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A Model of the Relationship between the Interest Rate and the Profit Rate

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Abstract

In this paper we investigate the relationship between interest rate and profit rate. Considering that the bank must obtain on the invested capital a profit rate at least equal to the normal one, the bank interest rate can be calculated as the price of the bank output, i.e. the loan. The profit rate thus determines the interest rate, through the instrument of the price equation. Central to this study is the analysis of the best way to imagine such a price equation, considering the role of the central bank.

We then move on to study the structure of interest rates and their relationship to the profit rate. Finally, by introducing the hypothesis of a bank profit rate permanently higher than the normal one, we confirm and better explain from an analytical point of view some insights expressed by Marx in Book III of *Capital*.

Keywords: bank profitability; interest rate; price equation; Marx; finance.

JEL Codes: E11; E43; G21

Introduction*

In this paper we make an attempt to give a new interpretation of the relationship between interest rate and profit rate using bank profitability as a key: the bank, like any other industry, must obtain from the invested capital a rate of profit at least equal to the normal one, defined as the rate of profit generated on newly installed capital goods, obtained using the available dominant technique, for a normal level of capacity utilisation. The result is that the interest rate can be identified as the price of the “commodity” loan. The possibility of including financial production coefficients in the price equation instrument is therefore critically discussed, as it is difficult to accept a *normality* nature

* I wish to thank Roberto Ciccone and an anonymous referee for valuable advice and suggestions. Any errors or omissions are obviously the sole responsibility of the author.

for these coefficients. So, the profit rate determines the banking interest rate, which could be considered the main interest rate.

The analysis of the structure of interest rates in relation to the functioning of the banking industry and the condition of normal profitability of bank capital may shed new light on the relationship between the profit rate and the various interest rates. These developments confirm certain insights from Marxian thought that have not yet been fully clarified from an analytical point of view.

Next, we discuss the assumptions underlying the developed model, particularly those on the deposit rate, and introduce the possibility of a higher-than-normal bank profit rate, studying the important implications of this assumption and showing in a table similarities and differences with the model based on free competition. We also offer a discussion of the methodology used, placing this analysis within the core of the classical theory.

The first section briefly summarizes the main approaches in the literature with a table. The second presents the model and the third offers some insights and reasoning about the model. This is followed by conclusions and an appendix (A) about consumer loan.

1. Summary of key contributions

In this first section we summarize the views of Smith, Ricardo, Marx and Keynes and the more recent contributions of the Sraffian (Panico and Pivetti) and Marxian (Shaikh) schools. The orthodox marginalist view is not discussed because in this theory the rate of interest tends to coincide with the rate of profit (considering that profit rate is not imagined as a surplus but as the remuneration of capital). The study of the literature on the subject is only touched upon here, since an in-depth study of the subject is beyond the scope of this article. However, a forthcoming article focusing on the literature on the relationship between the rate of profit and the rate of interest should give due attention to this analysis (Zolea, 2022).

For the Classics, Smith and Ricardo, the rate of interest is a part of the rate of profit and the latter determines the former, in a residual position with respect to the premium for the *risk and trouble*, objective or presumed, of entrepreneurial activity. We can see it in the first line of Table 1.

For Marx profit is divided into two parts, which end up in the hands of two subclasses of capitalists: the capitalists of money and those of industry, in contrast to each other. The interest rate is the part of the profit rate that goes to the financial capitalist and is given by the struggle for the division of profit between the two components of capital and the general conditions of the monetary sector of the economy. This is described in line two where profit and interest rate are given and their difference gives a residual part, the part of the profit rate that remains in the hands of productive capitalists.

Keynes assumes that entrepreneurs compare the rate of interest with the marginal efficiency of capital and continue to make investments until the last investment has a mar-

ginal efficiency equal to the rate of interest (Keynes, 1936, book IV). This mechanism seems to imply that the rate of interest determines the marginal efficiency of capital and in equilibrium the two are equal (line three).

Panico (1988) and Pivetti (1991) state interest rate and risk premium are given, while the real wage not. The result is that the sum of interest and risk premium gives the profit rate and prices and so the real wage¹ (line four).

In the last line, Shaikh's approach, followed and carried forward in these pages, has the same causal relationship as Marx's, although the rate of interest is determined endogenously as the price of the production of the banking sector. It can be argued, to simplify the argument, that the determination of the relations between the rate of interest and the profit rate occurs in two stages: in the first, the profit rate determines the rate of interest like any other price (of non-basic commodities; otherwise prices and profit rates would have to be determined simultaneously); in the second stage, having identified the rate of interest in the first, the profit rate is divided between financial and productive capitalists, where the share of productive capitalists is determined residually. While Marx considers the interest rate to be exogenously determined in a way that is not too clear and rigorous, Shaikh explains what determines it, but in a separate stage of the analysis, which makes the two approaches very close. This innovative approach should therefore not be confused with that of Smith and Ricardo, who consider the interest rate the endogenous variable for quite different reasons and determine it in quite a different way.

Table 1. Summary table

AUTHORS	ENDOGENOUS VARIABLES	EXOGENOUS VARIABLES	RELATION BETWEEN INTEREST AND PROFIT RATE
Smith, Ricardo	i	r, π	$r - \pi = i$
Marx	π	r, i	$r - i = \pi$
Keynes	i	r	$i \rightarrow r = i$
Pivetti, Panico	r	i, π	$i + \pi = r$
Shaikh	i, π	r	$r \rightarrow i$ $r - i = \pi$

The meaning of the symbols is: i = interest rate, r = rate of profit, π = risk and trouble premium or residual part, depending on the author.

2. The model

In this section we propose an original model of the relationship between the profit rate

¹ Thomas Tooke too, proposed the idea that the money rate governed the normal profit rate with both the money rate and remuneration for risk and trouble treated as exogenous; See Smith 2011.

and the interest rate in order to explain the functioning of the banking sector and the structure of interest rates. It should be noted that only traditional banking activities related to deposits and loans are considered here, whereas in reality many other types of services can contribute to the formation of bank profits². The purpose of this model is to explain the functioning of a banking industry “cleaned” of those other elements that may be more or less present depending on the specific bank under consideration. It is also intended to place this study within the approach of endogenous money theory, which seems to best represent the contemporary banking system³. The model thus illustrates how the bank lending rate is determined in relation to the rate of profit. The quantity of money in the system is not discussed because it is determined by demand, according to the endogenous money theory.

The interest rate treated is the nominal one, but it is possible to easily switch to the real one by considering the inflation rate. Moreover, this interest rate, in order to be compared with the profit rate, should be a medium-long term interest rate, although, as will be discussed in detail below, short and very short-term rates, such as overnight rates set by the central bank, play a major role in its determination.

