The relation between interest rate and profit rate: the role of bank profitability in an endogenous money framework

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INTRODUCTION

The scope of this article is to discuss the most relevant standpoints on the causal relationship between interest rate and profit rate, with a view to apply them to the analysis of present-day economy. The first part of the paper is a review of the literature[1]. Some of the most interesting theoretical elaborations on the relationship between profit rate and interest rate have been developed by authors who refer either to the Classical/Marxian school or to the modern Sraffian approach. A first group of authors states that the interest rate determines the profit rate, and therefore income distribution. A second one claims that, once the distribution is determined, it is the profit rate that regulates the interest rate.

Subsequently, we put forward an interpretation pivoting on banking profitability as the keystone: the bank, like any other industry, must obtain a profit rate from its invested capital, which in principle should be at least equal to the normal one[2]. Banking profitability, in turn, is largely predicated upon the structure of interest rates. This line of reasoning leads to confirm some of Marx's intuitions, that have not been fully clarified yet from an analytical point of view. In addition, the study of the structure of interest rates in relation to the functioning of the banking industry may shed new light on the relationship between interest rate and profit rate.

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[1] The various forms of marginalist theory are not examined. However, other non-Marginalist authors also deal with the financial system, e.g. Pasinetti, 1993; Graziani, 2003; Sylos Labini, 1948, 2005; Kalecki, 1941. See Cingolani, 2011 for a recent review of some of these post-Keynesian authors.

[2] Defined as the profit rate generated on newly installed capital goods, obtained using the dominant technique available, for a normal level of capacity utilisation.

The first section analyses the theoretical approaches from Marx to the Sraffian developments mainly linked to Panico and Pivetti and arriving at the most recent contributions, such as that of Shaikh. The evolution and differences in Marx's thought between the *Grundrisse* and *The Capital* are also highlighted. The second section proposes an economic and financial model that focuses on the profitability of the banking sector. The third section illustrates the relationship between profit rate, bank interest rates and other financial rates. Conclusions follow.

1. REVIEW OF THE LITERATURE

From the early days of economic science, it is possible to find traces of the subject of this study. For the classics, Smith and Ricardo, the rate of interest is a part of the rate of profit and the latter determines the former[3], in a residual position with respect to the premium for the *risk and trouble*, objective or presumed, of entrepreneurial activity. In Marx's work, several passages deal with the relationship between profit rate and interest rate. Mainly, the analysis is carried out in the so-called book III of *The Capital*, but there are also some interesting notes in the *Fundamentals of Political Economy Criticism* (or *Grundrisse*[4]). Here Marx, 1857-1858, offers an outline of the nature of the relationship between the profit rate and the interest rate. 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. Money, the product of the banking industry, as a commodity, is influenced by supply and demand. Continuing the reading of the *Fundamentals of Political Economy Criticism*, it is possible to find the following step (difficult to interpret):

> "[...] in the bourgeois economy, interest determined by profit, and only one of the latter's parts. Hence profit must be large enough to allow of a part of it branching off as interest. [...] There is a natural relation between wages and profit -- necessary labour and surplus labour; but is there any between profit and interest, same [as] that which is determined by the competition between these two classes arranged under these different forms of revenues?"

This passage is interesting for two reasons. The first reason is that it seems that in the capitalist system the interest rate depends on the profit rate, confirming Ricardo's thesis. In previous modes of production, however, it seems that the relationship was moving in the opposite direction. The

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[3] See Smith, 1776, volume one, p. 145 and volume three, p. 159. Ricardo takes up Smith's analysis according to which the two rates vary in the same direction, but it is the rate of profit that determines the rate of interest (Ricardo, 1817, p. 430, p. 432, pp. 491-492). J. S. Mill and Tooke, on the contrary, consider the two wages as unrelated and think that they can vary freely, even in opposite directions. See Panico, 1983, pp. 33-57, in particular p. 46; Pivetti, 1987a; 1987b.

[4] From the first word of the title in the original language.

second is the search for a *natural* relationship between interest rate and profit rate, similar to that between profits and wages.

In *The Capital*, Marx starts from a historical analysis. In pre-capitalist societies the lender of money was the *usurer*, whereas in capitalist society it is the *banker*. Usury does not disappear in capitalism, but its importance is considerably reduced, as it no longer concerns the sphere of capitalist production. Marx also differentiates capital between *interest-producing capital* and *productive capital*. *Interest-producing capital* exists only in the sphere of circulation, because when it is employed in the sphere of production, it becomes *productive capital*.

In the capitalist society the profit of the industrial capitalist has to be shared with the financial capitalist (banker). In the banking sector, therefore, no surplus is produced, there is no profit extraction; the profit extraction takes place in the production sector, but the profit is then distributed throughout the capitalist system, as specified in Marx, 1865[5]. 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[6]. These general conditions are determined by various elements of an *economic*, *conventional* and *institutional* nature. *Economic* elements are linked to the credit system, *conventional* elements to the legal system, and *institutional* elements are the product of state intervention (through the central bank)[7]. It is not possible to identify a natural rate of interest and the only possible price therefore appears to be the market price (Marx, 1894). Marx, *ibid.*, also believes that precisely because the capital productive of interest never enters the sphere of production (in fact, as soon as it enters, it would become productive capital), but remains in the sphere of circulation. Thus, the material laws of capitalist production cannot regulate its price, determining some natural price.

