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## Money, interest, and capital accumulation in Karl Marx's economics: A monetary interpretation

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# WSI

**Diskussionspapiere**

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**Money, Interest, and Capital Accumulation  
in Karl Marx's Economics:  
A Monetary Interpretation**

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**Eckhard Hein**

**Money, Interest and Capital Accumulation in Karl Marx's Economics: A Monetary Interpretation\***

**Abstract**

Starting from Schumpeter's important distinction between „real analysis“ and „monetary analysis“, in this paper it is shown that major elements of Marx's economic theory fall in the camp of monetary analysis and the implications for Marx's theory of capital accumulation are derived. First, Marx's theory of labour value has to be considered a „monetary theory of value“ because „abstract labour“ as the social substance of value cannot be measured without a social standard of value. Money as a social representative of value, therefore, is introduced at the very beginning of Marx's microeconomics. Marx's rejection of Ricardo's interpretation of Say's Law requires that money as a means of circulation and as a means of payment is non-reproducible and therefore cannot be a commodity. Second, in the schemes of reproduction it becomes clear, that the realisation of profits for the capitalist class as a whole requires money advances, which have to increase by means of rising credit in a growing economy. Third, the rate of interest in Marx's economics is conceived of as a monetary category determined by relative powers of financial and industrial capitalists. Therefore, similar to post-Keynesian theories of distribution and growth, the rate of capital accumulation is determined by the expected rate of profit and the exogenous rate of interest. From this it follows, that any “real theory” of crisis and stagnation, as the falling rate of profit theory of crisis, cannot be sustained within Marx's monetary analysis.

Key words: Money, interest, capital accumulation, Marx's economics

JEL classification: B14, B24, E11, E

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## 1. Introduction

Schumpeter (1954, pp. 277-278) has made the important distinction between „real analysis“ and „monetary analysis“. In “real analysis” the equilibrium values of employment, distribution and growth can be determined without any reference to monetary variables. In „monetary analysis“, however, monetary variables enter into economic theory at the very beginning and the real equilibrium cannot be determined without reference to money or monetary interest rates. Marx’s theory of capital accumulation and growth has usually been characterised as “real analysis” in the categories of Schumpeter. In Marxian economic theory, money and a monetary interest rate generally do not play a major role. In the influential introductions into Marx’s economic thinking by Mandel (1978) and Sweezy (1942) money is only considered in so far as a brief summary of Marx’s arguments in *Capital*, vol. I, is given where money is derived from the succession of the different forms of value and then builds the bridge to capital, the main object of Marxian scientific reasoning. The attempts by Fritsch (1968) and De Brunhoff (1976) to reconstruct Marx’s theory of money and credit remained without major consequences for Marxian theories of accumulation and crisis. These theories, therefore, stay in the camp of “real analysis”: the long run trends of accumulation as well as economic crises are derived from the development of income shares or from the capitalist introduction of technical progress. Therefore, Marxian debates on crisis theories have focused on underconsumption, profit squeeze or falling rate of profit arguments.<sup>1</sup> The effects of money and a monetary interest rate are not considered in the first place but they are rather introduced as modifying aspects after the major trends have been derived from real analysis.

Under these conditions, it comes with no surprise that in modern discussions of distribution and growth Marx’s theory is considered to be more similar to Classical “real analysis” than to post-Keynesian “monetary analysis”.<sup>2</sup> There has been, however, a range of papers since the publication of Keynes’s *General Theory* which have attempted to show the similarities between Marx’s and Keynes’s analysis in the fields of money, effective demand and interest rates.<sup>3</sup> From this perspective, Marx’s economics should rather be considered as “monetary analysis”. Starting from these observations, in this paper we will take issue with the interpretation of Marx’s economic theory as “real analysis”. We will show in a systematic way that major elements of Marx’s economic theory rather fall in the camp of “monetary

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<sup>1</sup> See Shaikh (1978, 1983) for surveys on Marxian crisis theories.

<sup>2</sup> See Amadeo (1986) and Marglin (1984).

<sup>3</sup> See Fan-Hung (1939), Alexander (1940), Kenway (1980), Dillard (1984), Foley (1986), Sardoni (1986, 1987), Rogers (1989) and Rotheim (1991).

analysis” and will derive the implications for a Marxian theory of capital accumulation and crisis.

In the second part of the paper we will show that Marx’s theory of labour value has to be considered a „monetary theory of value“ because „abstract labour“ as the social substance of value cannot be measured without a social standard of value. Money as a social representative of value, therefore, is introduced at the very beginning of Marx’s microeconomics, although Marx himself does not draw the full conclusions from this implication, because he still considers the monetary system to be based on a specific money commodity (gold). This, however, does not follow strictly from his own analysis. Marx’s rejection of Ricardo’s interpretation of Say’s Law also requires that money as a means of circulation and as a means of payment is non-reproducible and therefore cannot be a commodity. From Marx’s schemes of reproduction it becomes clear that the realization of profits for the capitalist class as a whole requires money advances, which have to increase in a growing economy. Rising real savings cannot be considered a precondition for growth but are rather a result of increasing monetary expenditures of capitalists. The independence of capitalists’ expenditures from savings requires the existence of a credit system in order to finance capitalist money advances. We will show that the price of credit, the rate of interest, in Marx’s economics is conceived of as a monetary category determined by relative powers of financial and functioning capitalists. There is no natural rate of interest determined by productivity and thrift as in Classical or Neoclassical economics. The rates of interest and profit differ also in the long run. Therefore, Marx’s production price model contains two degrees of freedom with respect to distribution. There is an inverse relation between the real wage rate and the rate of profit and also between the rate of interest and the rate of profit of enterprise.

This monetary interpretation of Marx’s economics has major implications for a Marxian theory of distribution and accumulation, as will be discussed in the third part of the paper. Capital accumulation requires rising money advances. The quantity of credit is therefore an endogenous variable, whereas the rate of interest is exogenous for investment and accumulation. Income shares are determined by relative powers of capital and labour, by the degree of competition in the goods market and/or by the pace of accumulation of capital. Under certain conditions, there may also be effects of interest rate variations on distribution between capital and labour. The rate of capital accumulation is determined by the expected rate of profit and the exogenous rate of interest. Monetary interest rates and effective demand exert a major influence on the accumulation path. From this it follows, that any “real theory”

of crisis and stagnation, as the falling rate of profit theory of crisis, cannot be sustained within Marx's monetary analysis. A monetary interpretation of Marx's theory of accumulation and crisis rather reveals broad similarities to monetary extensions of post-Keynesian theories of distribution and growth in the tradition of Joan Robinson, Nicholas Kaldor and Michal Kalecki.

## **2. Money, interest and credit in Marx's economics**

### **2.1 Marx's theory of value as a "monetary theory of value"**

The interpretation of Marx's theory of value as a "monetary theory of value" follows the early work by Rubin (1973) and the more recent publications by Heinrich (1991), Reuten (1988, 1995), Matthews (1996) and Williams (2000), among others. In these papers and books it is shown that the category of value in Marx's theory necessarily includes the category of money. The theory of value, therefore, also has to contain a theory of money. From this it follows that Marx's theory of value cannot be seen as a "labour embodied theory of value" and his theory of money need not be interpreted as a "commodity theory of money". Instead, Marx's theory of value has to be interpreted as a "monetary theory of value" and his theory of money as a "token" or "credit theory of money".

