uses State money by paying a price for its use. Banks can obtain this money from various sources, one of which is deposits. All this seems to point to deposits as an input of the banking sector. Not all deposits actually correspond to injections of State money, some are created together with credits by the bank itself and are bank money; they will become liquidity injections for other banks, and for the system, once used by the debtor. However, since the bank pays a passive¹³ rate on these, it seems legitimate to consider the category of deposits among bank inputs. On the other hand, these "fictitious" deposits are usually used almost immediately (if there were no need for money, a loan would not be requested), with the consequence that the accounting entry generating this type of deposit is quickly written off. In addition, it would be very difficult for banks to distinguish between the two types of deposits (which may often be in the same bank account), paying only some deposits. On the other hand, the very mechanism of credit is based on the creation of a liability for the bank and an asset for the beneficiary

¹² An increase in a bank's liquidity translates into an increase in its liquid reserves at the central bank, unless one assumes the accumulation and storage of huge sums of money in banknotes or metallic money. See Cesaratto, 2015, 2016, pp. 157-167, 2021; Lavoie, 2006, p. 62; as well as the ECB website https://www.ecb.europa.eu/explainers/tell-me-more/html/target2_balances.it.html ; also see footnote 6, p. 47, in Cesaratto, 2016: "[...] In the Eurosystem, however, although mandatory reserves are remunerated at the rate on the main refinancing operations (MRO), normally excess reserves held in the reserve account at the ECB are not remunerated. In normal times, excess reserves are thus more conveniently held in the "marginal deposit facility" where they get a positive remuneration, albeit lower than the rate on the MRO. Therefore, a stimulus to purchase government bonds would remain even in regimes that normally remunerate excess reserves held in the deposit facility. I said "normally" since at the time of writing, excess reserves held both in the reserve account or in the deposit facility are remunerated at a negative."

¹³ Or, we might even say, it gets a lower net interest income on loans.

of the credit, *as if* the latter had really deposited a certain sum with the bank and could dispose¹⁴ of it. By accepting this *fiction*, the bank also accepts the *fiction* of having received a *concrete* deposit of liquidity and therefore pays passive interest on it, *as if it were* an input.

These reflections are compatible with the theories of endogenous money. The quantity of money of the system is determined by the demand for solvent credit that banks face. As Rousseas, 1985, p. 136, also states:

“The raw materials, or inputs, of a bank are the deposits it is able to attract and its ability to borrow funds – both of which are the necessary ingredients for its final product, loans.”.

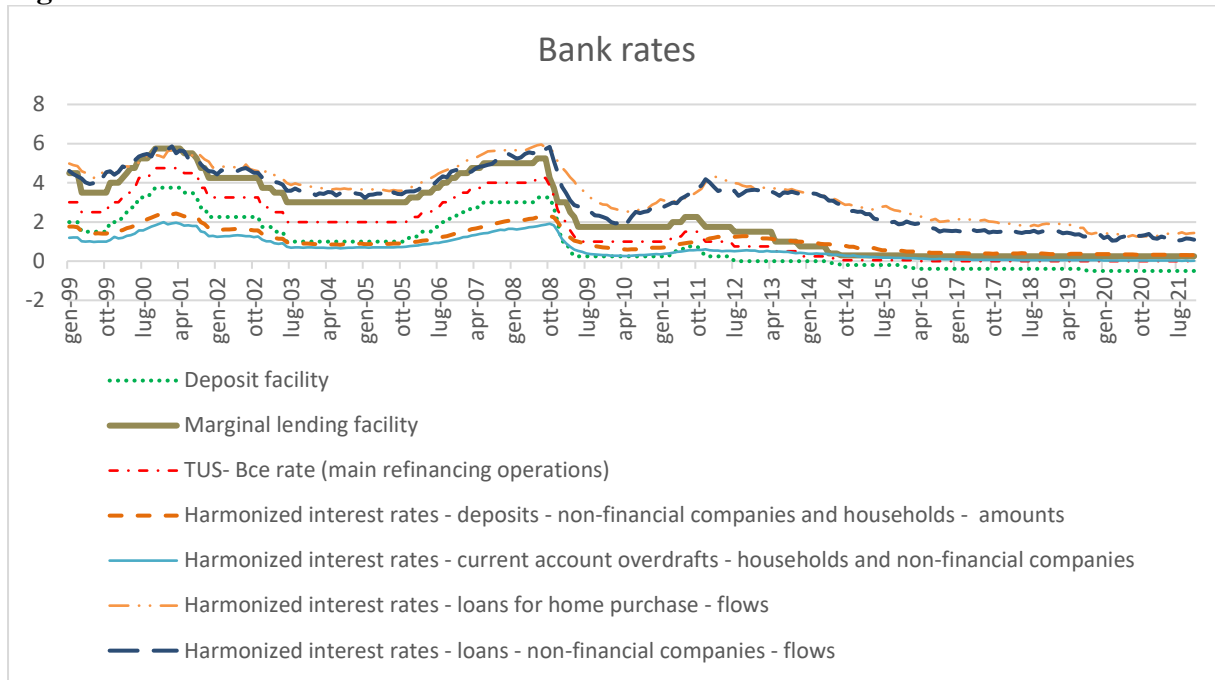
From a different point of view, the collection of deposits can be considered as a service that the bank offers to the public. Holding large sums of cash is risky, impractical and expensive.¹⁵ The bank solves all these problems for the depositor. So, it must be recalled that banks *need funding* for the reasons explained above. Funding and related services may be more or less profitable for the bank, but they are indispensable. If the bank could turn this necessary cost into a profit, it would make a higher profit, but this issue is secondary and cannot explain the nature of deposits.