Contrary to Ricardo's view, and seemingly from the *Grundrisse* passage mentioned above, the profit rate does not determine the interest rate, and the link between the two is rather obscure: determinants, though not easily reconciled, are the struggle between subclasses of capitalists, competition and the general conditions of the monetary sector of the economy[8]. The profit rate is, however, the upper limit of the interest rate, because if the profit rate were zero all the surplus

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[5] "*Rent*, *interest*, and *industrial profit* are only different names for different parts of the *surplus value* of the commodity, or the *unpaid labour enclosed* in it, and they are *equally derived from this source and from this source alone*." Marx, K. (1865), MIA.

[6] Basically, placing the banking sector within the well-known Marxian scheme *money - commodity - money*, the result is: M→M →C→M'→M". With M = money, C = commodity, M < M" < M'. Money passes from the hands of the financial capitalist to those of the productive capitalist, but still remains money (M→M). The latter uses the money to produce goods (M →C) which he sells, obtaining more money than at the beginning (M → M'). Part of this money finally goes to the financial capitalist (M'→ M").

[7] See Panico, 1988.

[8] "Marx admitted that there is a tendency for these two rates to move together, although he kept trying to diminish confidence in such a tendency." Panico, 1988, p. 59. See also Pivetti, 1987b.

would be captured by the financial capitalist[9].

Taking their cue from Sraffa, 1960, p. 39, Pivetti and Panico develop theories in which the profit rate and distribution depend on the interest rate, reversing the causal relationship assumed by the classics. Pivetti develops the *theory of monetary determination of distribution* (Pivetti, 1985, 1987a, 1987b and 1991). Pivetti's question is which variable should be considered independent between the profit rate and the wage rate[10]. Since the real wage contains a part of surplus, considering it as the exogenous variable seems arbitrary. The profit rate, on the other hand, seems to be composed of two parts (Pivetti, 1987a, pp. 254 - 255): the interest rate on long-term loans, which can be considered as the remuneration of capital, and the 'firm's profit', which remunerates the *risk and trouble* of productive activity. As one of the two components (or both) increases, prices will also increase. The interest rate can be controlled more or less directly by the central bank; if therefore the central bank controls one part of the profit rate, it follows that, if the other part is roughly fixed, the total profit rate is determined by the central bank. Necessary conditions for a conception of the profit rate as an increasing function of the interest rate are therefore the s*tability* of the firm's normal profit and its *independence* from the interest rate (Pivetti, 1987a, p. 261). Given the nominal wage, the interest rate determines the profit rate and prices and, thus, the real wage and the entire distribution. For Pivetti, his analysis is not in contrast with the Marxian idea of distribution based on class struggle: he does not deny the struggle between classes, rather he determines the terrain of conflict (Pivetti, 1987a, p. 265)[11].

Panico 1980, 1983, 1988[12], tried to model the economic-financial system by focusing the analysis on the functioning of the banking industry, elaborating the *monetary theory of the profit rate*. Panico, like Pivetti, believes that it is not the profit rate that determines the interest rate, but the opposite. However, the interest rate Panico refers to is a very particular rate and different from the one analysed by the classics. It is in fact a very short-term rate on operations such as Lombard credit, promissory notes and similar. Indeed, these kinds of operations are carried out by the banker,

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[9] Hilferding, 1910, takes up Marx's analysis: the interest rate is a part of the profit rate, which is its ceiling, and the level of the interest rate depends on the supply and demand for credit (*ibid.*, p. 110). The struggle between sub-classes of capitalists and the institutional factors, which are present in Marx's analysis, are not discussed by this author.

[10] See Pivetti, 1985, p. 73, as well as Pivetti, 1991, pp. 3-4.

[11] See also the debate between Nell, 1988, Wray, 1988, and Pivetti, 1988, in *Political Economy*. Finally, it is worth noting the commentary of Ciccone, 1990, which criticizes the fact that the variable that should determine the distribution is the real interest rate and not the monetary rate. The central bank can influence the real interest rate through the nominal interest rate, but it is doubtful that the real interest rate can be controlled by the central bank. The real interest rate depends on the nominal interest rate, but also on inflation. However, in Pivetti's model inflation results from the distributional effects of interest rate changes. If, therefore, the real interest rate depends on inflation and inflation depends on the real interest rate, the reasoning becomes circular. A response to the criticism can be found in Pivetti, 1991, pp. 52-54.

[12] More recently, Panico, 2012, returned to the topic with an article dealing with the relationship between the financial sector and distribution, in particular the effects of household loans on consumption and aggregate demand.

but they are not typical of the monetary capitalist[13], as the author himself[14] seems to recognise. In order to understand the relation between interest rate and profit rate, it is therefore essential to identify the *specific* function of the money capitalist, i.e. to inject new capital into production.