Shaikh and Panico base their analysis on the conception of the banking sector as a particular industry of the economic system. Like any other industry, the bank must ensure that the capital invested in it obtains a remuneration at least equal to the normal rate of profit in the economy (Mill, [1967] 1844, p. 305; Panico, 1988, p. 91; Shaikh, 2016, p. 449). Thus, taking up the idea of the Classics that the interest rate is the part of the profit rate that goes to the financial capitalist, it can be said that this part must be such as to guarantee to the latter a profit rate on the invested capital at least equal to the normal one; otherwise, banking activity (i.e., the activity of lending in the form of a business) would not be profitable. If this condition is met, the interest rate on bank loans can be calculated in exactly the same way as the price of any commodity⁴.

However, we take a different way from Panico’s model (as well as that of Dvoskin and Feldman, 2021), as we do not consider appropriate to assume financial technical coefficients referring to loans within the price equation of an industry. Picking up on Barba and De Vivo, 2012, p. 1485, this passage is particularly interesting:

The distinction does not surface in the production equations themselves, where technical coefficients do not discriminate between necessary and unnecessary expenses. As long as, for example, financial services are employed, they enter the interindustry relationships with their own coefficients, on the same footing as the technical coefficient of, for example, the steel needed to produce a unit of corn. Nevertheless, it would be difficult to deny that these expenses exhibit some peculiarities. What a ‘circulation coefficient’ expresses is not a relationship that can be defined once the technology is given. Circulation expenses depend on the changing conditions of realisation. Marx’s distinction between production and circulation appears here to reflect a difference between a

² See DeYoung and Rice 2004a, 2004b; Lapavistas and Mendieta-Muñoz, 2019; Toporowski, 2020.

³ As this webpage reports, many central bankers have also recently confirmed the validity of this approach: <https://rwer.wordpress.com/2012/01/26/central-bankers-were-all-post-keynesians-now/>.

⁴ In the post-Keynesian tradition, adding a mark-up to bank costs.

stricto sensu technique of production and a wider definition of it, which would also include circulation and realisation expenses.

For the two authors, while in a *broader sense* “circulation coefficients” can be included in price equations (see Steedman, 1977, p. 112-115), this seems less acceptable in a *narrower sense*, especially within the analytical tool of the price equation, since it is based precisely on the *necessity* and *normality* of the technical coefficients that appear in it⁵ (although the two authors do not seem to agree with this at the beginning of the quoted passage). The price equation is *not* the aggregate balance sheet of an industry and relates to the theoretical and abstract *natural price*. The idea of a price equation “in a broader sense” is not convincing, especially if it becomes fundamental for the determination of the relationship between interest rate and profit rate and thus of the distribution between wages and profits (see Panico, 1988).

Indeed, considering the financial coefficients, the proportion of capital financed through equity or debt seems completely arbitrary and random. Nor we can say that a particular proportion is cheaper than others and thus acts as a centre of gravitation of the possible proportions in a given industry. Indeed, in the context of the price equation, it is *irrelevant* whether the capital is equity or debt: the normal profit rate is obtained on the *whole capital employed*, irrespective of the part of the profits that will be paid as interests. If we were to insert financial coefficients for lending, we would obtain that capital would

⁵ See Arena (2016), pp. 193-194: ‘It is, however, essential to take the analysis further and to investigate the dividing line between technical and social factors more closely. An important passage in the Sraffa Archives provides a significant point of departure for this analysis:

Interest appears thus as the necessary means of overcoming an obstacle to production. It is a social necessity as distinguished from the material necessity of, say, putting coal into a locomotive that it may do its work. There are many other such socially necessary costs which appear as technical necessities. Thus, the work of a ticket collector on a bus or a railway: obviously, the railway would run equally well if no tickets were collected; but, if everybody travelled without paying, the shareholders would stop it; the work of the ticket collector prevents the shareholders from stopping the railway; the shareholders would be as effective in stopping trains as lack of coal in the engine. The ticket collector is therefore as productive as the fireman. (Sraffa D3/12 18/11)

This passage reiterates the importance of the distinction between “social” and “material necessity”. Even if a technical or material necessity is similar to a social necessity, the two must not be confused or conflated. Hence, even if a “ticket collector is as productive as a fireman”, we cannot consider them as equivalent. The ticket collector’s primary role is to safeguard, at least indirectly, the interests of the shareholders, whereas the fireman’s principal task is to protect the technical viability of the bus or the railway; without the latter there is a real risk of the destruction of capital. This is also why for Sraffa interest cannot be justified as a productive and necessary ingredient related to production, but rather as a strictly legal and conventional tool depending on institutions and conventions in a given society (Sraffa, D1/15 2). This is finally why Sraffa often expresses his doubts on the usual justifications for the necessity of interest (Sraffa, D1/15 6 and D3/12 7 44)’.

be remunerated differently depending on the method of financing it⁶. This would lead to various conceptual difficulties and *absurd* results⁷. First of all, if the entrepreneur does not get a remuneration *also* from debt capital, it is not easy to explain why he should use it, unless debt capital is identified with a (*necessary* and *normal*!) input of production rather than with the capital needed to purchase the means of production, a contradictory argument by definition⁸. Moreover, if we were to accept the existence of two competing systems of capital financing, the cheaper method would lead to lower selling prices and should therefore supplant the other. Furthermore, after having introduced passive financial coefficients, we would then have to introduce active ones into the price equations: assuming, for example, that deposits with interest are included in the price equations of productive activities, as the amount of deposits increases, firms would charge lower and lower prices, and might even arrive at a zero or even negative price⁹. Thus, a different path is followed: loans do not enter the production equations, since capital goods acquired by the loans themselves do, as Fratini, 2020, p. 5, clearly expresses:

The amount of capital K_t is not the quantity of an input. The quantities of inputs employed are \mathbf{X}_t , \mathbf{L}_t and $\mathbf{\Lambda}_t$ [\mathbf{X}_t , \mathbf{L}_t and $\mathbf{\Lambda}_t$ equivalent to vectors of goods, labour and natural resources].

Going back to Marx's distinction between *productive capital* and *interest-bearing capital*, by definition, only *productive capital*¹⁰ enters the sphere of production. If the productive capitalist were to use only his own capital, he would get all the profits and the entire profit rate. He would then play the role of both the financial capitalist and the productive capitalist: he would practically have financed himself.

In the following pages we try to develop an economic-financial model based on these

⁶ Such an approach is followed by Dvoskin and Feldman, 2021 (see *ibid.*, footnote 16, p. 13). Barba and De Vivo, 2012, p. 1485, write: "The case of increased circulation costs may be portrayed as a worsening in the technique of production. But this worsening is not related to the production activity strictly defined. It should be noted that (abstracting from the existence of exhaustible natural resources) only if the technique is defined in this wider sense is an *absolute* worsening in the conditions of production possible. No worsening in the conditions of production *stricto sensu* is conceivable: one would otherwise have to maintain that for some inexplicable accident the better technique has been forgotten and is no longer available".