It should also be noted that the deposit rate the bank pays on bank deposits is significantly lower than the rate it pays to the central bank to obtain liquidity. It is therefore cheaper for banks to borrow from deposits than from the central bank (see Figure 1). In addition, funding at the central bank is usually repo. This implies a need for banks to hold securities that they can exchange for central bank liquidity.

¹⁴ Sum provided by the bank itself: obviously, the above-mentioned entries also correspond to a liability of the debtor (the deposit) and an asset of the bank (the loan).

¹⁵ With regard to costs, we may think of buying an insurance or an alarm system. Moreover, the impracticality is also evident: it would be difficult to physically place, for example, 10 million euro 'under the mattress', in a drawer or in a cupboard.

Figure 1



Source: Own processing of Bank of Italy data. Values in percent.

1.1 Investment banks and other financial intermediaries

Compared to other financial intermediaries, banks have the privilege of creating (bank) money. Other financial intermediaries merely collect and employ resources, without being able to use deposits or funding from the central bank and without being able to create money.¹⁶

Banks are often divided into *commercial banks* and *investment banks*.¹⁷ Commercial banks are the most traditional type of bank, usually collecting deposits and providing credit to households and small and medium-sized enterprises. Investment banks, on the other hand, are mainly engaged in different financial activities: they finance corporations by underwriting and placing new issues, act as intermediaries in securities markets and provide financial advice, particularly on the issue, purchase and sale of securities. From the website of Borsa Italiana:¹⁸

"In detail, we can divide the macro-area of investment banking into: *Capital Markets* i.e. all activities related to the management of financial instruments issued by the bank's clients (bonds, shares and derivatives). [...] *Corporate Finance*: financial support to a company to support its

¹⁶ Recall that Nersisyan and Dantas, 2017, 2018, place non-bank financial intermediaries at an intermediate level between the real sector and the banking sectors, deeming money and liquidity creation a hierarchical process.

¹⁷ It should be noted that in the US, investment banks and commercial banks were divided by law through the *Glass-Steagall Act* of 1933. The activities of the two types of banks were then carried out by two different financial intermediaries until the *Gramm-Leach-Bliley Act* of 1999, which abolished the previous regulation. In 2010, the *Dodd Frank Wall Street Reform and Consumer Protection Act* re-established certain constraints on banks' investments.

¹⁸ Available at the following link: <https://www.borsaitaliana.it/notizie/sotto-la-lente/banche-investimento.htm>.

strategic decisions (mergers and acquisitions, joint ventures, spin-offs, restructuring activities). *Private Equity or Merchant Banking*: financial activities through which an institutional investor takes over shares in a company either by acquiring the shares or by bringing new capital into the target company. *Project Finance*: long-term financing operations consisting of the use of a newly formed company called a Special Purpose Vehicle (SPV), which serves to keep the assets of the project separate from those of the parties proposing the investment initiative. *Risk Management*: offer of financial services aimed at limiting the client's risk, whether of an industrial or financial nature (linked to price volatility). " (my translation).

From this brief *excursus* we can see that the activities carried out by investment banks and other financial¹⁹ intermediaries are very different from the activities of traditional banks. They are related to the sphere of circulation of capital (Marx, 1894), mainly consisting in the allocation of the existing capital in the system in the most profitable way possible.²⁰ These activities, although more or less closely linked to the traditional banking activity of collection and deployment, are not based on the creation of money: the capital they inject in production is not created *ex nihilo* by banks, but it is collected and channelled through various financial mechanisms where it can yield the highest return. This simplifies the analysis of these intermediaries, since, beyond legal and technical complications, the economic function is quite simple.²¹

The ability of commercial banks to create credit, on the other hand, as discussed in this paper, complicates the picture considerably and requires a study of functional categories. Moreover, the banking industry plays a major role in setting the various interest rates of the financial system (Zolea, 2021a, 2021b), thus playing a pivotal role within the world of finance.

2: CAPITAL AND LEGAL REGULATION

2.1 Definition of the perimeter of capital

Another interesting aspect of the banking industry is the difficult definition of capital. In every industry capital is usually considered what is anticipated for production: assuming an annual production and wages paid at the beginning of the production cycle, the entrepreneur advances a sum of money needed to buy all raw materials, intermediate goods and workers' wages. On this advanced capital, if the enterprise is profitable, the entrepreneur earns the profit rate. It does not matter whether the advance capital is the entrepreneur's own or has been borrowed. This is partly different for the bank. If we

¹⁹ It should be noted that there are many other financial intermediaries, such as insurance companies, which carry out a financial activity not allowed to banks.

²⁰ See about the financialisation at the expense of the real sector Mazzucato, 2018.

²¹ Even following the approach of Nersisyan and Dantas, 2017, 2018, commercial banks are on a higher rung of the payment pyramid, second only to the central bank.

consider deposits as debt capital of the bank, we have to calculate the profit rate on the sum of equity and deposits. Hilferding's unsuccessful attempt to unravel the problem demonstrates the difficulty of the problem. Hilferding, 1910, p. 172-173, does not distinguish between equity and deposits and seems to think that one can become the other: given the average profit rate and the profit of the banking sector, we obtain the own capital, which would be the part of credit capital that banks manage to "*transform*" into own capital.²² The reasoning tends to the tautological and the idea of transformation of deposits into equity is doubtful.

Assuming, roughly speaking, that every loan corresponds to a deposit and bank capital is equal to the sum of equity and deposits, bank capital would be enormous and the profit rate correspondingly very low. Simplifying the picture, the net interest rate would correspond to the profit rate: assuming deposits and loans to be equal, and leaving out for the moment equity capital which is much smaller than deposits or loans, the difference between lending and borrowing rate would be the profit rate. Counting also equity capital and expenditure on other costs and wages, the profit rate would be less than the interest rate. In classical theory, in J. S. Mill and Marx (Smith, 1776; Ricardo, 1817; Mill 1844; Marx 1894), as well as in the Sraffian and Marxian theory (Panico, 1988; Pivetti, 1991; Shaikh, 2016, Zolea 2021a, 2021b) the interest rate is considered a part of the profit rate. A firm that consistently obtains a lower than normal rate of profit (because it is equal to, or indeed less than, a part of it) could not exist, since competition would drive capital towards more profitable sectors.