As is well known, Marx's analysis of capitalist reproduction in *Capital*, vol. I, starts with the analysis of the commodity as the elementary form of wealth in bourgeois society (Marx, 1867, pp. 43-75). The products of individual labour in capitalist market economies, characterised by the social division of labour, assume the form of commodities. The co-ordination of the social division of labour through the exchange of commodities takes place in the single social sphere of capitalist economies, in the market sphere. In this sphere, private individual labour expended has to prove that it is a necessary part of the social expenditure of labour. Private labour has to prove to be "socially necessary labour". The result of private expenditure of labour, the individual commodity, has to be related to the total expenditure of labour in society, to the totality of commodities (Marx, 1867, p. 104).<sup>4</sup>

If the exchange of commodities is considered to be a socially and historically specific form of the mediation of the social division of labour, the substance and the magnitude of

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<sup>4</sup> According to Marx, „socially necessary labour“ is defined twofold. First, it is labour performed under the average technical conditions of production and with average skills and intensity (Marx, 1867, p. 47). Second, it requires that the product can be sold in the market sphere (Marx 1867, p. 109). There has to be effective demand for the results of individual labour in order to make it a component of social labour. From this it follows that „socially necessary labour“ can neither directly be expended in a specific production process nor be measured by the expenditure of concrete labour. Whether individual labour is socially necessary in the double sense mentioned above, can only be examined in the sphere of exchange.

value defining the exchange relations of commodities cannot be determined by socially and historically unspecific categories, as the expenditure of concrete physical magnitudes of labour. For the substance of value in Marx's economics, we rather get "abstract labour" which is constituted by exchange and which does not exist prior to the circulation of commodities (Reuten, 1988, p. 127). The magnitude of value can therefore only be expressed in a social category in which the product of the individual labour is allotted a certain portion of social labour. The socialisation of private labour in a capitalist market economy, therefore, requires the existence of a universal equivalent as representative of abstract labour and social value to which individual labour can be related. The value magnitude of each commodity is hence determined in the process of exchange in which individual products of labour are related to the universal equivalent. The formation of price and of abstract labour as the substance of value take place simultaneously. The universal equivalent to which each commodity is related in exchange may now be termed "money": "(...) money is the concrete expression of abstract labor – and, neglecting temporary surrogates, money is even the one and only expression of abstract labor" (Reuten, 1995, p. 109). In this sense, Marx's theory of value can be considered to contain simultaneously a theory of money.

In the development of the "money form" from the succession of the "elementary or accidental form of value", the "total or expanded form of value" and the "general form of value" in *Capital*, vol. I, Marx (1867, pp. 54-75) demonstrates the necessity of a universal equivalent for capitalist reproduction. Money as the result of the development of the value form is not considered to be a device facilitating the exchange of commodities in a barter economy, as in Classical economics, but is an indispensable condition for commodity production and exchange in capitalist economies (Williams, 2000). The development of the value form should, therefore, not be considered to expose the historical development of commodity production from barter over simple commodity production to capitalist commodity production, but should rather be seen as a logical development of the necessity of a universal equivalent in capitalist commodity production.

Marx takes the development of the value form, however, one step further and claims that only a commodity ("gold") which incorporates value itself can assume the money form and hence become the universal equivalent (Marx, 1867, p. 75). But as Heinrich (1991), Lipietz (1982), Matthews (1996), Reuten (1988, 1995) and Williams (1992, 2000) have convincingly made clear, the necessity of a money commodity cannot be sustained within the "monetary theory of value" sketched above. On the most abstract level it is rather dubious why a physical thing, the product of concrete labour, should represent a social form, abstract

labour (Williams, 2000). As the universal equivalent is a social construction, there is no need for it to be a commodity. What is needed is a socially accepted representative of the universal equivalent, money, and its guarantee by social institutions. Gold may therefore be money, but not because it is a commodity but because it is a socially accepted representative or token of value. Gold as a money commodity is, therefore, historically contingent but not theoretically necessary. From this it follows, that there is no theoretical metallism in Marx's theory of money (Matthews, 1996).<sup>5</sup> As we will show below, a reproducible money commodity would also contradict some major hypotheses of Marx's economics, i.e. the rejection of Say's law.

An understanding of money as socially accepted token of value is perfectly compatible with the modern credit-money system which can be described as a hierarchy of promises to pay with increasing social validity and liquidity from the bottom to the top (Evans, 1997). Payment between two parties takes place by means of a promise to pay of a third party with higher social validity and liquidity (Foley, 1987). The ultimate means of payment on the national level is of course the promise to pay of the social institution "central bank", central bank money. On the international level, it is central bank money issued by the central bank of the key currency. There is therefore also no reason to assume, as Marx (1867, pp. 141-144) does, that "universal money", money for international transactions, has to be a commodity.

## **2.2 The determination of the level of prices, the rejection of Say's law and the endogeneity of money supply in Marx's "monetary theory of value"**

The consequences of our interpretation of Marx's theory of value as a "monetary theory of value" for the functions and effects of money in capitalist reproduction have now to be examined.<sup>6</sup> The first function of money is that of a measure of value and the standard of price (Marx, 1867, pp. 97-106). Prices are measured in monetary units. According to Marx's

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<sup>5</sup> There is, however, no agreement on this point of view in Marxian economics. De Brunhoff (1976), Crotty (1987), Evans (1997), Foley (1983, 1986a) and Weeks (1981) hold that Marx's commodity theory of money is a correct albeit historically restricted starting point for the analysis of money and therefore not applicable to modern economies. Lapavitsas (2000) and Lapavitsas & Saad-Filho (2000) do not only consider commodity money to be an appropriate starting point for Marx's theory of money and credit but also argue that anchoring the monetary system on a money commodity would stabilize capitalist reproduction, also in modern times. Graziani (1997), on the contrary, argues that the capital labour relation requires credit money because the purchase of labour power is logically prior to the production of commodities and hence also to the production of the money commodity. For a more extensive treatment of some aspects of the Marxian debates see Hein (1997, pp. 34-42).