⁷ A similar line of thought is also followed by Pegoretti, 1983, Gattei, 1983, and Franke, 1988. Pegoretti even states it is impossible to define a general profit rate.

⁸ Imagine a production in which, given a certain amount of equity capital, the capitalist buys the quantity X of commodity 1, Y of commodity 2 and Z of commodity 3, where commodity 3 is "debt capital"; debt capital enters here as an input, not as capital. This is questionable.

⁹ It is certainly cheaper to use the money by investing in production and getting the normal rate of profit than to accumulate deposits, which yield less. However, the fact remains that accumulating deposits, according to the discussed interpretation would reduce the selling price. Which combination is more profitable between new investments and accumulation of deposits in order to obtain extra profits (or to produce at lower prices and fight competition) depend on many possible assessments and circumstances.

¹⁰ If we take a loan of X euros to produce a certain commodity, in the production of this commodity do not enter X euros, but Y commodities paid X euros.

assumptions¹¹, which also considers the deposit rate and the influence of the central bank on interest rates. In this model the interest rate is not a cost of the production sector, but a fraction of the profit rate, as in the Classics and in Shaikh, 2016.

Let us start the analysis from three simple equations describing the real production system, with:

w = monetary wage,

ω = vector representing the basket of commodities that constitute the real wage¹²,

\mathbf{p} = vector of prices,

r = general rate of profit,

r_b = general profit rate of the banking sector,

\mathbf{Q} = output matrix of the production sector,

A = loans (banking sector output),

\mathbf{A} = matrix of industry inputs,

\mathbf{K}_b = vector of material inputs of the banking sector,

i = lending interest rate on loans,

τ = interest rate on deposits,

τ^* = main refinancing rate set by the central bank,

D = deposits (one of the main inputs of the banking sector),

\mathbf{l} = vector of labour inputs in the industrial sector,

l_b = amount of labour employed in the banking sector.

It is also assumed that all capital is circulating, there is no joint production and prices are normalised by taking the monetary wage as given. Given the basket of commodities that constitute the real wage¹³, it is possible to determine the price system and the profit rate simultaneously. There are $n+2$ equations and $n+2$ unknowns \mathbf{p} , r , w :

¹¹ See also Zolea 2021a; 2021b.

¹² Following Panico, 1988, p. 202. Furthermore, Panico, 1983, pp. 159-160, states: “For the moment [...] we find ourselves with only one degree of freedom in the proposed analytical model. This degree of freedom can be eliminated if we consider i as an independent variable, or if we take as given the <<basket of commodities>> which constitutes the real wage. In the latter case, one must add the following equation $w = \lambda \mathbf{p}$ where λ is a line vector representing the <<basket of commodities>> that make up the real wage” (our translation). Panico in his model takes the first way, we preferred instead to follow the second, as in the Classics and in Shaikh, 2016. A different way is followed by Di Bucchianico, 2019, 2020, who applies the methodology of the *integrated sector of the commodity wage* (Garegnani 1984, 1987; Fratini 2015) to the study of the impact of finance on the profit rate.

¹³ The referee has pointed out that in a modern capitalist monetary economy wage-bargaining determines the money wage. So, it is more plausible to suppose the real wage is endogenous and treat the normal profit rate as the given distributive variable policy-determined by the money rate of interest. However, the assumption of a given real wage is a very common postulate in classical and post-Keynesian theory (see Garegnani 1984). Moreover, approaches based on monetary determination of the rate of profit are subject to other theoretical problems, discussed in this paper (see also Zolea, 2022). In addition, central banks’ use of negative rates raises additional questions about the possibility of monetary determination of the profit rate.

$$pQ = pA(1 + r) + wl \quad [1]$$

$$w = w^* \quad [2]$$

$$w = p\omega \quad [3]$$

Now we add the banking sector, where loan is the output of the banking industry, and the bank profit rate is equal to the normal one:

$$i = [pK_b(1 + r_b) + \tau D + wl_b] / A \quad [4]$$

$$\tau = \tau^* \quad [5]$$

$$r_b = r \quad [6]$$

$$i < r \quad [7]$$

[1] is the equation for the real productive sector, [4] is the equation for the banking sector. While in [4] i appears as the price of the produced commodity, it does not appear in [1] since it is included in r . A similar reasoning applies to the rate on deposits τ . While these are included in the inputs of the banking sector, they do not appear in the price equations of the real sector. Deposits affect the real sector because the part of the profit paid in the form of interest is to be considered net of what is earned on deposits. The system is now made up of $n+5$ equations and $n+5$ unknowns (to the previous two we must add i , τ and r_b), plus the condition that the interest rate must be strictly less than the profit rate [7], as in Marx, Panico and Shaikh. The main refinancing operations rate of the central bank is the rate at which banks can refinance themselves and obtain liquidity. Therefore, it seems reasonable to regard refinancing at the central bank as an alternative for banks to taking deposits. For simplicity, the deposit rate τ is set equal to the main refinancing rate set by the central bank. It follows that the deposit rate is exogenously¹⁴ determined (τ^*), as a cost, while the lending rate is the price of bank output. This simplifying assumption will be discussed in more detail below. The price equation of the banking industry [4] determines i , i.e. the price of production of the banking industry. The lending rate on bank loans, in turn, determines the part of the profit rate that goes to bankers (while other types of rates determine the part of the profit rate that goes to other types of financial capitalists, as will be discussed in the sixth section). It must respect the condition [7], i.e. it must be strictly lower than the profit rate, otherwise it would not be convenient for the productive capitalist to get into debt.

An increase of the deposit rate leads to an increase of the loan rate, so that the bank can reach the normal profit rate in the changed condition¹⁵. An increase of the lending rate leads to a reduction of the residual profit rate which remains in the hands of the productive capitalists. If the change in the interest rate were to be long-lasting, over a longer period, the productive capitalists might try to influence the central bank for lower rates, or they to raise prices at the expense of workers. Unlike in Pivetti's and Panico's theo-

¹⁴ See Moore, 1988, p. 266, on the role of central bank interest rates, consistent with the approach of this article: "Central banks establish domestic short-term nominal interest rates by exogenously setting the marginal supply price of liquidity to the banking system". See also Hicks, 1989, p. 107, who considers the deposit rate "the king-pin of the system".