Let us focus on deposits for a moment. While other types of enterprises buy the means of production, the bank borrows²³ them. Equity serves as guarantee through which the bank can take over the management of deposits, and only this equity has to be advanced by the banker in order to initiate bank production. To calculate the profit rate, deposit costs reduce profits, but deposits should not be included together with equity capital in the denominator of the fraction profit/capital = profit rate. Wray, 1990, p. 184 has a similar view: "That is, the interest rate must be sufficient to allow banks to earn the normal rate of profit on bank equity."

Let us now try another line of reasoning. Let us assume the bank lends out deposits directly, following

²² Hilferding, 1910, p. 172-173: " The process can be summarized as follows: the rate of interest is governed in the first place by supply and demand of loan capital as a whole, and this determines the gross profit of the banks, which they make by lending the money - their own and that which is deposited with them – at their disposal. The ratio between the bank's own assets and its customers' deposits is quite immaterial for the interest rate or the amount of gross profit. Of course, only part of the deposited money is actually at the disposal of the bank, while another part must be kept as a reserve fund, [...] It is evident that what is important is not the banks' own capital, since their profits do not depend upon this, but the total loan capital at their disposal. The basic datum is the level of profit, and the amount of their own capital must be adjusted in accordance with it. The banks can convert into their own capital only as much of the total loan capital as their profits allow. [...] For capital, however, banking is a sphere of investment like any other, and it will only flow into this sphere if it can find the same opportunities for realizing profit as in industry or commerce; otherwise it will be withdrawn. The bank's own capital must be reckoned in such a way that the profit on it is equal to the average profit." And again *ibid.* p. 180: " Bank revenue is not profit. Nevertheless, the total revenue, calculated on the basis of the bank's own capital, must equal the average rate of profit."

²³ With the exception of the actual physical means of production such as the physical location of the bank, computers, telephones, etc., the bank's assets are not subject to any restrictions.

for a moment the theory of exogenous money and leaving aside the question of money creation. We can easily assert the bank manages an intermediation activity. To include the funds managed by the bank in the bank's own capital would in this case be incorrect.²⁴ Let us now return to the theory of endogenous money. Here the bank creates loans without using previous savings, then later uses the funds it holds (or borrows) to cover cash outflows. But even in this case the funds are not part of the bank's capital, but funds *managed* by the bank. Any company can issue bonds and finance itself with debt capital, but only the bank can collect deposits. Deposits are also remunerated at a lower rate than bonds, and of course than bank loans. So, they are considered safer and *not invested*. Considering therefore the remuneration of loans and bonds as the remuneration of debt capital, the fact that deposits are remunerated at a lower rate seems to indicate a different nature of deposits than debt capital, at least in the perception and assessment of the market. Moreover, deposits in Italy and the EU are guaranteed by the State up to the amount of EUR 100,000 (Directives 2009/14/EC and 2014/49/EC), which is absolutely unheard of for any type of debt capital.

A further peculiar feature of the banking sector is that equity capital is never involved in the creation of loans. Instead, it is used to secure the banking business (as well as to allow the purchase of the few physical means of production of the banking sector, such as the physical location, or the purchase of computers).²⁵ Ricardo, 1816, p. 108 had already realised this feature of the banking system:

“There is this material difference between a Bank and all other trades: A Bank would never be established, if it obtained no other profits but those from the employment of its own capital: its real advantage commences only when it employs the capital of others. Other trades, on the contrary, often make enormous profits by the employment of their own capital only. [...] To increase the profits of the Bank proprietors, then, an increase of capital would be neither necessary nor desirable.”.

In the passage quoted above, Ricardo considers both deposits ("capital of others") and equity ("own capital") as capital, but recognises that they serve a very different function within the banking industry: to paraphrase Ricardo in modern terms, the bank's advantage is in fact based on the collection of deposits. Deposits have been discussed above, as for equity it seems that the less the bank has, the more profit it makes. Apart from the capital used to purchase the few real means of production in the sector, the equity placed in reserve does not seem to enter directly into bank production. However, if the bank had too little of it, it would not be able to cover any losses. Yet, as will be seen in detail in the following pages, there seems to be no criterion for defining what is the "correct" degree of equity

²⁴ Think of a removal company. Surely the vans it uses are part of the company's capital. Surely the furniture that these vans transport for removals is not part of the capital either.

²⁵ See the reasoning of Minsky, 1986, p 262: "Bank leverage, the ratio of assets to equity, can be taken to indicate how much of other units' debts a bank can make generally acceptable by pledging its 'good name'".

capital. Instead, there are rules of thumb that combine the need to secure the economic system and keep it stable with the search for profit. Security and the quest for profit seem to be in conflict, as Minsky masterfully illustrates with his theory of the financial cycle (see for instance Minsky, 1986).

Let us go further into the reasoning of Ricardo, 1816. Let us then consider, by way of an absurdity, the hypothesis of a bank which functions solely on its own capital, without deposits and without money creation; this hypothesis immediately proves absurd for several reasons.

The first is that, by lending own capital, the ratio of capital to loan is 1:1, there is no money creation (nor money multiplier as in the exogenous money theory). The possibility of credit is therefore very limited. The second is that the profit rate would have to coincide with the interest rate. By lending own capital, the interest rate would be directly related to the capital and would be equal to the profit rate. In order to be long-lasting and profitable, this interest rate, equal to the bank profit rate, should necessarily be equal to the general one.²⁶ But if the rate of interest were equal to the normal rate of profit there would be nothing left for the entrepreneurs and their remuneration would be zero, which is impossible.