Moreover, Panico considers the short-term interest rate just discussed as a *necessary* cost of production. From this idea (as well as from the Keynesian analysis of the interest rate), Panico, 1988, composes an economic model in which the level of prices and the level of the profit rate depend on the interest rate: an increase in the interest rate will raise prices and the profit rate, while it will decrease the quantity of goods that can be bought with the workers' monetary wage, i.e. it will lower the real wage. If the workers were able to counteract this fall in real wages by raising their money wages, their real wages could remain unchanged, but inflation would occur. In order to consider, however, financial costs as necessary to production and to insert them in the price equations, as Panico does in his model, we must also hypothesise technical coefficients linked to these financial costs, which should have a *normal* character: in other words, in every industry we should have a technical coefficient of financial costs towards which the financial costs of all the firms in the industry tend. But the financing of companies, even more in the short or very short term, responds to very different and also easily changing needs. It is therefore very difficult to hypothesise a *normal*[15] technical financial coefficient.

Some economists of the Marxian or post-Keynesian school have discussed, criticised and deepened the above theories in the new millennium[16]. Hein, 2002a[17], considers the theories of monetary determination of distribution incompatible with the Marxian approach because they would ignore the contrast between the sub-classes of capitalists: changes in the interest rate may have effects on the distribution between wages and profits, but these effects depend heavily on the market power of

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[13] Following the Marxian scheme outlined above (see footnote 6), only the first and fourth steps touch the money capitalist, i.e. steps M→M and M'→M". The bank, however, intervenes in each step, but performs other functions and facilitates the transformation cycle between capital-goods and capital-money

[14] See Panico, 1987, p. 87: "Thirdly, they advance capital to those industrial capitalists who require it in industrial activity. Only this third function corresponds to that performed by the money capitalists in the analysis described above. It is only in this case that the bankers make available new capital to the industrial capitalists. In the other two cases, the bankers only transform revenues or capital already in the hands of the industrial capitalists from a less liquid to a more liquid form."; *ibid.*, pp. 92-93.

[15] On this subject, see Mongiovi and Rühl, 1993, pp. 93-94.

[16] In the 1980s and 1990s, the subject of the relationship between the interest rate and the profit rate was also addressed. Within the Marxian framework, Pegoretti, 1983, elaborated the *theory of the tripartite distribution*, whose defects Gattei, 1983, immediately highlighted and attempted to correct. The critique of Panico and Pivetti's models is enriched by Mongiovi and Rühl, 1993, and later by Ciccarone, 1998, who elaborates an alternative model to Pivetti's model of monetary determination of distribution. However, this model presents problems in the assumptions about the structure of rates, since it assumes a proportional relationship between the rate on deposits and the rate on loans. This implies that, as rates vary, their difference also varies proportionally; this does not seem to correctly describe the functioning of the banking system. Moreover, in Ciccarone's model the distributional contrast may be mitigated by the variation of the deposit rate in the opposite direction to that of the real wage, a phenomenon whose relevance for the distribution could be dubious. See also Dvoskin and Feldman, 2020, on the models of Panico, Pivetti and Ciccarone; in their analysis a necessary and sufficient condition for a monetary theory of distribution is that the interest rate can be considered as the opportunity cost of real activity.

[17] See also Hein, 2002b.

firms and the bargaining power of productive capitalists and workers (*ibid*., p. 15). Hein, moreover, hypothesises a mechanism that keeps the interest rate below the profit rate in the long run: if the interest rate approaches or even exceeds the profit rate, it would be cheaper to invest in the financial sector than in the real sector; the amount of money available to be lent would increase and the interest rate would fall again to a level below the profit rate. The profit rate would then be a limit to the interest rate only in the long run (*ibid*., pp. 13-14). It should be noted, however, that the hypothesis of an interest rate higher than the profit rate is difficult to conceive, irrespective of the chosen time interval: if the interest rate were to exceed the profit rate, the interest would have to be remunerated by wages (or by agricultural rents), which is not compatible with a developed capitalist society.

Shaikh, 2016[18], 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 J. S. Mill. Basically, therefore, the interest rate would be proportional to the profit rate, where proportionality would be given by the above ratio. Considering, on the other hand, operating costs and fixed capital, Shaikh elaborates a more complex model where the causal relationship between the rate of profit and the rate of interest continues to go from the former to the latter: Shaikh does not see the rate of interest as a cost of production, but instead as a *disbursement from the total profit*, moving away from Panico's idea. He adds to a sraffian price system for the productive sector a price equation for the banking sector; the real wage is given and determines the profit rate and the relative prices: given a deposit rate of zero by hypothesis, the interest rate is determined by the profit rate for any given price level. If the real wage is given, the profit rate is given too, irrespective of the price level; a change in prices will therefore lead to a change in the interest rate in the same direction. As in Marx and Panico, the interest rate cannot be higher than the profit rate; however, it is noted that if prices rise above a certain limit, the interest rate may exceed the profit rate, calling into question the general validity of this condition.