¹⁵ As in post-Keynesian models using mark-up.

ries, where the change in the interest rate leads, through various steps, to a change in real wages, in the approach proposed here the change in interest rates leads to direct effects only on the residual of the profit rate, the real wage and the total profit rate remaining constant¹⁶. There is a (fairly) automatic mechanism only in the variation of the active bank rate against a variation of the passive one. This does not mean, however, that the effects on distribution hypothesised by Pivetti (1991) and Panico (1988) may not actually occur, but in the long run and in a more mediated and indirect way depending on the dynamics of the contrasts between workers and capitalists and between productive and financial capitalists.

In fact, even the change in the lending bank rate following a change in the deposit rate may not be so automatic. First, it should be noted that when the central bank rate falls to zero (while the bank deposit rate or *deposit facility* falls below zero), as in recent years, there are difficulties for banks to adjust their rates (see, among others, Zolea, 2020a; Di Bucchianico and Zolea, 2020). Moreover, rewriting [4] in a more useful way (i.e. with loans to the left of equal), we obtain:

$$iA = pK_b(1 + r) + \tau D + wl_b \quad [4.1]$$

It follows from [4.1] that an increase in τ leads to an increase in i ($\tau \uparrow \rightarrow i \uparrow$). However, the change in the lending rate is *not automatic*, but such that the normal profit rate r is guaranteed. Thus, the size of the change in the lending rate depends on the volume of loans and deposits. An increase in costs equal to $\Delta\tau D$ must be matched by an increase in income of the same magnitude. In other words: $\Delta\tau D = \Delta i A$. Only in the case where $D=A$ is it fair to say that i varies by the same amount as τ . If this is not the case, different scenarios may arise. If $D > A$, the change in the lending rate will be greater than the change in the borrowing rate; if $D < A$, the opposite will occur. The central bank's control over rates is thus mediated by bank profitability. Figure 1 seems to confirm the above conjecture.

Figure 1. Interest margin and ECB rate



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

¹⁶ As in Marx; see for example Marx, 1905-1910, vol. II, pp. 491-492, and Argitis, 2001.

As can be observed, the differential between lending and borrowing rates follows the general trend of the rates set by the central bank but has less wide (apart from the hardest period of the crisis between 2007 and 2012) and more frequent fluctuations. The higher frequency is easily explained because the differential is built on the difference between real finance rates, while the rates set by the central banker have longer and more regular intervals because they are due to monetary policy decisions. The smaller amplitude of fluctuations shows that the rate differential has to ensure bank profitability and, although it is influenced by central bank rates, it remains broadly stable¹⁷.

For the sake of completeness, we show the decomposition of the profit rate in order to take into account the existence of deposits and the interest rate paid by banks to depositors. However, this equation is not part of the model, as it shows an aspect of the financial-economic system at the accounting-aggregate level, i.e. by means of instruments of a different type from the price equations.

$$rK - (iA - \tau D) = \pi K \quad [8]$$

With restrictive assumptions, i.e. assuming that every loan corresponds to a deposit and that all the capital in the economy (set equal to 1, for example) is debt (in the form of bank loans), at the aggregate level we will have $A = D = K = 1$ and it will therefore be possible to see the relationship between rates:

$$r - (i - \tau) = \pi \quad [8.1]$$

where π is what remains to the productive capitalist of the profit rate after paying the interest rate on the borrowed capital. The coefficients indicating the amount of loans and deposits (A and D), actually, at the non-aggregate level, vary from firm to firm and do not have a general character: as has just been shown, there is a relationship between the rate of profit and the rate of interest, where the former determines the latter; on the contrary, how the profits of a firm are divided between bankers and entrepreneurs is a *purely empirical matter*, depending on the amounts lent by the bank to the entrepreneur in the form of loans and by the entrepreneur to the bank in the form of deposits, on which lending and borrowing rates will be paid¹⁸. More generally, from the real sector of the economy a part of the profits goes to the financial sector according to the volume of assets (including deposits) and liabilities (including bank loans) of the real sector and the various rates of each form of these assets and liabilities.

¹⁷ It should also be noted that the central bank's policy of near-zero (main refinancing rate) and negative (overnight deposit rate) rates seems to have pushed the rate differential, and thus apparently bank profitability, to a lower level (see Banca d'Italia, Rapporto Annuale, Statistical Appendix, various years, and ECB Economic Bulletin, No 3-2020 <https://www.ecb.europa.eu/pub/economic-bulletin/html/eb202003.en.html>).

¹⁸ Marx, 1894, MIA, chapter 12, states: If we inquire further as to why the limits of a mean rate of interest cannot be deduced from general laws, we find the answer lies simply in the nature of interest. It is merely a part of the average profit. [...] The way how the two parties who have the claim to it divide the profit is in itself just as purely empirical a matter belonging to the realm of accident as the distribution of percentage shares of a common profit in a business partnership".

3. Further developments

3.1. Natural interest rate

The analysis of the previous pages indicates that the profit rate determines the bank interest rate as the price of production in that sector. This reasoning is more related to Marxian and post-Keynesian approach than to that of Smith and Ricardo. For the Classics the rate of profit *directly* determines the rate of interest, whereas in this paper the rate of profit determines the rate of interest in the same way as it does for the prices of *non-basic* commodities¹⁹. Essentially, it is the *competition* and the *tendency towards the natural price* that determine the rate of interest. In addition, the deposit interest rate set by the central bank plays an essential role in this analysis. It influences the interest rate in the same way as changes in the cost of a key imported commodity (such as oil). All this seems to better explain Marx's approach, which recognises a multiple influence on the interest rate by the profit rate, by economic, institutional and conventional conditions, by competition in the loan market and by the contrast between workers and capitalists and subclasses of capitalists. The framework outlined in this paper clarifies these seemingly contradictory elements of Marx's thought²⁰. One element that at first sight contrasts with Marx's statement in Book III of *The Capital* (but not with the *Grundrisse*, Marx 1857-1858) is that the determination of the bank lending rate as the price of this industry indicates the existence of a *natural price*, which might suggest a *natural rate of interest*, a hypothesis strongly opposed by Marx (see for instance the passages already cited in Marx, 1894, chapter 12, and Lapavitsas, 1997, p. 99). This latter aspect of Marx's theory, however, can be linked to the critique of the Classics on the *direct determination* of the interest rate as a *natural part* of the profit rate (see Shaikh, 2016, p. 451). The theory elaborated in these pages proposes a determination of the interest rate dictated by technical conditions of production as well as by bank profitability. In this sense the interest rate can be defined as *natural*, in the same way as the prices towards which *market prices* gravitate are generally defined in classical theory. All this,