Banking is characterised by the use of deposits and the possibility of creating bank money. Without these characteristics, there would be no organised lending in the form of an enterprise, or, in other words, no bank. Usury²⁷ would be possible, but on a large scale it is not compatible with capitalist society and its development. First, without money creation it would not be possible to sustain the economic growth of present-day societies. In addition, an interest rate not lower than the profit rate would not allow enterprises to borrow money, unless they made zero profit on the borrowed capital and thus reduced its economic utility to zero.

2.2 The role of rules

From a functional point of view, therefore, bank capital only includes equity capital and (equity) capital reserves.²⁸ The special regulations of equity in the banking sector are therefore very important. The analysis of the rules of the banking sector in the next pages is based on the Italian and European laws

²⁶ The thesis of Park, 2021, that the financial profit rate is permanently lower than that of the production sector is in fact not very convincing, considering the action of competition. It should also be noted that Park, 2021, p. 6, considers ROE as an indicator of the Marxian *corporate profit rate* (*risk and trouble* premium in classical terms). This approximation does not seem well-founded: in the Marxian framework the division of investment into equity or debt capital is irrelevant, Marx focusing on the different *function* of capital (Marx, 1984; see also Zolea, 2021a, 2021b); in the Sraffian framework (Panico, 1988; Pivetti, 1991) the interest rate represents an opportunity cost to be paid on all capital, regardless of whether it is equity or debt.

²⁷ In a Marxian sense of not organized borrowing in the form of an enterprise, typical of the capitalist mode of production. See Marx, 1905-1910.

²⁸ Note that Shaikh (2016, p. 449), states that, leaving aside operating costs and bank fixed capital, the bank lending rate is equal to the profit rate multiplied by the ratio of reserves to loans and that this was the interpretation of Smith, Ricardo and Mill. This approach seems to go in the same direction as what is proposed in this paper, not considering deposits (and bonds) as capital.

and rules. In addition, the rules of Basel Accords are valid in Europe and in many other countries in the world like UK, USA, Canada and Japan.

The current²⁹ rules provide for capital requirements such that equity capital and reserves are equal to a certain percentage of risk-weighted assets. There are also regulations concerning equity capital³⁰, as there are for any listed company, but the rules on bank capital requirements are particularly detailed and binding compared to those for other types of companies and impose additional, characteristic obligations. The motivation is precisely to guarantee depositors and the resilience of the banking system to avoid financial and economic crises.

Let us now go into more detail about the regulation of bank equity. Today in Italy, and in the other countries adhering to the *Basel III* agreements, banks must comply with capital requirements appropriate to the activities they carry out. From the *Borsa Italiana* website:

"Common equity, i.e. common shares plus reserves, i.e. the highest quality component of a bank's capital, must be at least 4.5% of risk-weighted assets, i.e. loans made for a ratio that changes according to their riskiness. A loan to a company is, in fact, generally riskier than a loan to a government or a household. The purpose of the rule is to ensure that, if some of the bank's loans fall into default or are not repaid, the institution always has free capital to meet the losses. In addition to this 4.5 per cent ratio, there is a 2.5 per cent conservation buffer, which provides further protection and brings the minimum core tier 1 ratio to 7 per cent. Another buffer of 0-2.5 per cent of the capital is foreseen in the new scheme." (my translation).³¹

Bank equity is divided into *Tier 1* and *Tier 2*. In turn, *Tier 1* is divided into *Common Equity Tier 1* (CET1) and *Additional Tier 1*.

CET1 capital consists primarily of common stock, reserves and retained dividends, i.e., the highest quality portion of bank capital; *Additional Tier 1* consists primarily of equity-like financial instruments; *Tier 2* consists of hybrid capitalisation instruments from subordinated liabilities.

The *Common Equity Tier 1 ratio* (CET1 ratio) is the ratio of CET1 to risk-weighted assets; this ratio must be at least 4.5%. In addition, the *Tier 1 ratio* must be at least 6% of risk-weighted assets and total capital must be at least 8%. In addition to these requirements, there is a buffer of 2.5% called the *Capital Conservation Buffer* (CCoB), which serves as an anti-crisis buffer, and an additional buffer between 0% and 2.5%, called the *Countercyclical Capital Buffer* (CCyB), which serves as a countercyclical buffer.

²⁹ In this paper we usually refer to the laws, rules and regulations in force in Italy. Many of these rules, however, are valid throughout Europe and also in many other countries of the world, due to international agreements that have been incorporated into the legal systems of the various countries.

³⁰ In order to carry out banking activities, in Italy banks must have a minimum capital according to Article 14 of the Testo Unico Bancario (TUB): €5 million for cooperative banks, €10 million for others (see Bank of Italy Communication of 29 May 2013 https://www.bancaditalia.it/compiti/vigilanza/normativa/archivio-norme/circolari/c263/Adeg_cap_proc_pendenti.pdf).

³¹ From the Borsa Italiana website: <https://www.borsaitaliana.it/notizie/speciali/mercati-internazionali/basilea-3-nuove-regole-per-il-mondo-finanziario.htm>.