<sup>6</sup> According to our analysis, the functions of money discussed below are all related to capitalist commodity production. Different functions cannot be assigned to different stages in the development of commodity production as Lapavitsas (1994) assumes. He holds that money as a measure of value and a standard of price applies to elementary and accidental commodity exchange, money as means of circulation to general commodity production and only "money as money" to capitalist commodity production.



commodity theory of money, the level of prices is measured in units of the money commodity and is therefore given by the ratio of the weighted average labour value of the commodities in circulation to the labour value of a unit of the money commodity. If the necessity of a money commodity is rejected, however, the level of prices has to be determined in a different way. As Foley (1983) has proposed, the level of prices and the value of money can be seen as given by entrepreneurial pricing which itself depends on the trend of accumulation and on the distribution struggle between capital and labour.<sup>7</sup> The money wage rate may therefore assume a prominent role in the determination of the price level (Matthews, 1996). Also in a money token system, the level of prices has nothing to do with the supply of money, as supposed by the quantity theory of money, but is determined by non-monetary forces.<sup>8</sup>

The second function of money is that of a means of circulation (Marx, 1867, pp. 106-130). Commodities (C) have to be traded for money (M) in a capitalist economy. Money may hence interrupt the succession of sales (C-M) and purchases (M-C) in the circuit C-M-C. This function of money provides Marx with the first argument to reject Ricardo's version of Say's law in his *Theories of Surplus Value*.<sup>9</sup> Money as a means of circulation constitutes Marx's "possibility theory of crisis", because it may interrupt the circuit C-M-C (Marx, 1861-63, pp. 499-508).<sup>10</sup> As money also has the potential to function as a store of value (hoarding), a role of money subsumed under the third function of "money as money" by Marx (1867, pp. 130-134) in *Capital*, vol. I,<sup>11</sup> an increase in the willingness to hoard causes a lack of aggregate demand for the economy as whole and may therefore trigger a general crisis. A "general glut" can,<sup>12</sup> however, only occur if the demand for money as a store of value does not constitute a

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<sup>7</sup> In their "new solution" to the transformation problem Foley (1982) and Lipietz (1982a) define the "value of money" - also for money token - as the ratio of the expenditure of direct and indirect labour power to nominal value added: "The value of money expresses the social equivalence of money and labour time which is inherent in commodity production, and would be meaningfully defined even if money were an abstract unit of account" (Foley, 1982, p. 39). This concept, however, does not yet contain a determination of the price level.

<sup>8</sup> In Marx's commodity money system, however, there seems to arise an effect of the quantity of money on the level of prices as soon as the money commodity in circulation is replaced by paper money (Marx, 1867, pp. 125-130). An increase in the supply of paper money should increase the level of prices measured in units of paper money because a unit of paper money now represents less units of the money commodity in circulation. This quantity theory relation, however, can only be sustained, if the representative of the money commodity is only used for circulation purposes. But this need not be the case. According to Marx (1867, p. 130), the role of money as money which includes the function of money as a store of value (hoard) may also be assumed by the money representative. Hence, there need not be a strict relation between the quantity of paper money and the price level, because the amount of paper money in hoards may be variable.

<sup>9</sup> On the differences between Ricardo's version of Say's law and the neoclassical version see Garegnani (1978, 1979).

<sup>10</sup> On Marx's rejection of Say's law in the formulation of Ricardo and the "possibility theory of crisis" as opposed to a theory of the actual crisis see more explicitly Kenway (1980), Sardoni (1987, pp. 26-36) and Hein (1997, pp. 51-59).

<sup>11</sup> The third function of "money as money" also includes the functions of money as a means of payment and of money as universal money which have already been mentioned above.

<sup>12</sup> See Sowell (1972) for an overview of the „general glut“-controversy.

demand for production. If money is a reproducible commodity, an increase in demand for that commodity may cause a partial crisis due to a disturbance of the proportions of demand which, however, is conceded by the proponents of Say's law, but will not cause a general crisis due to insufficient aggregate demand. A lack of aggregate demand may only arise, if there are no resources devoted to the production of money. Therefore, money has to be non-commodity money to sustain the critique of Say's law and to pose the problem of effective demand to capitalist economies. This has been made clear by Keynes (1933, p. 86) in the drafts preceding the publication of the *General Theory*: "Perhaps anything in terms of which the factors of production contract to be remunerated, which is not and cannot be a part of current output and is capable of being used otherwise than to purchase current output, is, in a sense, money. If so, but not otherwise, the use of money is a necessary condition for fluctuations in effective demand."

For Marx, a second argument against Say's law derives from the function of money as a means of payment (Marx, 1861-63, p. 511), a function Marx subsumed under "money as money" in *Capital*, vol. I (Marx, 1867, pp. 134-141). Money functions as a means of payment when the sale of a commodity and the realization of its price are separated. The seller becomes a creditor, the buyer a debtor and money is the standard and the subject of a creditor-debtor-contract. Money as a means of payment, therefore, leads to a modern credit-money system as sketched above. In such a system, on the one hand, the demand for commodities is no longer limited by income created in production. Investment is therefore not limited by savings. The crucial nexus of income with expenditure and savings with investment in Ricardo's version of Say's law is therefore relaxed. On the other hand, money as a means of payment increases the vulnerability and fragility of the system. Capitalists do not only have to find appropriate demand for their produced commodities, but they have to find it within a certain period of time in order to be able to meet their payment commitments. If there are unanticipated changes in market prices for final products in the interval between the purchase of a commodity as an input for production and the sale of the final product, capitalists may be

unable to meet their payment commitments. Default of individual capitals may interrupt credit chains and cause a general crisis.<sup>13</sup>

In the discussion of the role of money as a means of circulation Marx (1867, pp. 116-124) shows that the quantity of money necessary for circulation ( $M_c$ ) is given by the volume of traded commodities ( $Y^r$ ), the average price of these commodities ( $p$ ) and the velocity of circulation of a unit of money ( $q$ ):  $M_c = \frac{pY^r}{q}$ . The quantity of money has therefore no direct effect on the price level. The level of prices is determined by other forces, i.e. by distribution struggle and/or the trend of accumulation as already mentioned above. For capitalist reproduction to proceed smoothly, the quantity of money has to adjust passively to the needs of circulation. From this it follows that money has to be endogenous for the income generating and growth process.

The rejection of Say's law and its necessary replacement by a theory of effective demand as well as the need for endogenous money for the expansion of capitalist economies also become clear in Marx's discussion of simple and expanded reproduction in *Capital*, vol. II (Marx, 1885, pp. 396-527). In the schemes of reproduction Marx analyses the conditions for capitalist reproduction in a two-sector model without foreign trade and economic activity by the state. Sector 1 produces means of production and sector 2 produces means of consumption.<sup>14</sup> Commodities enter circulation with a given price to be realized, consistent with the arguments given above. The supply price of each sector is given by constant capital costs expended in production ( $D$ ), wage costs ( $W$ ) and profits ( $\Pi$ ). The demand for output of sector 1 consists of gross investment ( $I^g$ ) in constant capital of both sectors, the demand for output of sector 2 consists of consumption demand out of profits ( $C_{\Pi}$ ) and out of wages ( $C_w$ ). Assuming that "workers spend what they get" we obtain from the demand-supply equilibrium  $D_1 + W_1 + \Pi_1 = I_1^g + I_2^g$  in sector 1 and  $D_2 + W_2 + \Pi_2 = C_{w1} + C_{\Pi1} + C_{w2} + C_{\Pi2}$  in sector 2 the familiar proportionality condition for simple reproduction in which there is no net investment:  $I_2^g = C_{w1} + C_{\Pi1}$ . Sector 1's supply of investment goods to sector 2 must be equal

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<sup>13</sup> The role of credit in economic crisis is explored in more detail by Marx in *Capital*, vol. III (Marx, 1894, pp. 476-519) where he shows that the credit system may exacerbate economic crisis caused by the effect of "real factors" on the profit rate. As Arnon (1994), Crotty (1986) and Pollin (1994) have observed, Marx's theory displays broad similarities to Minsky's "financial instability hypothesis" (Minsky 1975, 1977). There is, however, a major difference between Marx's and Minsky's theories, because Minsky sees economic crisis caused in the financial sector whereas Marx views economic crisis to be caused by real factors and only exacerbated by financial relations. On Marx's and post-Keynesian financial crisis theories see the more extensive treatment in Hein (1997, pp. 252-276).