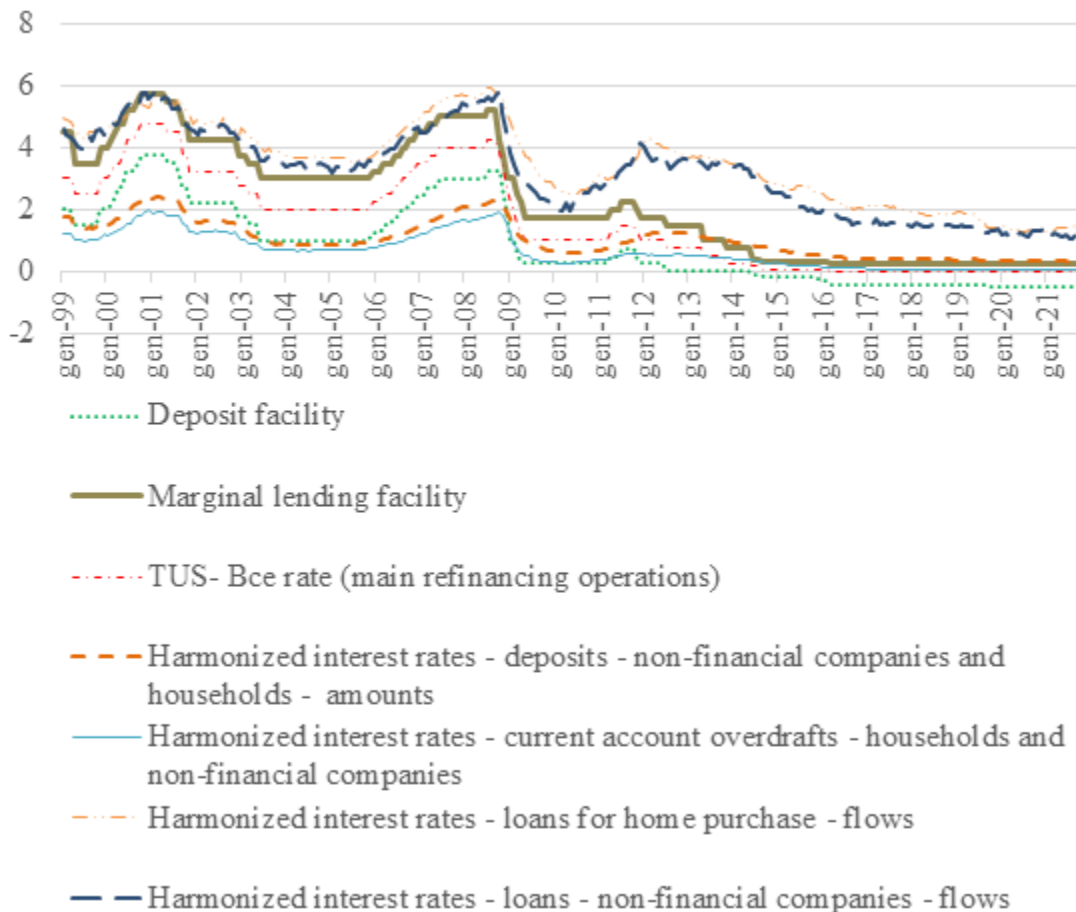
¹⁹ In this regard we recall Barba and De Vivo 2012, p. 1490 and p. 1494: "Banks were only offering the service of channelling funds from lenders to anyone who was disposed - often induced-to borrow. [...] This service cannot be deemed to have added value from any reasonable point of view. That the intermediating sector is 'producing' something is an optical illusion. It simply offers a chance of realising a capital gain by 'passing the parcel' to someone else. Everybody would agree that some financial intermediation may perform a valuable function (e.g. reducing a solvent borrower's need of self-finance), but those revenues for financial firms arose from activities unable to create any 'social value' or from activities whose result has to be properly understood as the enjoyment from betting, a production that can hardly pass the test of being 'productive of the means of production'"; "Applying this reasoning to the financial sector, we discuss whether the services produced by it are to be considered as basic commodities. We argue that contrary to what could at first sight appear, many financial services really consist of the provision of gambling facilities and have to be regarded as the final consumption of luxury goods". See also Nell, E., 1988, p. 264: "Would not the provision of financial services be a non- basic industry? So the rate of profit would determine the rate of return on such services".

²⁰ It should be remembered that Book III of *Capital* was published posthumously by Engels, who found many difficulties in reorganising and understanding Marx's unfinished manuscripts, in particular the chapters about interest rate.

then, does not seem to contradict the Marxian theory and indeed specifies better from an analytical point of view many aspects of it.

3.2. Deposit rate insights

Figure 2. Bank rates



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

3.3. Analysis of the relationship among profit rate, bank rates and interest rate structure

Once the model of the banking sector and its interaction with the real sector has been illustrated, and the lending rate on bank loans has been determined, it is possible to derive a further insight into the structure of interest rates, which completes the analysis in this study, in particular by adding bond lending. In the previous section it was shown how the lending rate on bank loans depends on the profit rate; we now illustrate the link between other interest rates and the profit rate, a link in which bank lending and borrowing rates play a fundamental role.

Having obtained the bank lending rate via [4], we can imagine an interest rate structure dependent on the main refinancing rate set by the central bank and the profit rate. The first rate determines the floor of the rate structure, while the second one, in turn depend-

ent on the first one and the profitability of bank capital, determines the ceiling; bond rates would be in the middle. If the rate of a bond were lower than the deposit rate (equal for hypothesis to the main refinancing rate) it would be more convenient to deposit money in the bank, facing a lower level of risk and having more liquidity; *mutatis mutandis* if this rate were higher than the loan rate, it would be more convenient to borrow directly from the banks and not to issue bonds.

Bonds are securities and have a much higher circulation than bank loans; this implies buying and selling them for capital gains. Apparently bank loans have no circulation at all, but recent financial innovations and securitisation operations have created an indirect market for bank loans. Bonds are not contractible, usually require payment of a lower interest rate and are long-term²¹. A bank loan has higher rates, can be short-term or long-term, can be granted to large and small enterprises and is contractible. In addition, bank lending often places greater constraints on the management of the enterprise (distribution of dividends, mergers, purchases, further indebtedness). Finally, banks have specialised legal departments, whereas this is often not the case for bondholders, who can be bought by anyone.

In spite of these differences, it seems reasonable to assume that in many cases²² bonds and bank loans are alternatives and thus follow the structure outlined above, although there are clear cases where this is not the case: for example, it is very difficult for small enterprises to issue bonds; since the alternative is missing, their only source of financing is the bank.

Analytically we can explain why the bond rate is lower than the bank rate. The interest rate on bank loans must guarantee, after payment of costs and wages, a profit rate on bank capital at least equal to the normal one, whereas for the bond rate there is no such need, since the purchase of bonds does not involve any entrepreneurial activity, nor, among other things, any production costs²³. While the bank does not lend own capital²⁴,

²¹ We can also assume that bonds have higher fixed costs than loans. Issuing and managing bonds is much more complex than borrowing from a bank. It therefore requires a specialised service within or outside the firm.