There is also a liquidity requirement, the *Liquidity Coverage Ratio* (LCR), which requires banks to have sufficient liquid assets to cover net liquidity outflows under highly stressed conditions over a 30-day period. Finally, there is the *Pillar 2 Requirement* (P2R), which is: "a bank-specific capital requirement which applies in addition to, and covers risks which are underestimated or not covered by, the minimum capital requirement (known as Pillar 1) [the capital requirements above]".³² P2Rs are not fixed, but are established through a supervisory review and evaluation process by the European supervisory authorities, the *Supervisory Review and Evaluation Process* (SREP).³³

On 12 March 2020, the ECB temporarily changed the capital requirements due to the economic health emergency caused by the Covid-19 pandemic. Basically, banks can then operate with lower capital requirements, i.e. the cogency of these requirements is reduced.³⁴

This raises a further theoretical problem. In traditional industries we can identify various production techniques due to chemical or physical factors, some of which are more profitable than others in certain contexts. Since the bank *creates* money and does not produce it, it is difficult to identify a production technique. It is also possible to identify empirical criteria of prudence that allow the activity to be carried out in a relatively stable and reliable manner (Minsky, 1986)³⁵. Given the fundamental importance of the sector for the economy as a whole, it is normal for the Government to intervene to regulate the matter. This, however, implies that banking technique is not determined by engineering or physical issues, but by legal ones. We could speak of a *normative production technique*. We might think of such a case if we assume a production technique that is prohibited because it is polluting. In the case of pollution, the law takes account of the diseconomies which may arise for the public as a whole, despite the possible short-sightedness of the individual producer. In the case of banking, the law wishes to avoid bankruptcies which would be detrimental to all citizens and operators in the system. While this

³² From the ECB website: <https://www.bankingsupervision.europa.eu/banking/srep/html/p2r.en.html> .

³³ See the European Council's website <https://www.consilium.europa.eu/en/policies/banking-union/single-rulebook/capital-requirements/> , the Borsa Italiana website <https://www.borsaitaliana.it/notizie/sotto-la-lente/tier-capitale-banche164.htm> , as well as these two pages from the ESRB website: [https://www.esrb.europa.eu/national_policy/capital/html/index.en.html#:~:text=The%20capital%20conservation%20buffer%20\(CCo%20OB.to%20conserve%20a%20bank's%20capital](https://www.esrb.europa.eu/national_policy/capital/html/index.en.html#:~:text=The%20capital%20conservation%20buffer%20(CCo%20OB.to%20conserve%20a%20bank's%20capital) and [https://www.esrb.europa.eu/national_policy/capital/html/index.en.html#:~:text=The%20capital%20conservation%20buffer%20\(CCo%20OB.to%20conserve%20a%20bank's%20capital](https://www.esrb.europa.eu/national_policy/capital/html/index.en.html#:~:text=The%20capital%20conservation%20buffer%20(CCo%20OB.to%20conserve%20a%20bank's%20capital) .

³⁴ ECB, press release 12/03/2020, "ECB Banking Supervision provides temporary capital and operational relief in reaction to coronavirus" <https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200312~45417d8643.en.html> . In detail: "Capital and liquidity buffers have been designed with a view to allowing banks to withstand stressed situations like the current one. The European banking sector has built up a significant amount of these buffers. The ECB will allow banks to operate temporarily below the level of capital defined by the Pillar 2 Guidance (P2G), the capital conservation buffer (CCB) and the liquidity coverage ratio (LCR). The ECB considers that these temporary measures will be enhanced by the appropriate relaxation of the countercyclical capital buffer (CCyB) by the national macroprudential authorities.

Banks will also be allowed to partially use capital instruments that do not qualify as Common Equity Tier 1 (CET1) capital, for example Additional Tier 1 or Tier 2 instruments, to meet the Pillar 2 Requirements (P2R)."

³⁵ Minsky, 1986, pp. 266-267: "Banking literature posits the concept of the prudent banker: a banker who accepts just the right amount of risk. To a banker risk results from the selection of assets, liabilities, and leverage, that is, from the composition of the balance sheet. But the risks bankers carry are not objective probability phenomena; instead they are uncertainty relations that are subjectively valued. Furthermore, the acceptable risks for a unit to carry at any moment of time reflect experience and, predominantly, quite recent experience."

is a special case in other production sectors, it is the normal rule in the banking sector.

From this reasoning we can derive further considerations on the utilisation of the "productive capacity" of the banking sector. The rule that equity must be equal to about 8% of risk-weighted assets identifies a minimum ratio between capital and assets, i.e., in a bank, between capital and output. The bank's assets do not only consist of loans, of course, but also of other assets, such as public securities. Depending on the risk associated with the type of assets, the amount on which the equity³⁶ ratio is calculated will vary.

Let us now follow an example where for simplicity of presentation and calculation we will use a 10% rule instead of 8%. Let us assume a capital of 10. The bank will be able to create loans up to 100, assuming for simplicity that loans are the only form of assets.³⁷ If the demand for credit that the bank faces is 110, bank would have to increase its equity to 11 in order to meet this demand and comply with the law. The bank in question therefore has a kind of "productive capacity" of 10 times its equity³⁸ capital. By increasing equity it can also increase output, but still maintain that ratio. However, it is possible that the bank chooses to create less bank money than the maximum allowed (i.e. by lending less than it could, provided of course that there is adequate demand for credit): for example, with a capital of 10, the bank may have assets of 90. It may be convenient to have margins of guarantee in order to not run into the unintentional exceeding of the threshold and to not incur penalties. On the other hand, quoting Ricardo, 1816, p. 108, it is convenient for the bank to minimise its own capital and therefore maximise the credit that can be produced with that capital, i.e. by lending as much as possible³⁹ (with an asset of 90 it is convenient for the bank to have a capital of 9; if it is 10 it is convenient to increase the loan or decrease the capital, perhaps by investing it in other economic sectors).

If the statutory ratio were to fall, as recently happened with the new rules decided by the ECB to combat the pandemic, there would be in practice an increase in the 'productivity of capital': given a certain amount of capital, more output could be produced, i.e. more money could be created and lent;

³⁶ It should be noted that there are various methods of calculating and weighting asset risk, which can be decided by the central bank and supervisory authorities, or even by individual banks themselves, respecting certain parameters (https://www.bis.org/basel_framework/).