Shaikh agrees with the direction of the relationship between the profit rate and the interest rate theorized by the classics, i.e. from the former to the latter, but he also confirms Marx's view that there is not a natural interest rate, as he argues that a different interest rate is associated with each price level (Shaikh, 2016, pp. 487- 488). Moreover, unlike the classics, the rate of interest does not depend on the profit rate *sic et simpliciter*, but depends on the profit rate as the price of an industry that must guarantee a profit rate at least equal to the normal one. Basically, it is the *tendency for*

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[18] See also Shaikh, 2011, where a preliminary analysis of the 2016 study is presented.

profit rates to be uniform that determines the relationship between the interest rate and the profit rate.

Toporowski, 2018, 2020, criticises Shaikh's approach, as well as the classics' view of the relationship between the interest rate and the profit rate, and prefers the analysis of Hilferding and the 'Austromarxists'. He also states, *ibid*. 2020, p. 466, that the interest rate is not correlated with the profit rate[19]. Furthermore, Toporowski criticises Shaikh's choice of a zero deposit rate. This last remark is quite important and will be a central part of the model presented in the next section. Lapavitsas and Mendieta-Muñoz, 2019, take a different approach to the Marxian theory, also discussing the issue of short and long-term loans, as well as other transactions offered by the bank that contribute to bank profits and are necessary for production[20]. They develop a model that describes the relationships between the real economy and finance.

2 A MODEL OF THE RELATIONSHIP BETWEEN INTEREST RATE AND PROFIT RATE BASED ON THE PROFITABILITY OF BANK CAPITAL

In this section we propose an original model of the relationship between profit rate and 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 funding and lending are considered here, whereas in reality many other types of services can contribute to the formation of bank profit[21]. The purpose of this model is to explain the functioning of a banking industry "cleaned" of other elements that may be more or less present depending on the specific bank under consideration. This study has also to be placed within the approach of *endogenous money theories*, which seems to best represent the contemporary banking system[22]. Therefore, the model illustrates the way the interest rate on bank loans is determined, in relation with the profit rate. The quantity of money of the system is not discussed because it is determined by the demand in accordance with the *endogenous money theories*.

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[19] This approach is actually closer to Tooke and J. S. Mill than to Marx. Toporowski, 2020, p. 469, p. 471, p. 473 also believes that capitalists give and borrow money from each other through the intermediary of the bank. Hence two subclasses of capitalists cannot be identified. Moreover, such an approach, which differs not only from that of the classics, but also from that of Marx, does not seem compatible with the *theory of endogenous money* (according to which the bank does *not* lend deposits, but *creates* loans); see Graziani, 2003.

[20] However, the question arises as to which of these transactions are actually characteristic of traditional banking (see DeYoung and Rice 2004a, 2004b). Moreover, it can be observed that fees on some types of banking services are often assimilated to deposit rates, as stated by the ECB 2020, p. 71.

[21] See DeYoung and Rice 2004a, 2004b, Lapavitsas and Mendieta-Muñoz, 2019, Toporowski, 2020.
[22] For example: https://rwer.wordpress.com/2012/01/26/central-bankers-were-all-post-keynesians-now/ .

We have seen that 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 receives a return equal to (at least) the normal rate of profit of the economy. Given this condition, the interest rate on bank loans can be conceived exactly as the price of any commodity.

This is far from Panico's modelling, as it is not appropriate to assume *technical financial coefficients* in the price equation of an industry. The proportion of capital financed by equity or debt seems entirely arbitrary and random. Nor can it be argued that a particular proportion is cheaper than others and thus acts as a centre of gravity for the possible proportions in each 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 profits that will be paid as interest. If we inserted financial lending coefficients, capital would be remunerated differently depending on the method of financing it[23]. This would lead to various conceptual difficulties and *absurd* results. First, if the entrepreneur does not get a remuneration from debt capital too, 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 notion of capital. A contradictory argument by definition. Moreover, if we accepted the existence of two competing capital financing systems, the cheaper method would lead to lower selling prices and would therefore supersede the other. Furthermore, after the introduction of passive financial coefficients, we have to introduce the active ones into the price equations: assuming, for example, that deposits are included in the price equations of productive activities, as the quantity of deposits increases, firms would charge lower and lower prices, and could even reach a zero or even negative price.

A different path is therefore followed: loans do not enter the equations of production, while the capital goods acquired by the loans themselves[24] do. Taking up Marx's distinction between *productive capital* and *interest capital*, by definition only *productive capital* enters the sphere of production[25]. If the productive capitalist used only his own capital, he would get all the profits and the full rate of profit. He would then play the role of both financial and productive capitalist: he would practically have financed himself.

In the following pages we try to develop an economic-financial model based on these assumptions, which also considers the deposit rate and the influence of the central bank on interest rates. In this

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[23] Such an approach is followed by Dvoskin and Feldman, 2020 (see *ibid.*, footnote 16, p. 13).

[24] Fratini, 2020, p. 5: "The amount of capital K_t is not the quantity of an input. The quantities of inputs employed are X_t, L_t and Λ_t [with X_t, L_t and Λ_t equivalent to vectors of goods, work and natural resources]".