²² It should be noted that there can be many cases where a bond interest rate is higher than the interest rate on a bank loan. For example, an investment might be considered too risky by the banking system and the only option for the company is to finance itself on the market hoping to find investors at a high rate. There are many possible valid reasons for company management of financing that could lead to higher bond rates than bank rates (distribution of company risk, difficulties in bank financing, tax reasons), but in this study we only analyse the theoretical link at a very general and abstract level with the profit rate. We thank Lorenzo Esposito, Bank of Italy, for some valuable suggestions about it.

²³ See Giacché, 2020, p. 447. Giacché, 2020, however, does not seem to dwell on the need for the lender organised in the form of a company (the bank) to obtain a profit rate at least equal to that considered normal.

the purchase of a bond generally²⁵ involves the use of own capital. Bonds thus give their holder a percentage of profit coinciding with the bond interest, which may be less than the normal profitability of capital.

Public securities such as government bonds can then be added to the scheme (represented in Figure 3). These securities, regardless of contingent situations such as the spread increase or the recent sovereign debt crisis, are considered among the safest securities and usually give rather low interest rates. Government bonds could be placed between bank borrowing rates and bond rates. With:

i' = bond rate,

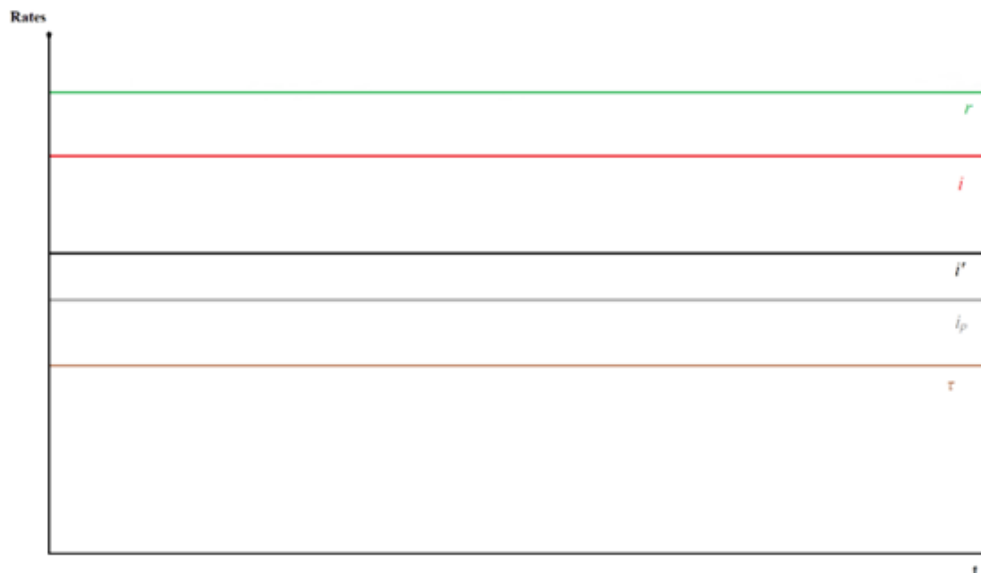
i_p = government bond rate,

$$\tau < i' < i \quad [9]$$

$$\tau < i_p < i' < i \quad [10]$$

$$\tau < i_p < i' < i < r \quad [11]$$

Figure 3. Interest rate structure



Own elaboration.

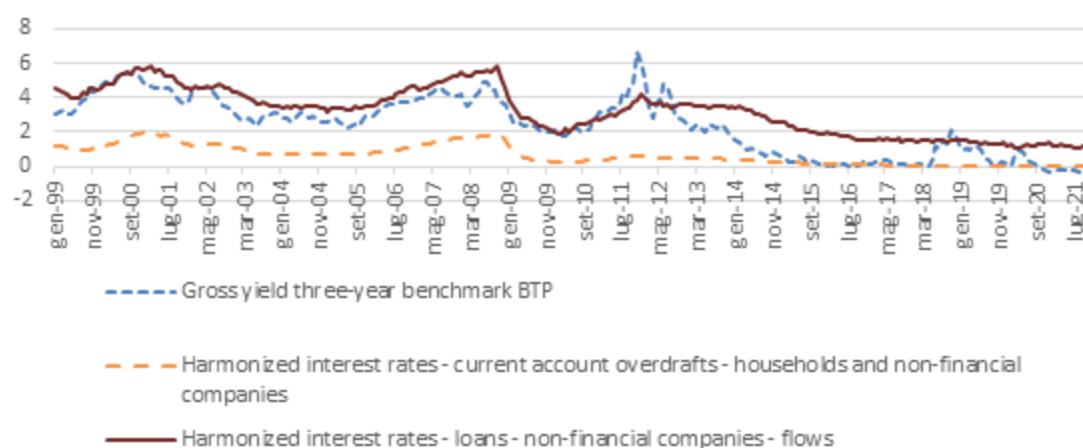
Figure 4 confirms the structure of the rates summarised in [11] and schematised in Figure 3. As we might expect, the rate on public bonds generally follows the expected trend, but some peaks exceed the rate on loans, between 2011 and 2012, i.e. the period

²⁴ As Ricardo already stated, 1816, p. 108: “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”; Ricardo, 1816, p. 109: “But the profits of the Bank essentially depend on the smallness of the stock of cash and bullion; and the whole dexterity of the business consists in maintaining the largest possible circulation, with the least possible amount of their funds in the unprofitable shape of cash and bullion”.

²⁵ Leaving aside cases of financial engineering and *leverage buyouts*.

of the sovereign debt crisis. Subsequently, yields on public securities fell considerably, thanks in part to the purchase of these by the European Central Bank²⁶ (ECB), except for new critical periods linked to political or government crises that were reflected in the dynamics of the *spread*. It is also worth noting the collapse of the rate on government bonds in mid-2012, which reached below zero between 2020 and 2021. The expected trend within the corridor formed by the deposit and loan rates is confirmed, except in the last year. This exception is due to negative rates and the effects of the *unconventional* monetary policies implemented by the ECB in recent years.

Figure 4. Structure of rates



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

3.4. Profit rate and interest rate structure

A change in the distribution leads to a change in all commodity prices, including lending. In addition to leading to a change in the loan rate, a different distribution leads to a different ceiling of the rate structure, resulting in a greater or lesser bandwidth of rates within the corridor identified earlier. However, two elements should be noted. The first is that the central bank can intervene to reduce the effects on the financial structure of a change in the distribution, for example by decreasing the deposit rate if the lending rate increases, with the result of curbing the increase in the lending rate (or even reducing it). The second is that changes in the distribution usually occur slowly and in the long run, whereas central bank action is much more frequent and has an immediate effect. In a short-run analysis, therefore, the distribution can be taken as given, while the lending rate and the whole structure of rates respond to central bank influences²⁷.