³⁷ Although there are various forms of assets (not only loans) and various methods of calculation, for the same risk of the asset the weighting will be the same. This complicates the picture, but the overall concept does not seem to be affected. As for the different calculation methods, it must be assumed that they converge substantially on the same basic approach, unless we assume that the law itself leads to significant and substantial differences between banks.

³⁸ Both equity and output in this case are more or less liquid forms of money, which makes it possible to say that output is 10 times equity (otherwise we could measure the two aggregates only in value).

³⁹ The *Rapporto Banche*, CER, 2/2020, Graph 58, shows that the ratio of capital to total assets (unweighted) increased between 2007 and 2015 (the crisis period) and then started to decrease, while still remaining at a higher level than in 2006. It should also be remembered, as mentioned above, that new rules on bank capitalisation came into force in those years. This graph seems to suggest that banks increased their capitalisation in order to cope with the crisis, as well as to comply with the new rules requiring a higher capital than before.

alternatively, with the same output, the equity employed⁴⁰ could be reduced. The opposite would be true in the case of an increase in the capital/product ratio established by law.

Given a certain capital / output ratio, provided that capital is increased, could output increase at any level? The answer to this question is complex. First, we can say the bank has "increasing returns to scale"⁴¹ and could therefore create any volume of credit. As the amount of credit granted increases, banking costs do not increase significantly. Assume a bank office (although today an employee with a computer and an internet line would be sufficient), which doubles its credit between one day and the next. The number of employees would not increase and they would not be paid overtime. If the demand for credit were to increase by 10 times, there would probably be no increase in costs for the bank, but if it were to increase by 100, new staff would perhaps be needed, and if it were to increase by 1,000 or 10,000 times, another bank office would be needed. Such increases, however, are rather unreasonable and unrealistic. It can therefore be assumed that a bank can carry out any *reasonable* level of lending without a *major* increase in costs (although, as we have seen, there are limits). The real and concrete limit to credit expansion, assuming always an increase in demand⁴², is the bank's ability to attract capital to reserve. So there are indeed limits to credit creation, but they do not depend on the bank itself, but on the rules imposed on the sector and on the ease of attracting new capital to be put in reserve within the economic system of reference.⁴³ Moreover, as the amount of credit granted by the bank increases, the exposure to risk increases, with the consequence that it may not be convenient for the bank to expand credit in all circumstances.

3: THE NATURE OF BANK BONDS

Bank funding also takes place through the issuance of securities. The functional differences between equity and deposits in the banking industry have been discussed in the previous pages. So what role do bonds play (*functionally*)? Are they part of funding and therefore comparable to deposits, or are they capital and therefore comparable to equity?

Bonds are more expensive for a bank than deposits or refinancing with the central bank, but they have

⁴⁰ The ECB aimed at the first possibility, i.e. an increase in credit, but also addressed the second, averting an increase in dividends resulting from a decrease in capital. ECB, press release 12/03/2020, "ECB banking supervision provides temporary capital and operational relief in reaction to coronavirus" <https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200312~45417d8643.en.html> .

⁴¹ It should be noted that Marx (1844), p. 45 - long before today's electronic and digital systems - already spoke of this phenomenon: "It is clear from the outset that the relation of fixed capital and circulating capital is much more favourable to the big capitalist than to the smaller capitalist. The extra fixed capital required by a very big banker as against a very small one is insignificant. Their fixed capital amounts to nothing more than the office."

⁴² And provided that this application is at an acceptable level of risk for the bank.

⁴³ See Disyatat, 2011.

other advantages. In the case of deposits, banks can offer good conditions, but the public decide on the amount and duration of deposits. Banks are therefore faced with uncertainty. With bonds, on the other hand, the bank takes an active role in raising funds and the maturities of the securities are certain. Refinancing at the central bank is also accompanied by problems: the central bank offers liquidity in exchange for collateral with a certain rating (the operations are usually repo, therefore not definitive and with fixed maturities). In the bond market, no collateral is needed to obtain liquidity and the maturity of the bond is decided by the issuing banks themselves.

Compared to equity capital, bonds imply a difference in the power of control (and ownership) of the bondholder compared to the shareholder. We can also assume to be easier to raise resources due to the lower risk that the bond entails for the investor.⁴⁴

We can hypothesise that debt capital has to be considered together with equity capital and that it is in some cases preferred to equity capital only for business management reasons, as in other enterprises. Alternatively, the stability, certain maturity of bonds and the absence of collateral could explain why banks are willing to pay a higher price to implement funding through bonds, instead of using only deposits or refinancing with the central bank. The greater stability of bonds compared to deposits allows banks to have higher risk exposures and thus more complex, remunerative and risky financial transactions. Many complex financial operations are based on debt securities issued by banks (e.g. *covered bonds*⁴⁵ involved in the securitisation of bank loans).

It is not easy to determine whether bank bonds fall under the notion of equity or deposit. A suggestion that seems to go in the direction of considering bank debt securities as deposits could come from the analysis of data on the volume of deposits, capital and bank bonds, as shown in Figures 2 and 3. The two graphs show the evolution of bank capital, deposits, loans and debt securities issued by Italian banks between 1861 and 2011. In this very long historical series, the data on deposits and loans are practically coincident until 1996 (except for a significant drop in loans between 1974 and 1988), then they diverge significantly (Figure 2): in 1993 the “Testo Unico Bancario” (TUB) was issued allowing banks to issue bonds (Article 12). However, if deposits and debt securities are added together, the series is again very similar to that of loans (Figure 3), even surpassing them after 2005. Finally, again in Figure 3, it can be seen that the trend of the series concerning capital, although on a different scale (right-hand scale), follows a very similar pattern to that of deposits and loans, confirming that capital is

⁴⁴ However, in EU the recent provisions on bank resolution (Directive 2014/59/EU) providing for the so-called "bail-in", make bank bonds much riskier than in the past, somewhat assimilating their level of risk to that usually associated with shares, while not giving the bondholder any decision-making power.