[25] If you take a loan of X euros to produce a certain commodity, in the production of this commodity you do not get X euro, but Y commodities paid X euro.

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. The possibility of higher than normal bank profitability in the banking sector and an analysis of the structure of interest rates will then be introduced.

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

w = monetary wage,

$\boldsymbol{\omega}$ = vector representing the basket of goods in the real wage[26],

$\boldsymbol{p}$ = 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,

Λ = loans (banking sector output),

$\boldsymbol{A}$ = matrix of industry inputs,

$\boldsymbol{K_b}$ = 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),

$\boldsymbol{l}$ = 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 goods in the real wage, it is possible to determine the price system and the profit rate simultaneously. There are $n+2$ equations and $n+2$ unknowns $\boldsymbol{p}$, r, w:

[1] $\boldsymbol{pQ} = \boldsymbol{pA}\,(1+r) + w\boldsymbol{l}$

[2] $w = w^*$

[3] $w = \boldsymbol{p\omega}$

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[26] 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 goods>> which constitutes the real wage. In the latter case, one must add the following equation $w = \boldsymbol{\lambda p}$ where $\boldsymbol{\lambda}$ is a line vector representing the <<basket of goods>> that make up the real wage.", our translation. Panico in his model takes the first way, here it is 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.

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

[4] $i = [\mathbf{p}\mathbf{K}_b\,(1 + r_b) + \tau D + wl_b]\,/\,\Lambda$

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

[6] $r_b = r$

[7] $i < r$

[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 banking output, i does not appear in [1] since it is included within r. A similar reasoning applies to the deposit rate τ. While in fact the deposits enter the inputs of the banking sector, they do not appear in the price equations of the real sector. The system is now composed of $n+5$ equations and $n+5$ unknowns (to the previous two we have add i, τ and r_b), plus the condition that the interest rate must be strictly lower than the profit rate [7], as in Marx, Panico and Shaikh. The main refinancing rate of the central bank is the rate at which banks can refinance themselves and obtain liquidity; it therefore seems reasonable to regard refinancing from the central bank as an alternative for banks to taking deposits. For simplicity, therefore, the deposit rate τ is set equal to the main refinancing rate set by the central bank. It follows that the deposit rate is exogenously determined (τ^*), as a cost, while the lending rate is the price of bank output.

The price equation of the banking industry [4] determines i, i.e. the price of production of the banking industry. The lending rate of interest on bank loans, in turn, determines the part of the profit rate that goes to the bankers (while other types of rates determine the part of the profit rate that goes to other types of financial capitalists, as it will be discussed in the following pages). Interest rate on loans must respect the condition [7], i.e. 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 profit rate in the changed condition. An increase in lending rates leads to a reduction in the residual profit rate which remains in the hands of the productive capitalists. The productive capitalists might then try to influence the central bank to lower rates, or they might try to reduce real wages. Unlike in Pivetti's and Panico's theories, 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 only leads to

effects on the residual of the profit rate, the real wage and the total profit rate remaining constant[27]. There is an (almost[28]) automatic mechanism only in the variation of the active bank rate against a variation of the passive bank rate. This does not mean, however, that the effects on the distribution hypothesised by Pivetti and Panico can also occur, but in a more mediated and indirect way.

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. Considering for illustrative simplicity that every loan corresponds to a deposit and that all the capital in the economy (set equal to 1) is debt (in the form of bank loans), at the aggregate level we would have $K = \Lambda = D$ and thus:

[8] $r = (i - \tau) + \pi$

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 (Λ and D), in fact, vary from firm to firm and do not have a general character: as we have just shown, there is a relation between the profit rate and the interest rate, 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* question, which depends 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 paid[29]. 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.

Finally, assuming that the banking sector presents particular and stable viscosities to the functioning of competition[30], for example due to oligopolistic concentration, institutional barriers to market

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[27] As in Marx, see Argitis, 2001.

[28] When the rate set by the central bank increases, it is quite normal that bank rates increase accordingly. However, when the central bank rate falls to zero (while the *deposit facility* rate falls below zero), as in recent years, there are difficulties for banks to adjust their rates; see, among others, Zolea, 2020.

[29] 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.".

[30] See Sylos Labini, 1984.

entry due to the particular regulation of the sector, or some kind of agreement or *cartel* among banks[31], one can imagine conditions different from [6], in particular that the bank profit rate is higher than normal:

[6.1] $r_b \geq r$

The aim of the cartel is in fact to increase the profits of the participants; higher profits are also obtained in the case of a monopoly (or oligopoly), in which the production of a sector is concentrated in the hands of a few companies, which have greater market power and can set sales prices, influence the purchase price of inputs, exercise greater power in wage bargaining and be able to organise a united front against the legislator or the regulator[32]. However, this monopolistic structure involves in particular an increase in the price of output that leads to a higher than normal profit rate. It does not imply a reduction in the quantity of output produced, which is in fact demand-dependent, as *endogenous money theories* sustain.

In this case, Marx's analysis according to which the interest rate varies due to the contrast between subgroups of capitalists would be better confirmed: thanks to a bargaining power reinforced by the high degree of concentration in the banking sector, banks could raise the prices of their services to obtain higher profits, in particular they could raise the interest rate on loans beyond the level that guarantees a normal profit rate on bank capital[33].