²⁶ With the Public Sector Purchase Programme (PSPP) and the Pandemic Emergency Purchase Programme (PEPP) during Covid-19 crisis. For an overview of quantitative easing purchase programmes, see, among others, Zolea, 2020b.

²⁷ It is indeed undeniable that the central bank influences interest rates. However, in this analysis, this does not imply adherence to monetary theories of distribution.

3.5. Model with monopolistic banking sector

Finally, assuming that the banking sector presents particular and stable viscosities to the functioning of competition²⁸, e.g. due to an oligopolistic type of concentration, due to institutional barriers to entry due to the particular regulation of the sector²⁹ or due to some type of agreement or cartel among banks³⁰, the condition [6] is no longer binding and the system is better described by the:

$$r_b \geq r \quad [6.1]$$

The aim of the cartel is in fact to increase the profits of the participants. Higher profits are also achieved in the case of a monopoly (or oligopoly), where production in a sector is concentrated in the hands of a few firms, which enjoy greater market power, setting selling prices, influencing the purchase price of inputs, exercising greater power in wage bargaining and being able to organise a united front before the legislator or possible regulator³¹. It should also be noted that this monopolistic structure in particular results in an increase in the price of output leading to a higher-than-normal profit rate, but does not imply a reduction in the amount of output produced, which is in fact demand-dependent, as post-Keynesian endogenous money theory states.

With this hypothesis we return to Marx's approach, according to which the interest rate is an independent variable that varies in relation to the contrast between subgroups of capitalists³²: by virtue of a bargaining power reinforced by the high degree of concentration in the banking sector, banks can raise the prices of their services in order to obtain higher profits, in particular they can raise the interest rate on loans beyond the level that guarantees a normal profit rate on bank capital.

It should be noted that the Italian banking system until the 1990s was deeply influenced and controlled by the Government. With the liberalisation of the sector (starting with the law no. 218/1990, the so-called 'legge Amato'), there has been a shift to a market system that is much more exposed to the dynamics of the foreign financial and banking market. One of the effects of this liberalisation is the concentration of the banking sector, also to better compete with European and global banking giants. Sapienza, 1999, p.

²⁸ See Sylos Labini, 1984.

²⁹ Mazzucato, 2018, pp. 127-128: "Therefore, licensing and regulation placed small banks at a significant cost disadvantage in comparison with large banks, which can spread the costs (and risks) of bureaucracy more widely and raise funds on more favourable terms. This made it more difficult for new competitors to enter the market. For the old ones, there was plenty of monopoly income to be extracted, especially as they could easily coordinate with each other to avoid excessive competition, without the need for formal (and illegal) cartel agreements, while customers trusted them - rarely questioning their methods or their financial health - precisely because the regulators were watching them. For example, it took an investigation by the UK Competition Commission in 2000 to establish that the country's four big banks had operated a complex monopoly on small business services, leveraging their 90% market share to extract £2 billion a year in profits and raise their average return on capital to 36% by agreeing not to compete with each other" (my translation).

³⁰ On banking concentration, see Hilferding, 1910; Mazzucato 2018.

³¹ In Italy, the Bank of Italy and the European Central Bank.

³² Epstein, 1992 reason about how the contrast between subgroups of capitalists and between them and workers is reflected in the type of central bank.

151, notes a progressive increase in banking concentration in Italy from the 1980s onwards³³:

In the period between 1985 and 1995, more than 200 mergers and incorporations took place involving both credit companies and special credit institutions, regardless of their size (my translation).

Figure 5 shows that while the trend in total banking assets increased between 2004 and 2012 and then started a slight decline, probably due to the financial crisis, the number of Italian banks gradually decreased from 2007 onwards. This dynamic seems to confirm the hypothesis of concentration of the banking sector in Italy in recent years³⁴.

Figure 5. Bank concentration



Source: Own processing of Bank of Italy, Statistical Data Bank. Values in millions of euros on the left-hand scale; values in units on the right-hand scale. Total banking assets are calculated as an average of monthly values over 12 months.

As can be seen in the first row of Table 2 for Shaikh the banking profit rate is equal to the normal one and therefore endogenously determinable given the normal one. In this paper we generally agree with this hypothesis, but we also try to overcome it, introducing the idea of a profit rate permanently higher than normal in the banking sector, due to barriers to entry and monopolistic behaviour. Due to this market power, banks set an interest rate that generates a higher-than-normal bank profit rate. The interest rate here no longer depends on the general rate of profit but on the strength of the banking sector rel-

³³ “In Italy, the phenomenon of bank concentrations, which began in the 1980s, accelerated in the following years, also encouraged by some fiscal measures” (my translation). Sapienza, 1999, p. 151.

³⁴ From the entry “Banking Concentration” by C. Passera, 2009, in the *Enciclopedia Treccani online* we can read: “Since the early 1990s, the European banking industry has undergone a concentration process that has no precedent after World War II. Financial deregulation, technological progress and increasing integration between markets are the main determinants of the aggregation phase between banking companies. [...] From 1999 to 2007, the number of banks in the European Union (EU) of 15 countries fell by an average of 3.1% per year, from almost 8900 to just under 6900 (-22.4%), according to ECB (European Central Bank) data. The decline was most marked at the turn of the century as the concentration process intensified [...]. Despite the reduction in the number of credit institutions, from 2000 to 2007 the total assets of the banking sector in the EU-15 continued to grow at significant rates, averaging 8.7% per year (about +94% in total). This reflects an increase in the average size of banks from €1.8 billion to €5.8 billion in terms of total assets between 1997 and 2007 [...]” (my translation).

ative to the productive sector (perhaps mediated by state and central bank intervention). This hypothesis seems to be able to explain in a formally clearer way Marx’s approach, where the interest rate is taken as an exogenous variable. Under the explicit hypothesis of a stably non-competitive banking market, the bank profit rate is no longer equal to the normal profit rate and cannot be taken as given. The rate of interest depends directly on the relations of force between finance, production and labour, in which Government, central bank and institutional elements play their role. There remains a two-stage structure to be able to determine all the variables involved, but the first stage only defines the profit rate of the banking sector (line two), which is not necessary in the second stage. This has some effects on the structure of interest rates as the ceiling i is more independent than in the previous formulation.