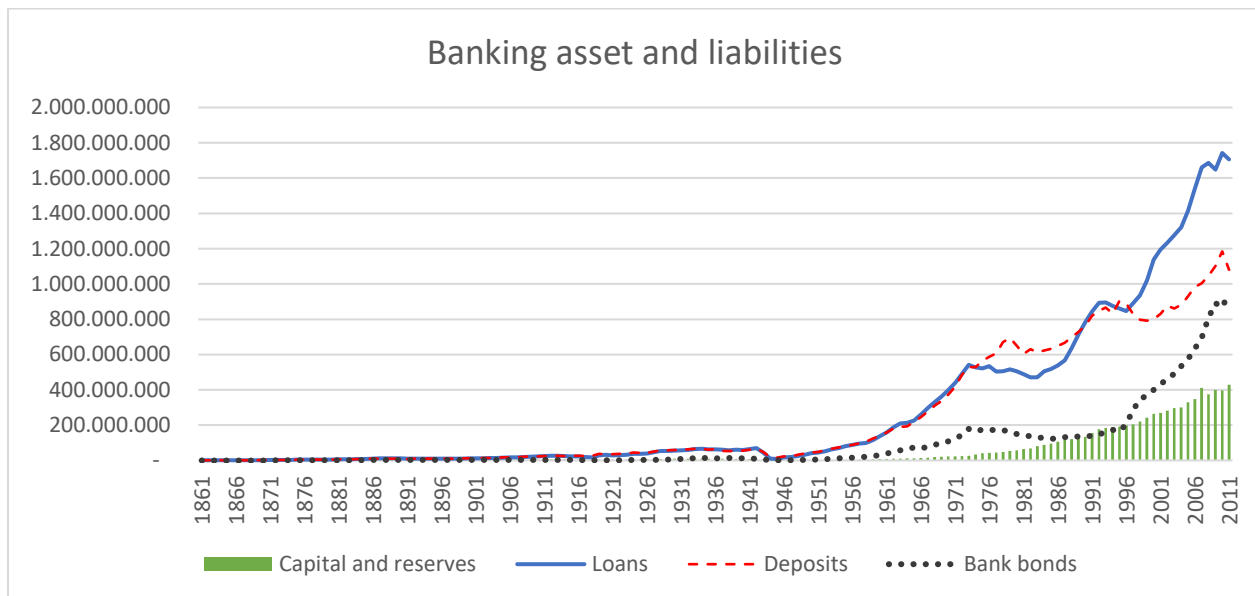
⁴⁵ For *covered bonds*, see Borsa Italiana website: <https://www.borsaitaliana.it/notizie/sotto-la-lente/coveredbond.htm> .

proportional to assets and showing no change when bonds are introduced into the banking market.

These data suggest that since the 1990s the instrument of bank debt securities has developed and that it has partly replaced direct deposit-taking, thanks to the introduction of different regulations. This seems to indicate that bonds are more related to the deposit category than to the capital one.

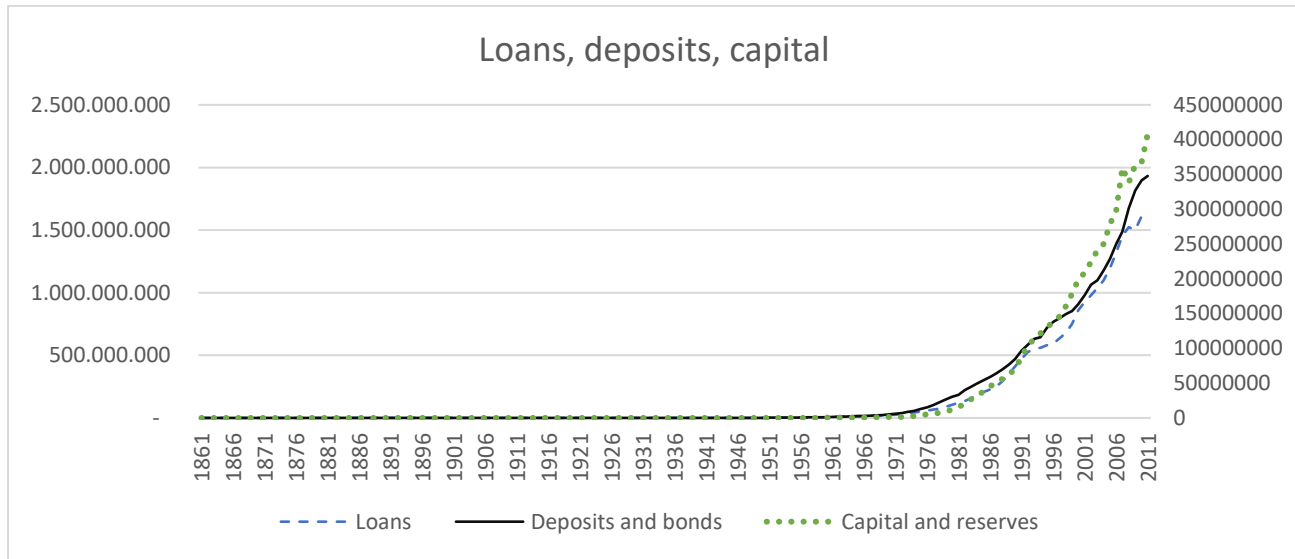
Since the bond market is aimed at collecting savings, it is obvious that the purchase of bonds implies an injection of liquidity for the bank issuing the bond (there is no problem here as with deposits that correspond to credits). Once State money has been collected by issuing bonds, deposits will decrease (someone will withdraw money from his deposit and use it to buy bank bonds). Following the theory of endogenous money, banks could increase liquidity, but banks are not interested in increasing liquidity, but only in changing the form in which they obtain it, from deposits to bonds.