<sup>14</sup> For a more extensive treatment of the schemes of reproduction see Kenway (1987) and Hein (1997, pp. 136-155).

to sector 2's supply of consumption goods to sector 1. Marx also shows that expanded reproduction and therefore balanced growth in capitalist economies is generally possible and he derives the proportionality conditions as an extension of the condition presented above for simple reproduction. Here, however, is not the place to discuss the related details.<sup>15</sup>

Besides this familiar proportionality condition, the schemes of reproduction also contain a treatment of effective demand. From the equality of aggregate demand and aggregate supply and the assumption that workers do not save, we get:  $\Pi_1 + \Pi_2 = I_1^n + I_2^n + C_{III} + C_{II2}$ , where  $I^n = I^s - D$  denotes net investment. From this of course Kalecki's (1968) interpretation of Marx's schemes of reproduction arises: As capitalists cannot determine their sales and their profits but can only decide about their expenditures on net investment and consumption goods, these expenditures have to ensure that profits produced will be realized. The expenditures of the capitalist class as a whole determine realized profits. Therefore, net investment determines savings in Marx's schemes of reproduction. A realization failure, the inability to sell commodities at predetermined prices is therefore due to insufficient investment or consumption demand by capitalists. The determinants of these major components of effective demand should therefore have been analysed in the next step of the investigation. There is, however, no theory of investment demand in Marx's schemes of reproduction and hence no determination of the level of output or the rate of growth of the economy (Kalecki, 1968; Sebastiani, 1991). But Marx was well aware of the problem of effective demand, also when discussing the effects of a falling rate of profit due to a rising organic composition of capital in *Capital*, vol. III: "The conditions of direct exploitation, and those of realizing it, are not identical. They diverge not only in place and time, but also logically. The first are only limited by the productive power of society, the latter by the proportional relation of the various branches of production and the consumer power of society" (Marx, 1894, p. 244).

Capitalists' expenditures as the causal force of income and profits require that these expenditures can be financed independently of current income. There has to be the potential that investment can be financed independently of current savings. Capitalists need access to money in order to get the process of reproduction started. In the schemes of reproduction, there can be found a detailed treatment of related monetary flows as well. Marx (1885, pp. 329-354, 415-426) shows that also for simple reproduction the circulation of commodities requires money advances by capitalists. After a given period of production capitalists enter

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<sup>15</sup> See Sweezy (1942) and Hein (1997, pp. 148-155) for an extensive discussion.

circulation with the produced commodities and with an amount of money necessary for circulation. “So far as the entire capitalist class is concerned, the proposition that it must itself throw into circulation the money required for the realization of its surplus-value (correspondingly also for the circulation of its capital, constant and variable) not only fails to appear paradoxical, but stands forth as a necessary condition of the entire mechanism. For there are only two classes: the working class disposing only of its labour-power, and the capitalist class, which has a monopoly of the social means of production and money” (Marx, 1885, p. 425). Of course, the necessary amount of money to be advanced by capitalists is determined by the volume of commodities to be traded, the average price of the commodities and the velocity of circulation of a unit of money, as mentioned above. After the successful circulation of commodities the money flows back to capitalists and stands ready to be advanced again in the next period.

In a growing economy with the price of commodities taken as given for the sake of simplicity, the quantity of money to be advanced by capitalists has to increase. As potential sources for additional money advances and hence for money’s endogeneity, Marx (1885, pp. 349-350) discusses the transfer of money from hoards and an increasing velocity of money in circulation.<sup>16</sup> But these sources can only temporarily facilitate economic expansion. In the long run, the quantity of the money stock has to increase by means of increasing the production of the money commodity, according to Marx (1885, pp. 350, 494-495).<sup>17</sup> As there is no necessity of a money commodity in Marx’s economics and as the creation of money in modern economies is not limited by the availability of the money commodity “gold”, we can conceive of the adjustment of the quantity of money to the rate of expansion of the capitalist economy by means of creation and destruction of credit-money. Or as Foley (1986a, p. 89) puts it: “The sustainable rate of growth of the system obviously depends on the level of such new borrowing: the higher the total borrowing, the faster the rate of expanded reproduction that can be achieved by the system”.

As capitalist expansion presupposes the expansion of credit, the conditions of credit are crucial for capital accumulation and economic growth. The availability and the price of credit may have an important impact on effective demand, especially on capitalist investment. This is implicit in the circuit of capital already discussed by Marx (1867, pp. 145-153) in *Capital*,

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<sup>16</sup> In *Capital*, vol. I, Marx (1867, p. 134) also relates the endogeneity of the quantity of money in circulation to hoarding and dishoarding.

<sup>17</sup> See also De Brunhoff (1976, pp. 60-72) and Foley (1986a, pp. 86-89). Lapavistas (2000) and Mollo (1999), however, do not seem to be aware that hoarding and dishoarding of a money commodity can only play a limited role for money endogeneity in a growing economy.

vol. I. Capitalists advance money (M) in order to buy commodities (C), means of production and labour power, which are combined in the production process (P), the result being a bundle of commodities (C') which has to be sold for a higher amount of money (M'):  $M - C \dots P \dots C' - M'$ . The difference between M' and M is of course money profit ( $\Pi$ ). In a growing economy in which at least parts of money advances have to be financed by means of credit, capitalists will only advance money if expected money profits will be sufficient to cover credit costs. As money advances by the capitalist class as a whole are of utmost importance for the realization of produced profits, realized profits will depend on the relation between expected profits and credit costs or on the relation between the expected profit rate and the rate of interest. This relation will therefore be of utmost importance for the formulation of a Marxian theory of effective demand, growth and economic crisis. It will, therefore, be examined in more detail in the following chapter.

### **2.3 Credit, rate of interest and rate of profit in Marx's theory**

According to Marx, credit derives from money in its function as a means of payment. In the interval between the sale of a commodity and the payment of its price a credit relation is established. Marx (1894, pp. 400-413) distinguishes between commercial credit and bank credit. Bank credit may increase if commercial banks discount commercial credit (bills of exchange) or if additional credit is granted. Marx does not suppose that credit supply of commercial banks is limited by private savings but assumes that commercial banks can, in principle, create credit without limits which will then circulate as credit-money (De Brunhoff, 1976, pp. 93-99; Reuten, 1988):<sup>18</sup>

“The credit given by a banker may assume various forms, such as bills of exchange on other banks, cheques on them, credit accounts of the same kind, and finally, if the bank is entitled to issue notes – bank notes on the bank itself. A bank-note is nothing but a draft upon the banker, payable at any time to the bearer, and given by the banker in place of private drafts. This last form of credit appears particularly important and striking to the layman, first, because this form of credit-money breaks out of the confines of mere commercial circulation into general circulation, and serves there as money; and because in most countries the principal banks issuing notes, being a particular mixture of national and private banks, actually have the national credit to back them, and their notes are more or less legal tender;

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<sup>18</sup> We therefore disagree with Lapavitsas (1997, 2000a) and Lapavitsas & Saad-Filho (2000) who consider the credit system in Marx's theory to be mainly a mechanism for the internal reallocation of idle funds among industrial and commercial capitalists.

because it is apparent here that the banker deals in credit itself, a bank-note being merely a circulating token of credit.” (Marx, 1894, pp. 404-405).