Table 2. Different assumptions about banking competition

	ENDOGENOUS VARIABLES	EXOGENOUS VARIABLES	RELATION BETWEEN INTEREST AND PROFIT RATE
Perfect competition	$i, \pi, r_b [= r]$	r	$r \rightarrow i$ $r - i = \pi$
Imperfect competition	r, i	$\pi, r_b [> r]$	$(i \rightarrow r_b)$ $r - i = \pi$

The symbols have the same meanings expressed above; r_b = profit rate in the banking sector.

A final thought concerns a methodological aspect of this analysis. Following the interpretation of Garegnani (1981, 1984), the classical theory can be organized in a *core* in which the relationships between the *intermediate data* (Garegnani, 2007) are logical-mathematical (deductive) and in a part of the theory outside this core, which explains those data that for this reason are defined as “intermediate” and in which enter considerations and analyses not only logical-mathematical but also social, historical and political. The analysis developed of the banking sector and the determination of the interest rate can be placed in the core of classical theory, as the interest rate is determined as a price and the determination of prices is part of the theory of value and distribution, within the core. Not all the reasoning useful for the determination of the interest rate, however, is possible within the core: in this analysis we have considered as intermediate data the deposit rate τ and the bank profit rate r_b (in addition to the data usually considered). The rate on deposits, as we have seen, depends on the policy rates set by the central bank, that are considered as data within the above model. Outside the core, economic theory has much to say about them. The same applies to the bank profit rate if it is considered higher than normal. While in fact the trend toward uniformity in the profit rate would not require the use of additional intermediate data, if we consider this particular profit rate to be greater than normal, a deeper analysis of the social, political and institutional structures that allow the banking sector to hold this privilege is required. In other words, in order to undertake this analysis via logical-mathematical relations, it is necessary to postulate whether or not the banking profit rate is normal. Which of the

two hypotheses is more appropriate for a specific country at a specific historical moment depends on other branches of economic theory.

4. Concluding remarks

In this paper the condition that capital employed in the banking industry receives a profit rate at least equal to the general one, along with a careful examination of the functioning of the banking industry, makes the endogenous determination of the interest rate as the price of the commodity “loan” conceivable, given the conditions of production in the banking industry, where the rate set by the central bank constitutes the price of an input. It is also criticised the introduction of finance within the instrument of the price equation by means of financial coefficients of production; in fact, these coefficients cannot act as a center of gravity for the financial structure of firms, lacking the character of normality, unlike the technical coefficients of production usually used in price equations. Following Marx’s approach, the interest rate is considered part of the profit rate and not a cost of production.

It is also noted that it is possible to define a structure of rates starting from the main re-financing rate set by the central bank and the condition of normal profitability of bank capital, constituting the active interest rate on bank loans the upper margin and the passive rate on deposits the lower margin of the range of various interest rates. The structure of rates is thus defined by several elements, corroborating Marx’s idea of heterogeneous determination of interest rates. An increase in interest rates by the central bank will *prima facie* lead to a reduction in the residual component of the profit rate that remunerates the industrial capitalist, given the same total profit rate and real wages. However, a substantial and lasting change could lead to a sharpening of the contrast between classes and between subclasses of capitalists, with various possible outcomes, from the maintenance of the new *status quo* to a decrease in real wages or a push on the central bank for an intervention opposite to the initial one.

If we then modify the condition of normal profitability of bank capital, i.e., assuming a higher-than-normal bank profit rate due to a particular monopolistic concentration in the sector, the rate of interest depends on other elements that are more difficult to quantify, such as the degree of monopoly and political and social conditions. In Marxian terms, this last aspect can be linked to the contrast between financial capitalists and productive capitalists, where the high degree of monopoly in the banking sector becomes a weapon in the hands of bankers to obtain higher profits. This last hypothesis seems to be able to illustrate in a formally clear and precise way the ideas expressed by Marx in the third book of *Capital*.

It should be noted that the model developed here can be inserted within the core of classical theory, taking as *intermediate data*, in addition to the usual ones, the interest rate on deposits fixed indirectly by the central bank, as well as the bank profit rate, if it is considered higher than normal.

Appendix A: Consumer credit

We have only discussed the production credit in these pages. However, in addition to the loans that banks make to the production sector, a large proportion of bank loans consists of consumer credit or home loans to workers. The proportions in which loans are divided between consumer credit, mortgage financing, and business financing depend from bank to bank and country to country. In this appendix, we try very briefly to introduce and discuss this issue, reserving it to more precise and complete analysis in future studies.

If we assume that only capitalists can save, while workers consume all their income, which is equivalent to saying that workers' wages are at subsistence level, it would not be easy to discuss credit to workers, because they could not in any way repay it. The workers' future consumption would be equal to their present consumption and always at the subsistence level. If there is no time in the worker's life when he earns more than subsistence, since he can never save, it is hard to see how he could repay the debt incurred.

We can also imagine that not all the surplus goes to capitalists and that therefore a part goes to workers who earn a wage higher than the level of mere subsistence. In this second case, workers can also save and therefore take out loans to be repaid over time with their savings³⁵. As seen above, in classical and Marxian theory interest is a part of profit and the interest rate a part of the profit rate. If consumer credit is included in the picture, it turns out that interest is nevertheless a part of surplus, although not of profit, since not all surplus takes the form of profit, since workers manage to appropriate a fraction of it. Basically, however, the concept is the same: the bank does not produce surplus but appropriates part of the surplus produced in other sectors, in one case by the capitalists, in the other by both capitalists and workers.

An alternative consists in considering within the *historical subsistence* the possibility of taking on debts by the worker, which implies that workers do not consume all their income and save a part of it. It might be difficult for a wage earner to buy a house in one lump sum, but buying the house through a mortgage and paying off the debt in installments could be within the subsistence wage. On the other hand, something similar already happens in advanced countries where there is a pension system: part of the worker's wage goes to constitute, in a more or less complex and mediated way, a fund to be used during retirement. And the possibility of having a pension seems to be part of what today can be considered a socially recognized subsistence wage. Something similar can be hypothesised for indebtedness for the purchase of a property.

It must also be acknowledged that the worker may take on more debt than he can repay and end up with a wage net of debt that is less than the (historical) subsistence wage.

³⁵ Thus, there is a problem in all models that assume that workers consume more than their wages, but do not save, and the capitalists' savings finance expenditures greater than the workers' wages. The contradiction is identified in the fact that workers cannot repay their debts. Finally, the endogenous money theory predicts the creation of credit by banks without the need for a prior act of saving.

Thus, it is possible that the basket of commodities the worker can actually purchase will shrink, even though the real wage has remained the same. Such an eventuality, if widespread among workers, could have effects on the level of real subsistence itself, lowering it, once it is deemed acceptable that the average standard of living of a worker includes a lower basket of commodities.

As we have seen, the theme of the relationship between consumer credit and mortgages and workers' subsistence has multiple interpretations and implications, which require a more complete analysis.

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