3 ANALYSIS OF THE RELATIONSHIP BETWEEN 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 through the introduction of bond lending. We have shown in the previous section 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.

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[31] On banking concentration, see Hilferding, 1910.
[32] In Italy, the Bank of Italy and the European Central Bank.
[33] On how the contrast between subgroups of capitalists and between them and workers is reflected in the type of central bank, see Epstein, 1992.

Having obtained the bank lending rate via [4], one can imagine an interest rate structure dependent on the main refinancing rate set by the central bank and on the profit rate. The first rate determines the floor of the rate structure, while the second one, dependent on the first one and on 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, it would be more convenient to deposit money in a 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 cheaper to borrow directly from banks than by bonds.

Bonds are securities and have a much higher circulation than bank loans. This implies buying and selling them for capital gains, with consequent fluctuations in rates, even independently of the above structure. Apparently, bank loans have no circulation at all, but recent financial innovations and securitisation operations have created a market for indirect bank loans. Bonds are not renegotiable, usually require the payment of a lower interest and are long-term[34]. A bank loan has higher rates, can be short-term or long-term, can be granted to large and small enterprises and is renegotiable. In addition, bank lending often put greater restrictions 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 anyone. In spite of these differences, it seems fair to assume that in many cases bond loans and bank loans are alternatives, although there are cases where this is not true (e.g. it is very difficult for small enterprises to issue bonds; as there is no alternative, their only source of financing is the bank)[35].

Analytically can be explained why the bond rate is lower than the bank rate. The interest rate on bank loans has to guarantee, net of costs, 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 costs. While the bank does not lend its own capital[36], the purchase of a bond involves the use of own capital. Bonds thus give their holder a percentage of profit coinciding with the bond interest, which may be lower than the normal profitability of capital.

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[34] It can also be assumed that bonds have higher fixed costs than loans. Issuing bonds is a much more complex operation than borrowing from a bank. It therefore requires a specialized service within or outside the company.

[35] See Banfi et al., 2014; Forestieri, 2015, or, among others, https://www.educba.com/bond-vs-loan/ .

[36] As in Ricardo, 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.".

One can then add government bonds to the scheme, which, regardless of contingent situations such as the *spread* increase or the recent sovereign debt crisis, are considered among the safest securities and usually give low interest rates. These could be placed between bank borrowing rates and bond rates. With:

i' = bond rate,

i_p = government bond rate,

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

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

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

CONCLUSIONS

In the classical approach the relationship between profit rate and interest rate is based on a causal relationship from the former to the latter. The interest rate is considered as the return on capital in the absence of risk and the difference between the two rates represents the premium for the *risk and trouble* of entrepreneurial activity.

Marx's analysis seems more difficult to interpret. He introduces some further fundamental elements, such as the lack of a natural banking production technique, resulting in the lack of a natural interest rate, the conflictual division between sub-groups of capitalists, relating to different types of capital, and the influence on the interest rate of other *economic*, *conventional* and *institutional elements*, such as central bank intervention or the effects of legal regulations. Marx seems to accept in part the causal relationship hypothesised by the Classics, but the hypothesis of contrast between capitalists, the absence of a natural interest rate and the influences of legal-social aspects seem to drive his analysis in other directions.

Panico and Pivetti elaborate theories that lead to similar but opposite results to those of the classics: the interest rate determines the profit rate as well as the price of goods and therefore the real wage.

According to both Panico's and Pivetti's ideas, the central bank plays a fundamental role in determining distribution. Shaikh, on the other hand, predicating on the analysis of the banking sector, proposes a model that overturns the conclusions of these two authors and reaffirms the causal relationship of the classics and Marx.

This paper shows that the introduction of the condition that capital employed in the banking industry receives a profit rate at least equal to the general profit rate, together with a careful examination of the functioning of the banking sector, makes conceivable the endogenous determination of the interest rate as the price of the commodity "loan", given the conditions of production in the banking sector, where the rate set by the central bank constitutes the price of an input. The model proposed here would confirm the idea of Marx on the relationship between interest rate and profit rate. It also shows how it is possible to define an interest rate structure starting from the main refinancing rate set by the central bank and the condition of normal profitability of bank capital, the lending rate on bank loans being the upper margin and the deposit rate the lower margin of the range of various interest rates. The interest rate structure is thus defined by several elements, supporting Marx's idea of heterogeneous determination of interest rates. An increase of interest rates by the central bank will *prima facie* lead to a reduction of the residual component of the profit rate that remunerates the industrial capitalist, the total profit rate and the real wage remaining the same. However, a large and lasting change could lead to a sharpening of the contrast between classes and between subclasses of capitalists, with various possible outcomes, ranging from maintaining the new status quo, to a fall in the real wage, or to pressure on the central bank to intervene in the opposite direction.