The quantity of credit-money is therefore endogenous for capitalist reproduction and is determined by credit demand of capitalists, as we have already claimed above:<sup>19</sup> “The quantity of circulation notes is regulated by the turnover requirements, and every superfluous note wends its way back immediately to the issuer” (Marx, 1894, p. 524).

The evolution of the contract- and credit-system includes the establishment of interest-bearing capital with the interest rate as a claim on a part of surplus value produced by productive labourers. As the capitalist production process requires monetary advances, each sum of money may assume the role of interest-bearing capital which can be “sold” for interest (Marx, 1894, pp. 338-357). The circuit of capital may, therefore, be framed by a credit relation  $M - M'$  and extends to:  $M - M - C \dots P \dots C' - M'' - M'$ , with the difference  $M'' - M = \Pi$  as profits and the difference  $M' - M = Z$  as interest ( $Z$ ). Total profits split into profits of enterprise ( $\Pi^n$ ) and interest:  $\Pi = \Pi^n + Z$  (Marx, 1894, pp. 358-390). According to the different functions in the extended circuit of capital, the capitalist class can be distinguished into money capitalists and functioning capitalists. Both functions, however, may be assumed by the same person or the same enterprise. Functioning capitalists are ready to borrow from money capitalists and to pay interest because money has the potential to generate money profits, if it is used to initiate a process of production in which the expenditure of labour power generates surplus value. Interest is therefore the part of surplus value produced under the supervision of functioning capitalist which is received by money capitalists. As also own capital advanced for production purposes yields imputed interest, the rate of profit on total capital advanced ( $r$ ) can always be conceived of as a sum of the rate profit of enterprise ( $r^n$ ) and the rate of interest ( $i$ ):  $r = r^n + i$ . In order to make functioning capitalists advance money for production purposes, the rate of profit has to exceed the rate of interest to allow for a positive rate of profit of enterprise.

According to Marx, there is an inverse relation between interest and profits of enterprise. Variations in interest rates do not affect the value or the price of commodities but only have an effect on the distribution of surplus value or total profits between money capitalists and functioning capitalists. Variations in the rate of interest have no influence on the rate of profits but affect the rate of profit of enterprise inversely: “(...) assuming the

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<sup>19</sup> In this respect Marx agrees with the banking point of view in the „banking-currency-controversy“ (Lapavitsas, 1994; Mollo, 1999).

average profit to be given, the rate of the profit of enterprise is not determined by wages, but by the rate of interest. It is high or low in inverse proportion to it” (Marx, 1894, p. 379).<sup>20</sup>

From this it follows that Marx’s determination of income shares takes place in two stages. In the first stage, Marx considers the rate of profit to be determined by the distribution conflict between capital and labour. With the technical conditions of production given, the rate of profit is therefore determined by the real wage rate. In the second stage, the rate of interest then exerts an influence on the distribution conflict between money capitalists and functioning capitalists and makes the rate of profit of enterprise a residual variable. In these two steps the two degrees of freedom of Marx’s production price model are closed.

Although the rate of profit of enterprise in Marx’s economics can also be considered as remuneration for the risks and troubles of real investment, Marx’s view must be distinguished from the Classical views of Smith and Ricardo who consider the rate of interest and the rate of profit of enterprise to be independent variables which do not affect each other and which therefore can be summed up to derive the rate of profit (Pivetti, 1987). The recent attempts by Panico (1985) and Pivetti (1985, 1987, 1991) to close the degree of freedom of the classical production price model by Sraffa (1960) by means of an exogenous rate of interest which determines the rate of total profits and makes the real wage rate the residual variable can therefore not be applied to Marx’s theory.<sup>21</sup> As this procedure has to assume a constant rate of profit of enterprise when the interest rate varies, it ignores the distribution conflict between money capital and industrial capital (Argitis, 2001). This conflict is, however, essential for Marx’s theory. In Marx’s economics the rate of interest can therefore not be taken to determine the rate of profit.

In Marx’s two stage determination of income shares, the rate of interest is assumed to be an exogenous variable for production and growth. The rate of interest is determined in the market for money capital, but there is no “natural rate” as centre of gravity for actual rates (Marx, 1894, pp. 358-369). Instead, the rate of interest is given by concrete historical, institutional and political factors which reflect the relative powers of money capital and industrial capital. There is, however, a long run upper bound for the rate of interest given by the rate of profit as long as the latter, as in Marx, is assumed to be independent of the former. Increasing interest rates approaching or exceeding the rate of profit will induce industrial capitalists to prefer financial investment instead of real investment. This will increase the

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<sup>20</sup> See also Argitis (2001), Pivetti (1987) and Hein (1997, pp. 63-69) on the relation between profits of enterprise and interest in Marx’s theory.

<sup>21</sup> This objection can of course also be applied to Panicos (1980) attempt to reformulate Marx’s approach in a production price model.



supply of money capital and bring down the rate of interest to a reasonable level below the rate of profit again (Marx, 1894, p 378). Only in the sense of setting a long run maximum limit can the rate of profit be considered to determine the rate of interest (Marx, 1894, p. 360).

Summing up, the interest rate in Marx's system can be seen as a monetary category determined by the relative powers of industrial and money capital.<sup>22</sup> With these power relations given the rate of interest is an exogenous variable for income determination, distribution, accumulation and growth, whereas the quantities of credit and money are endogenous, as shown above. This view is compatible with the main features of modern monetary systems as seen in post-Keynesian monetary theory:<sup>23</sup> The rate of interest is a distribution parameter determined by the central bank's monetary policies as well as by liquidity preference and risk aversion of monetary wealth holders. The quantities of credit and money are determined by that part of credit demand which meets the standards of the central bank's discount policy, the creditworthy credit demand. The quantity of credit supply passively adjusts to the level of credit demand at the rate of interest given by the central bank's base rate and a mark-up of commercial banks determined by risk and liquidity premia.<sup>24</sup>

In a Marxian monetary approach the central bank may be interpreted as an institution which can be used as an instrument in the distribution struggle between social classes. As Epstein (1992) has shown in a political economy model of central banking, central bank policies may depend on relative powers and alliances of classes. Following this model, the direction of central bank policies depends on the relation between capital and labour, on the

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<sup>22</sup> See Argitis (2001), Panico (1980, 1988) and Pivetti (1987) for similar results with respect to Marx's theory of the rate of interest.

<sup>23</sup> See for instance Cottrell (1994), Hewitson (1995), Kaldor (1970), Lavoie (1984, 1992, pp. 149-216), Moore (1989) on post-Keynesian monetary theory. For a broader survey of post-Keynesian economics see Arestis (1996). The compatibility of Marx's theory of interest, money and credit with the post-Keynesian "horizontalist" approach does, however, not imply that Marx's approach agrees with some post-Keynesian views on the origin and the role of money. In Marx's theory, money and credit are not considered to be means to overcome uncertainty as ahistorical characteristics of human life as such, as in Davidson (1994). Marx rather considers money and credit to be historically specific social institutions mediating the social division of labour which itself cause uncertainty and instability as main characteristics of capitalist reproduction (see also Lapavitsas & Saad-Filho 2000).