Figure 2



Source: own elaboration on data from De Bonis, Farabullini, Rocchelli, and Salvio, 2012, "A Quantitative Look at the Italian Banking System: Evidence from a new Dataset since 1861", Bank of Italy, Quaderni di Storia Economica, Economic History Working Papers, no. 26, June. Values in thousands of euros. Values are deflated taking 2017 as the base year.

Figure 3



Source: own elaboration on data from De Bonis, Farabullini, Rocchelli, and Salvio, 2012, "A Quantitative Look at the Italian Banking System: Evidence from a new Dataset since 1861", Bank of Italy, Quaderni di Storia Economica, Economic History Working Papers, no. 26, June. Values in thousands of euros. Nominal values.

CONCLUSIONS

In this paper we have tried to shed light on an aspect that seems to be little discussed within post-Keynesian endogenous money theory, namely how it is appropriate to consider deposits from a functional point of view. Although banks create bank money, State money is not producible by banks, which need it as an input. Moreover, although the quantity of deposits and reserves depends on the demand for credit, and is therefore endogenous to the monetary-economic system, customer deposits and central bank loans are the main mechanisms by which banks get State money, and they pay for it. To be precise, the bank input is State money and not exactly deposits. However, deposits allow banks to find liquidity in the economic-financial system in an alternative less costly way than borrowing from the central bank. For these reasons, it seems reasonable to consider deposits as an input in bank production.

It should also be noted that credit creation does not seem to be defined by a traditional production technique. In order to limit the risk of bankruptcy, with the consequent damage to the entire economic and social system, certain legal regulations establish minimum requirements for the equity capital of banks. This creates a kind of *regulatory production technique*: given a certain volume of assets with a certain risk, legal regulations impose a specific minimum amount of equity capital. This creates a gravity centre in the amount of capital required to start a banking business, given the riskiness of the assets: lower levels of capital are not tolerated by law, higher levels lead to a lower profit rate.

For the purposes of calculating the profit rate, it seems logical to assume that bank bonds should not be regarded as debt capital as for any other enterprise, but as an alternative method of raising liquidity. In fact, given the *normative production technique*, only equity capital must be advanced to start a bank. Thus, bank bonds are an input of the banking industry just like deposits. Banks have started to differentiate their funding in order to manage their liabilities more profitably and to afford more complex and profitable financial operations.

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Appendix A

1: α creates a credit to A at the rate of 10%

α	
Credit to A: 110	Deposit of A: 100

A	
Deposit in α : 100	Debt to α : 110

2: A produces using its credit (buying commodities e.g. from B who deposits in β). The central bank (CB) finances in government currency α at a rate of 3%.

α	
Credit to A: 110	Deposit of A: 100
State money from CB: 100	Debt to CB: 103

A	
Deposit in α : 100	Debt to α : 110

β	
State money from α : 100	Deposit of B: 100

B	
Deposit in β : 100	

3: A sells the product

α	
Credit to A: 110	Debt to CB: 103
+ 120 State money from A	Deposit from A: 120

A	
+ 120 from the sale of the product =	Debt to α : 110
Deposit in α : 120	

4: A repays the debt with interest (10%).

α	
Credit to A: 110	Debt to CB: 103
+ 120 State money	Deposit from A: 120
State money: 17	Deposit of A: 10

A	
Deposit in α: 120	Debt to α: 110
Deposit in α : 10	

5: Dividend distribution.

α	
State money: 17	Deposit of A: 10
State Money: 7	Distributed dividends: 7

A	
Deposit in α: 10	Distributed dividends: 10

APPENDIX B

1: α creates a credit to A (0% interest rate). C has a deposit of e.g. 500 in α .

α	
Credit to A: 100	Deposit of A: 100
State money from the deposit of C: 500	Deposit of C: 500

A	
Deposit in α : 100	Debt to α : 100

2: A uses only 30.

α	
Credit to A: 100	Deposit of A: 70
State money from the deposit of C: 470	Deposit of C: 500

A	
Deposit in α : 70	Debt to α : 100
Cash: 30	

3: A repay his debt.

α	
Credit to A: 100	Deposit of A: 70
State money from deposit of C: 470	Deposit of C: 500
State money from A: 30	

A	
Deposit in α: 70	Debt to α: 100
Cash: 30	

APPENDIX C

1a: α creates a credit to A (0% interest rate).

α	
Credit to A: 100	Deposit of A: 100
State money from deposit of others and held as reserves to the CB: 300	Deposits of others: 300

A	
Deposit in α : 100	Debt to α : 100

2a: A uses his loan.

α	
Credit to A: 100	Deposit of A: 100
Reserves: 200	Deposits of others: 300

A	
Deposit in α: 100	Debt to α : 100
Cash: 100	

1b: α creates a credit to A (0% interest rate), reserves must be 10% of deposits. α uses his liquidity profitably.

α	
Credit to A: 100	Deposit of A: 100
State money from deposit of others and held as reserves to the CB: 40	Deposits of others: 300
"Free" State money: 260	
State bonds = 260	

A	
Deposit in α : 100	Debt to α : 100

2b: A uses his loan, reserves must be 10% of deposits. α uses his liquidity profitably.

α	
Credit to A: 100	Deposit of A: 100
Reserves to the CB: 30	Deposits of others: 300
"Free" State money: 10	
State bonds = 170 [=260 -100 (cash) +10]	

A	
Deposit in α: 100	Debt to α : 100
Cash: 100	