If we then modify the condition of normal profitability of bank capital, i.e. assuming a higher than normal bank profit rate due to particular monopolistic concentrations in the sector, the rate of interest would also depend on other elements that are more difficult to quantify, such as the degree of monopoly. In Marxian terms, the high degree of monopoly in the banking sector becomes a weapon in the hands of the bankers to achieve higher profits in the contrast between financial capitalists and productive capitalists. Which is the most correct hypothesis on bank profitability, normal or above normal, is a starting point for possible future studies, specially empirical and econometric ones.

The development of a model that correctly describes the functioning of the banking system and the structure of interest rates is an important instrument for orientation in the contemporary economic world. So, understanding the relationship between the central bank, the banking sector, finance and the production sector is fundamental to correctly analysing and assessing the effects of monetary policy, particularly in a period like the present one.

REFERENCES

Argitis G. (2001), "Intra-capitalist Conflicts, Monetary Policy and Income Distribution", Review of Political Economy, vol. 13, n. 4, pp. 453-470.

Banfi A., Biasin M., Oriani M. and Raggetti G. (2014), Economics of financial intermediaries, Novara: Isedi.

ECB (2020), Economic Bulletin, n. 3.

Ciccarone G. (1998), "Prices and distribution in a Sraffian Credit Economy", in Review of Political Economy, vol. 10, n. 4, pp. 399 - 413.

Ciccone R. (1990), "Comment (on Pivetti)", in Bharadwaj K., Schefold B., Essays on Piero Sraffa, Londra: Routledge editore, pp. 454 - 456.

Forestieri G. (2015), Corporate & Investment banking, Milan: Egea.

Cingolani M. (2011), "Interest, Growth, and Income Distribution: What Ought to Be the Objectives of EU Macroeconomic Policy Coordination?", International Journal of Political Economy, vol. 40, n. 4, pp. 31-61.

DeYung R. e Rice T. (2004a), "Noninterest Income and Financial Performance at US Commercial Banks", Financial Review, vol. 39, n. 1, pp. 101-127.

DeYoung R. e Rice T. (2004b), "How do banks make money? The fallacies of fee income", Economic perspectives, vol. 28, n. 4, pp. 34-51.

Di Bucchianico S. (2019), "The impact of financialization on the rate of profit", Review of Political Economy, vol. 33, n. 2, pp. 303-326.

Di Bucchianico S. (2020), "A note on financialization from a Classical-Keynesian standpoint", Quaderni del Dipartimento di Economia politica e statistica (University of Siena), n. 824.

Dvoskin A. and Feldman G. D. (2020), "On the role of finance in Sraffian System", Review of Political Economy, latest articles.

Epstein G. (1992), "Political Economy and Comparative Central Banking", Review of Radical Political Economics, vol. 24, n.1, pp. 1-30.

Fratini S.M. (2015), "Surplus", in Kurz, H.D. and Salvadori, N., The Elgar Companion to David Ricardo, London: Edward Elgar Publishing Limited.

Fratini S. M. (2020), "Incomes from Capital in Alternative Economic Theories", Centro Sraffa Working Papers, n. 42.

Garegnani P. (1984), "Value and distribution in the classical economists and Marx", Oxford economic papers, vol. 36, n. 2, pp. 291-325.

Garegnani P. (1987), "Surplus approach to value and distribution", in Eatwell J., Milgate M., Newman P., The New Palgrave. A Dictionary of Economics, Londra: Macmillan, pp. 560-574.

Gattei G. (1983), "I "tre termini" della distribuzione", Quaderni di storia dell'economia politica, vol. 1, n. 2, pp. 183 -191.

Graziani A. (2003), The Monetary Theory of Production Cambridge: Cambridge University Press. Hein E. (2002a), "Money, Interest and Capital Accumulation in Karl Marx's Economics: A Monetary Interpretation", WSI Discussion Paper, n. 102.

Hein E. (2002b), "Monetary policy and wage bargaining in the EMU: restrictive ECB policies, high unemployment, nominal wage restraint and inflation above the target", PSL Quarterly review, vol. 55, n. 222, pp. 299-337.

Hilferding, R. (1910), Il capitale finanziario, Mimesis Edizioni Milano - Udine, 2011; original edition The financial capital. A study on the recent development of capitalism, Wiener Volksbuchhandlung, Vienna.

Kalecki M. (1941), "The short-term rate of interest and the velocity of cash circulation", Review of Economic Studies, vol. 2, n. 2, pp. 97-99.

Keynes, J.M. (1936), Teoria generale dell'occupazione, dell'interesse e della moneta, Campolongo A. (ed.), U.T.E.T., Turin, 1971; original edition The General Theory of Employment, Interest and Money, Macmillan and Co., London.

Kurz H.D. e Salvadori N. (1995), Theory of Production: A Long-Period Analysis, Cambridge: Cambridge University Press.

Lapavitsas C. e Mendieta-Muñoz I. (2019), "The historic rise of financial profits in the US economy" Journal of Post Keynesian Economics, vol. 42, n. 3, pp. 443-468.

Marx, K. (1857 - 1858), Foundations of the Critique of Political Economy, Marxist Internet Archive (MIA), https://www.marxists.org/archive/marx/works/1857/grundrisse/ ; original edition Grundrisse der Kritik der politischen Ökonomie 1857-1858, Diez verlag, Berlin, 1953.