<sup>24</sup> It should be noted that the position sketched here differs from those post-Keynesian views which assume that a decreasing liquidity position of commercial banks and rising lender's and borrower's risk finally lead to rising interest rates when the quantity of credit is expanding in the accumulation process (Minsky, 1986; Palley, 1996; Rousseas, 1998; Wray, 1990). If an accommodating policy of the central bank is supposed, however, there will be no decreasing liquidity position of commercial banks when credit is expanding. If we further suppose that commercial banks only supply credit to creditworthy borrowers, there will also be no increasing borrower's or lender's risk when credit is increasing. For the economic system as a whole, increasing credit means increasing expenditures and hence increasing revenues from which credit can be repaid. There is therefore good reason to assume that the interest rate is the exogenous variable of the accumulation process and that the quantities of money and credit are endogenous variables. If interest rates are rising when the quantity of credit is expanding this is due to restrictive monetary policies chosen by the central bank (Lavoie, 1996).

relation between finance capital and industrial capital, on the degree of political and economic independence of the central bank and on the position of the national currency in the international currency system. In a Marxian monetary approach, as the one sketched in the present paper, it is also not clear whether labour income shares – or the real wage rate when technical conditions of production are constant – should remain unaffected by interest rate variations initiated by central banks or monetary wealth holders. In a monetary economy the real wage rate and – with constant technical conditions of production - the rate of profit can no longer be determined solely by relative powers of capital and labour in the labour market. In the labour market the commodity labour power is traded for money and the nominal wage rate is established in this market. The real wage rate, however, is influenced by entrepreneurial pricing in the goods market as well. Here interest rate variations may have direct and indirect effects which should be taken into account.

The resulting model should therefore contain Marxian and neo-Ricardian effects of interest rate variation on distribution (Argitis, 2001). Labour income shares are likely to be affected by interest rate hikes and hence rising interest costs for industrial capital, when these hikes are considered to be permanent and when industrial capitalists are in a position to pass on higher costs to prices or to compensate rising interest costs by decreasing labour costs through increasing productivity. The ability to increase prices in the goods market and to reduce real wages or labour income shares will depend on the degree of competition in the goods market and on the power of labour in the labour market to demand higher nominal wages when prices or productivity are increasing. Temporary increases in interest rates, however, may not induce industrial capital to increase prices and may therefore have no effects on the real wage rate. A high degree of competition in the goods market may also prevent goods prices from rising when interest rates increase permanently. A permanent redistribution at the expense of labour may also be impossible if labour unions are powerful enough to increase money wages when prices increase. In this case rising interest rates will cause accelerating inflation rates. These potential distribution effects of interest rate variation will be considered in the discussion of the implications of Marx's monetary analysis for the theory of capital accumulation and crisis in the following section.

### **3. Implications for the theory of accumulation and crisis: the similarities to post-Keynesian theories of distribution and growth**

In its orthodox variants based on “real analysis”, Marxian theories of capital accumulation assume that the development of the technical conditions of production and the development of

distribution determine the accumulation path (Shaikh, 1978, 1983). Realization problems may only occur in the short run but do not exert any influence on the long run trend of growth. The long run accumulation rate, the rate of growth of the capital stock (K),  $g = \frac{\Delta K}{K}$  is determined by the development of the rate of profit defined as the ratio of annual profits ( $\Pi$ ) to the capital stock  $r = \frac{\Pi}{K}$ , and capitalists' propensity to accumulate out of profits  $a = \frac{\Delta K}{\Pi}$ . We therefore get for the rate of capital accumulation:  $g = ar$ . The causality of the models runs from the determination of distribution in real terms to the determination of capital accumulation, under the assumption that accumulation is limited by capitalist profits and the rate of accumulation is determined by the rate of capitalists' savings.<sup>25</sup> Money, credit and a monetary interest rate are inessential for this strand of theory. Economic crises are caused by those factors which make the rate of profit decline. Writing the rate of profit as:

$$r = \frac{\Pi}{K} = \left(1 - \frac{W}{Y}\right) \frac{Y}{K} = \left(1 - \frac{w^r}{y}\right) \frac{1}{v},$$

a declining profit rate can either be caused by rising labour income shares ( $W/Y$ ), i.e. the real wage rate ( $w^r$ ) rising faster than labour productivity ( $y$ ), or by rising capital-output-ratios ( $v$ ). The first cause for falling profitability and economic crisis has been elaborated in the "profit squeeze"-approach, the second cause in the falling-rate-of-profit-due-to-rising-organic-composition-of-capital theories.<sup>26</sup> Of course, these approaches have solid foundations in Marx's own work. In *Capital*, vol. I, especially in chapter 25 "The General Law of Capitalist Accumulation", Marx (1867, pp. 574-582) elaborates on the interaction of distribution and capital accumulation. In *Capital*, vol. III, in part III "The Law of the Tendency of the Rate of Profit to Fall", Marx (1894, pp. 211-266) analyses the effects of the development of the forces of production on the rate of profit. In each of these chapters he abstracts from monetary elements and assumes Say's law to hold in order to derive the pure effects of income distribution and technical change on the rate of profit and on capital accumulation. As has already been remarked by Shoul (1957), these passages cannot be

<sup>25</sup> There may be of course feedbacks from accumulation to distribution in those models. See Amadeo (1986) and Marglin (1984) for more specific formulations.

<sup>26</sup> For the short run version of the profit-squeeze approach explaining trade cycles see the seminal paper by Goodwin (1967), for the long run version explaining economic stagnation see Glyn & Sutcliffe (1972) and the more recent work in the "Social-Structure-of-Accumulation"-approach, i.e. Gordon, Weisskopf & Bowles (1987). For the falling-rate-of-profit-due-to-rising-organic-composition-of-capital theories see Catephores (1989, pp. 166-187) and Shaikh (1978, 1978a, 1983a, 1987). For a critique of the necessity of a falling rate of profit due to technical change in a model with prices of production instead of labour values see Van Parijs (1980).

considered to deliver complete theories of accumulation and crisis but should rather be seen as focussing on particular elements of economic crisis.

From our analysis of Marx's monetary theory, we have to reject the impression that the "real" variants of Marx's accumulation and crisis theory sketched above could be the only possible interpretations. In a Marxian model of accumulation based on "monetary analysis" neither the determination of distribution can take place in real terms in the labour market nor can capital accumulation be determined by capitalist savings. Contrary to a real exchange economy in which Say's law might hold, we have to analyse a monetary economy in which capital accumulation is independent of capitalist savings. As we have elaborated above, in a growing economy capitalists need to have access to means of finance irrespective of current profits or savings. According to Marx, the credit system has the potential to supply these means of finance in the form of credit at a given rate of interest - provided that capitalists meet the credit standards defined by the central bank we should add. The rate of interest is the exogenous variable for production and growth, the quantities of credit and money are endogenous variables in Marx's monetary theory. Taken together, investment is the causal force which determines income and savings in this Marxian framework of accumulation and growth.