Marx, K. (1865), Value, Price and Profit, Marxist Internet Archive (MIA) https://www.marxists.org/archive/marx/works/1865/value-price-profit/ ; originally published by J. J. E. Marx, London, 1898.

Marx, K. (1894 posthumously), Das Kapital, Marxist Internet Archive (MIA), https://www.marxists.org/archive/marx/works/1894-c3/ ; (the first edition of Das Kapital was published in 1867 in Hamburg, books II and III were published posthumously by F. Engels in 1885 and 1894) original title Das Kapital.

Mongiovi G. and Rühl C. (1993), "Monetary theory after Sraffa", in Mongiovi G., Rhül C., Macroeconomic Theory: Diversity and convergence, Cheltenham: Edward Elgar.

Nell E. (1988) "Does the Rate of Interest Determine the Rate of Profit?", Political Economy, vol. 4, n. 2, pp. 263 - 267.

Panico C. (1980), "Marx's analysis of the relationship between the rate of interest and the rate of profits", Cambridge journal of economics, vol .4, n. 4, pp. 363-378.

Panico, C. (1983), Politiche monetarie, prezzi e distribuzione, Liguori Editore, Naples.

Panico C. (1988), Interest and Profit in the Theories of Value and Distribution, Londra: Macmillan.

Panico C., Pinto A., Puchet M. A. (2012), "Income distribution and the size of the financial sector: a Sraffian analysis", Cambridge Journal of Economics, vol. 36, n. 6, pp. 1455 - 1477.

Pasinetti L. (1993), Structural Economic Dynamics: A Theory of the Economic Consequences of Human Learning, Cambridge: Cambridge University Press.

Pegoretti G. (1983), Capitale finanziario, profitto, interesse, Milano: Franco Angeli Editore.

Pivetti M. (1985), "On the Monetary Explanation of Distribution", Political Economy, vol. 1, n. 2, pp. 73 - 103.

Pivetti, M. (1987a), "Interesse e profitto d'impresa: parti in cui il profitto si risolve o determinanti del profitto?", pp. 253 - 268, in Marx e il mondo contemporanea, A. M. Nassisi (edited by), Editori Riuniti, Rome.

Pivetti M. (1987b), "Interest and profit in Smith, Ricardo and Marx", Political Economy, vol. 3, n. 1, pp. 63 - 74.

Pivetti M. (1988), "On the Monetary Explanation of Distribution: a Rejoinder to Nell and Wray", Political Economy, vol. 4, n. 2, pp. 275 - 283.

Pivetti M. (1990), "On the Monetary Explanation of Distribution", in Bharadwaj K., Schefold B., Essays on Piero Sraffa, London: Routledge, pp. 432 - 454.

Pivetti M. (1991), An Essay on Money and Distribution, London: Macmillan Academic and Professional LTD.

Ricardo, D. (1816), Proposals for an Economical and Secure Currency, in The Works and Correspondence of David Ricardo, vol. 4 Pamphlets and Papers 1815 - 1823, Piero Sraffa and M.H. Dobb publishers, Cambridge University Press, Cambridge, 1951; original edition printed by John Murray, London.

Ricardo, D. (1817), Principi di economia politica e dell'imposta, Porta P.L. (edited by), special edition realized for Il Sole 24Ore Economia & Cultura, Nuovo Istituto Italiano di Arti Grafiche,

Bergamo, 2010; original edition On the Principles of Political Economy and Taxation, John Murray, London.

Shaikh A. (2011), "The first great depression of the 21st century", Socialist Register, vol. 47, pp. 44-63.

Shaikh A. (2016), Capitalism, competition, conflict, crisis, New York: Oxford University Press.

Sylos Labini P. (1984), Le forze dello sviluppo e del declino, Rome: Laterza.

Sylos Labini P. (2005), Torniamo ai classici. Produttività del lavoro, progresso tecnico e sviluppo economico, Bari: Laterza.

Smith A. (1776), *Indagine sulla natura e sulle cause della ricchezza delle nazioni*, traduzione di Ada Bonfirraro, Roma: Newton Compton editori, 1976; edizione originale: *An Inquire into the Nature and Causes of the Wealth of Nations*, Londra: W. Strahan e T. Cadell.

Sraffa, P. (1960), Production of commodities by means of commodities, PVT. LTD. publishers, Bombay.

Toporowski J. (2018), "Marx, finance and political economy", Review of Political Economy, vol. 30, n. 3, pp. 416-427.

Toporowski J. (2020), "Anwar Shaikh and the classical theory of interest: a critical note", Cambridge Journal of Economics, vol. 44, n. 2, pp. 465-474.

Wray L. R. (1988), "The Monetary Explanation of Distribution: A Critique of Pivetti", Political Economy, vol. 4, n. 2, pp. 269 - 273.

Zolea R. (2020), "Tassi negativi, ma anche no", Menabò di Etica ed Economia, n. 118, https://www.eticaeconomia.it/tassi-negativi-ma-anche-no/ .