This Marxian framework shows broad similarities to post-Keynesian theories of growth and distribution in the tradition of Nicholas Kaldor (1955/56, 1957, 1961), Joan Robinson (1962) and Michal Kalecki (1954).<sup>27</sup> Whether variations in investment will generate the adequate savings by means of redistribution, as in the Kaldor/Robinson version of the post-Keynesian model, or by means of variation in the degree of capacity utilisation, as in Kalecki's model, depends on the degree of capacity utilisation in the initial equilibrium. If the equilibrium degree of capacity utilisation is allowed to deviate from full capacity utilisation, as in the Kaleckian model, variations in the rate of accumulation can be adapted by variations in capacity utilisation and will have no effect on distribution. Income shares are then rather determined by firms' mark-up pricing on unit labour costs in incomplete goods markets with the mark-up being determined by the degree of competition in the goods market and by relative powers of capital and labour in the labour market. If, however, there is full capacity

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<sup>27</sup> See Amadeo (1986) and Marglin (1984) for comparisons of the orthodox Marxian model with post-Keynesian models. For a more detailed discussion of post-Keynesian models of growth and distribution see Lavoie (1992, pp. 282-347). In Hein (1997, pp. 155-219) an extensive discussion of the orthodox Marxian model, a modified Marxian model, the models by Kaldor and Robinson as well as different variants of the Kaleckian model is provided.

utilisation in equilibrium, as in the Kaldor/Robinson version of the post-Keynesian model,<sup>28</sup> variations in the rate of capital accumulation are supposed to affect income shares in order to establish an investment-savings-equilibrium.<sup>29</sup> To achieve appropriate redistribution when accumulation rates change, in the long run prices in the goods market have to be more flexible than nominal wages in the labour market. There may, however, be major obstacles for the supposed adjustment processes. In the case of increasing accumulation rates under the conditions of full utilisation of the capital stock and low unemployment or even full employment, workers may resist redistribution in favour of profits. Increasing prices in the goods market might trigger rising nominal wages and cumulative inflation may result, so that the system is characterised by an “inflation barrier”. In the case of decreasing accumulation rates, some price rigidities in the goods market may prevent the necessary redistribution in favour of wages which then may cause decreasing production and capacity utilisation with negative feedbacks on investment. Although the case of full utilisation and the potentials for instability should not be neglected in a Marxian theory of effective demand and accumulation, full capacity utilisation should not be considered the normal state of affairs in a capitalist monetary economy. According to Marx (1867, p. 424), advanced capitalism displays a high degree of elasticity of production so that increasing demand can be supplied without major disturbances for prices and distribution caused by capacity constraints (Kurz, 1987).

Following Marx’s monetary analysis, investment decisions will be influenced by the expected rate of profit and the exogenously given rate of interest mainly determined by central bank policies. The rate of profit can be decomposed into the profit share ( $h$ ), capacity utilisation ( $u$ ) and the capital- potential output ( $Y^P$ )-ratio ( $v$ ):

$$r = \frac{\Pi}{Y} \frac{Y}{Y^P} \frac{Y^P}{K} = hu \frac{1}{v}. \quad (1)$$

Capital accumulation will therefore be influenced positively by the development of the profit share and of capacity utilisation and negatively by the development of the capital-potential output-ratio. Increasing interest rates have a direct and negative impact on investment because finance or opportunity costs of real investment are rising. But there are also indirect effects on investment, because interest rate variations will affect distribution and hence consumption demand, if we assume that workers do not save, that monetary wealth owners’ savings propensity out of interest income is positive but below one, and that profits of enterprise are

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<sup>28</sup> Whereas Joan Robinson (1962) only assumes full utilisation of the capital stock on the equilibrium growth path, Kaldor (1957, 1961) also assumes full employment of labour.

<sup>29</sup> To achieve this, the propensity to save out profits of course has to exceed the propensity to save out of wages.

completely retained by firms and therefore saved by definition. If prices and hence the profit share remain constant in the face of rising interest rates, profits of enterprise will decline and aggregate consumption demand will increase. If rising interest rates cause rising prices and an increasing profit share, the wage share will decrease and consumption demand will fall. Changing consumption demand will finally feed back on investment through the effects on capacity utilisation.

Main features of distribution and accumulation in our Marxian monetary model can now be displayed within a simple one-sector-model which shows broad similarities to a monetary extension of a basically Kaleckian model of distribution and growth in the tradition of Bhaduri & Marglin (1990) (Hein, 1999).<sup>30</sup> For the sake of simplicity, the model is abstracting from technical change. As there is no overhead labour in the model, labour productivity as well as the capital-potential output-ratio are constant up to full capacity output. The capital stock is assumed not to depreciate. As in the Marxian model there are no capacity constraints, commodity prices ( $p$ ) are not affected by fluctuations in demand and can be taken to be determined by mark-up pricing on unit labour costs following Kaleckian models. The mark-up ( $m$ ) is influenced by the degree of competition in the goods market and by the relative powers of capital and labour in the labour market. Under certain conditions discussed above, the mark-up may respond to interest rate variations:

$$p = [1 + m(i)] \frac{w}{y}, \quad m > 0, \quad \frac{\partial m}{\partial i} \geq 0. \quad (2)$$

The profit share ( $h$ ) is determined by the mark-up and may therefore also vary with changes in interest rates:

$$h = \frac{m(i)}{1 + m(i)}, \quad \frac{\partial h}{\partial i} \geq 0. \quad (3)$$

Savings consist of profits of enterprise, which we assume to be equal to retained earnings, and of savings ( $S_z$ ) out of interest income ( $Z$ ), which we assume to be distributed to monetary wealth holders. Monetary wealth holders' savings propensity ( $s_z$ ) is positive but below one. Workers do not save. The savings rate ( $\sigma$ ) relates total savings to the capital stock:

$$\sigma = \frac{S}{K} = \frac{\Pi - Z + s_z Z}{K} = r - i(1 - s_z) = hu \frac{1}{v} - i(1 - s_z), \quad 0 < s_z < 1. \quad (4)$$

Capitalists' desire to accumulate depends on the rate of profit and the rate of interest. Under the assumption of constant production coefficients, there is an influence of the

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<sup>30</sup> For a survey of monetary extensions of post-Keynesian theories of growth and distribution see Lavoie (1995).

development of distribution and of demand on the rate of profit. The rate of capital accumulation ( $g$ ) will therefore be determined by the profit share, the rate of capacity utilisation and the interest rate. To induce a positive accumulation rate, the rate of profit has to exceed the rate of interest:

$$g = \frac{I}{K} = \alpha + \beta u + \tau h + \theta i, \quad \alpha, \beta, \tau > 0, \quad \theta < 0, \quad g > 0 \text{ für } r - i > 0. \quad (5)$$

The growth equilibrium is given by the equality of savings and investment decisions:

$$\sigma = g. \quad (6)$$

The  $g=\sigma$ -equilibria will be stable if the savings rate responds more elastically to variations in capacity utilisation than the accumulation rate:

$$\begin{aligned} \frac{\partial \sigma}{\partial u} - \frac{\partial g}{\partial u} &> 0, \\ \frac{h}{v} - \beta &> 0. \end{aligned} \quad (7)$$

The equilibrium values of the endogenous variables of the model are given by:

$$u^* = \frac{i(1 - s_z + \theta) + \alpha + \tau h}{\frac{h}{v} - \beta}, \quad (8)$$

$$g^* = \sigma^* = \frac{i \left[ \beta(1 - s_z) + \frac{h}{v} \theta \right] + \frac{h}{v} (\alpha + \tau h)}{\frac{h}{v} - \beta}, \quad (9)$$

$$r^* = \frac{\frac{h}{v} [i(1 - s_z + \theta) + \alpha + \tau h]}{\frac{h}{v} - \beta}. \quad (10)$$

The equilibrium values for the growth path are jointly determined by the monetary interest rate, the distribution parameter and the parameters of the investment and savings functions. As further analysis shows, changes in the exogenous monetary interest rate have profound effects on the equilibrium values of the rates of profit, accumulation and capacity utilisation (see appendix). The direction of the impact of monetary interventions, however, is not unique. The potential regimes of accumulation range from a negative impact of interest rate hikes on the equilibrium rates of profit, accumulation and capacity utilisation to a positive influence of increasing interest rates on the equilibrium values of the growth path. Generally, a negative impact on the growth equilibrium will occur, if savings propensities out of interest and the direct interest elasticity of investment with respect to the interest rate are

comparatively high. A positive impact of rising interest rates on the growth equilibrium is generally possible, if savings propensities of monetary wealth holders are very low and interest rate elasticities of investment decisions also show low values.

This very simple and restrictive model which, however, contains some essentials of Marx's monetary economics has shown that monetary variables have a crucial impact on the accumulation path. Variations in this path may be due to changing monetary policies, its impacts on distribution and changing reaction coefficients in the savings and investment functions. From this it follows, that a monetary interpretation of Marx's theory precludes the determination of a unique accumulation path from real factors. Therefore, also crises of accumulation and economic stagnation cannot be explained by "real forces" alone, as in profit squeeze and falling-rate-of-profit-approaches, but need to take into account the interaction of "monetary" and "real" forces in a concrete historical analysis.<sup>31</sup>

#### 4. Conclusions

Starting from Schumpeters definitions of "real" and "monetary analysis" we have shown in this paper that Marx's economic analysis provides a coherent framework for monetary analysis. Money appears at the very beginning of Marx's analysis in his "monetary theory of value". This theory presupposes a universal equivalent, a representative of abstract labour as social category, to which commodities can be related in exchange. There is no convincing argument in Marx's economics that money as the universal equivalent has to be a commodity. Marx's monetary theory of value is therefore perfectly consistent with a credit-theory of money as in post-Keynesian monetary economics.

The roles of money as means of circulation, hoarding, and payment make Marx reject Ricardo's version of Say's law and replace it with the "possibility theory of crisis" which also requires money to be a non-commodity. The rejection of Say's law leads to a Marxian principle of effective demand for which the schemes of reproduction provide a basic framework. For simple as well as for expanded reproduction it has to be presupposed that capitalists are able to make monetary advances in order get produced profits realized. Therefore, capitalist expenditure generates profits and investment determines savings also in Marx's theory of capital accumulation and growth which therefore should be based on the principle of effective demand. The Marxian approach presented here insofar resembles the

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<sup>31</sup> For a preliminary attempt towards such an analysis see Hein & Ochsen (2000).



post-Keynesian theories of distribution and growth in the tradition of Nicholas Kaldor, Joan Robinson and Michal Kalecki.

In a growing economy monetary advances by capitalists have to increase from period to period. Only the creation of credit can be considered as a generally unlimited source of finance for capitalist expansion. The conditions of credit are therefore of crucial importance for capital accumulation and growth also in Marx's economics. Marx regards the quantity of credit to be endogenous for capital accumulation and to be determined by credit demand whereas the interest rate is exogenously determined by historical, institutional and political factors reflecting the relative powers of money capitalists and functioning capitalists. If we regard central bank policies as an instrument in distribution struggle, Marx's view on this aspect is also compatible with modern post-Keynesian theories on endogenous credit-money and exogenous interest rates which are determined by central bank policies as well as by liquidity and risk considerations of monetary wealth holders.

According to Marx's two stage determination of distribution, the rate of profit is determined together with the real wage rate by capital labour conflict in the labour market. Distribution conflict between money capitalists and functioning capitalists then determines the rate of interest and makes the rate of profit of enterprise the residual variable. Within Marx's monetary framework, however, it cannot be precluded that interest rate hikes reduce the real wage rate and the wage share, because capital labour conflict only determines the nominal wage rate in the labour market. The real wage rate also depends on entrepreneurs' pricing in the goods market on which interest rate hikes under certain conditions may have an effect. If rising interest rates are considered to be permanent and if the degree of competition in the goods markets as well as relative powers of capital and labour allow for rising prices without triggering rising nominal wages, increasing interest rates may cause falling real wages.

The main elements of our monetary interpretation of Marx's economics have finally been integrated into a simple model of monetary interest rates, distribution and accumulation in which equilibrium growth may deviate from full capacity growth. It was shown that the equilibrium growth path is determined by the exogenous interest rate, its effects on distribution and by the parameters in the investment and savings functions. Variations in the interest rate have a profound impact on equilibrium growth through different channels: there is a direct effect on investment and there are indirect effects via distribution and consumption demand. The overall direction of influence of interest rate variations on the growth path is not unique but depends on the reaction of distribution and on the values of the parameters in the

accumulation and savings function. From this it follows, that neither the equilibrium growth path can be determined from “real analysis” of distribution and technical change, as in orthodox Marxian theory, nor can a crisis of accumulation solely be derived from “real analysis”, as in profit-squeeze and falling-rate-of-profit-due-to-rising-organic-compositions-of-capital-theories. According to our interpretation, Marxian theories of accumulation and crisis cannot be based on “real forces” alone, but need to take into account the interaction of “monetary” and “real” forces in a concrete historical analysis. Within this kind of analysis, it will be impossible to derive “general laws of accumulation” irrespectively of concrete historical circumstances of capital accumulation.

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**Appendix: Effects of interest rate variations on the equilibrium values of the rates of capacity utilisation, accumulation and profit**

$$\frac{du}{di} = \frac{(\tau - \frac{u}{v}) \frac{dh}{di} + (1 - s_Z + \theta)}{\frac{h}{v} - \beta} \quad (i)$$

$$\frac{dg}{di} = \beta \frac{du}{di} + \tau \frac{dh}{di} + \theta \quad (ii)$$

$$\frac{dr}{di} = \frac{h}{v} \frac{du}{di} + \frac{u}{v} \frac{dh}{di} \quad (iii)$$

<b>Table I: Responses of the profit share, the rate of capacity utilisation, the accumulation rate and the profit rate to a variation in the interest rate: potential regimes of accumulation</b>				
	$\frac{dh}{di}$	$\frac{du}{di}$	$\frac{dg}{di}$	$\frac{dr}{di}$
<b>1</b>	0	0	-	0
<b>2</b>	0	-	-	-
<b>3</b>	0	+	-	+
<b>4</b>	0	+	+	+
<b>5</b>	+	-	-	-
<b>6</b>	+	-	-	+
<b>7</b>	+	-	+	-
<b>8</b>	+	-	+	+
<b>9</b>	+	+	-	+
<b>10</b>	+	+	+	+