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Theorizing the process of financialization through the paradox of profit: the credit-debt reproduction mechanism

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ABSTRACT
Financialization occurs where, over time, capitalist economies undergo a transformation, with profit-making via investment in production declining, to be replaced by profit-making via investment in financial markets. In the present research, we offer a novel theoretical explanation for this process, that we call the credit-debt reproduction mechanism. We derive this inductively, starting with Marx's analysis of the paradox of monetary profit and its practical manifestation in the capitalist economy, the shortage of money in circulation. This shortage results in capital becoming increasingly expensive, making long-term investment decisions less certain, less profitable and less justifiable. Investment in financial markets grows, but this leads to an ever-expanding cycle of credit and debt, which puts capitalist economies on a one-way road from productive investments to predominantly unproductive investments. We include in this analysis important reflections on the distinction between "financialization" and "financial development." We also revive and revisit the notion of the shortage of money as a key driver in this process. Another contribution made in this research is to draw a distinction between practical and theoretical solutions to the paradox of monetary profit. Crucially, our research confirms the absence of a theoretical solution to the paradox, there existing only practical solutions.

KEYWORDS
Paradox of monetary profit; financialization; monetary production economy; shortage of money in circulation; credit-debt reproduction mechanism

JEL CLASSIFICATION CODES
E11; E44; E49; G01; P10

Financialization is a multi-faceted and multi-layered concept that is related to the inevitable process of profit accumulation in all monetary production economies. It can be defined as "the increasing role of financial motives,

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financial markets, financial actors and financial institutions in the operation of the domestic and international economies" (Epstein 2005, 3). Thus, over time, finance, the financial sector and financial activities occupy an ever-growing share of total economic activity. This leads to ever-greater profit-seeking through financial speculation, by both the household and production sectors, driven by a progressive rise in public and private debt and the ratio of total debt to GDP.

Financialization thus gives an ever-greater role and power to credit and credit issuers over time, as any profit-seeking activity leads to a permanent and growing shortage of money in circulation. One solution to deal with this shortage will be the injection of more money/credit into circulation. In the absence of money with zero-debt obligation (helicopter money), more credit expansion will be needed. But, this leads to more debt accumulation and a further shortage of money in circulation, which, in turn, needs more credit for its redemption.

Reference to profit-seeking activities and the shortage of money in circulation leads us to the paradox of monetary profit. This concept, dating from the work of Karl Marx, refers to the impossibility of monetizing profit as a direct result of the shortage of money. The paradox exists in all profit-based monetary production economies, not just capitalist systems. Keynes also provided historical evidence of the shortage of money from the mercantilist era, under the term "scarcity of money" (Keynes 1936, 212).

From this, we offer our first contribution to the literature, that potential "solutions" to the paradox come in two forms—practical and theoretical. A theoretical, and also sustainable, solution must be able to prove that the same amount of money/credit, brought into and circulating within the system, would be enough to monetize profit at the end of the process (i.e., no extra injection of money/credit is needed), regardless of whether the system is defined by classes or sectors. Therefore, any extra money/credit that comes into circulation for the realization of profit provides only a practical solution.

The solutions offered by Marx, and later by Circuitists and Post Keynesians, are what we call practical solutions: extra money/credit needs to be injected into circulation to monetize the profit. We argue, moreover, that there is no theoretical solution to the paradox (*contra* some recent claims made, as elaborated on below). In any profit-based monetary system, the creation of credit guarantees that the demand for money/credit is always above the initial supply of credit. By extending the demand for money/credit above supply, the importance and the weight of money/credit increases continuously, in contrast to other factors of production.

This dynamic is key to the present research. The definition of financialization given at the outset links this concept to the shortage of money in circulation and the practical way to satisfy this shortage. More than this, however, as the weight given to money and money-providers in investment decisions grows, two shifts occur. First, uncertainty rises over the profitability of productive projects, as the profitability of the financial aspects of investment grow in importance; and second, this drives a shift in the center of focus, from productive to unproductive investment, as the primary source of profit-making.

From this, we derive our research question: How can we theorize the nexus between the persistent shortage of money in circulation (as the manifestation of the paradox of monetary profit) and the process of financialization? We adopt an inductive approach in seeking an answer to this question. We develop a narrative that investigates the aforementioned concepts, analyzing each in turn and elaborating how they relate to each other. A key element of this argument is to be found in Marx's formalization of the paradox of monetary profit. Whilst the paradox of monetary profit remains unresolved theoretically, in what follows the paradox and the shortage of money in circulation provide the conceptual "missing link" to the historical origins of financialization.

Our second contribution to the literature is thus to theorize the process of financialization and its links to the paradox of monetary profit, via a mechanism that we label the *credit-debt reproduction mechanism*: credit reproduces itself, but only in the form of new debt. In the absence of exogenous demand for money/credit, the credit-debt reproduction mechanism explains the core and endogenous shortage of money in circulation in all monetary production economies (including capitalism). By taking external elements such as new technological advances, new investment projects, the rise of population, etc., into account, this shortage will be exacerbated exogenously. This extra demand for money/credit is what leads to the rise of the weight and importance of credit and credit providers in the economy, maintaining the vulnerability of the whole economic system to the financial sector and growing unproductive investments. In undertaking this analysis, we also offer a third contribution. Keynes (1936), in Chapter 23, refers to the scarcity of money, in analyzing Mercantilist's monetary affairs. In the present research, we are reviving interest in this concept, now referred to as the shortage of money in circulation, as a key element in our theorizing of modern-day financialization.

In the rest of the paper, we next reflect on the different understandings that heterodox and mainstream schools of economic thought have for, respectively, "financialization" and "financial development." We then analyze financialization in greater detail, exploring the differences within heterodox economics as to whether it can be considered a relatively new phenomenon, starting with financial liberalization and deregulation in the

1980s, or whether its roots go further back, to earlier conceptions of the monetary production economy (Sawyer 2013).

From this, we analyze the paradox of monetary profit and its manifestation, the shortage of money in circulation. This enables us to draw together these concepts with financialization to provide a new theorization of the process of financialization, based on the paradox of monetary profit: the credit-debt reproduction mechanism. This, we posit, is the process in which credit reproduces itself on a diminishing scale and creates a situation through which demand for credit will be continuously above supply, increasing the role and power of credit issuers in the economy. We also show how this process, present in all capitalist economies, can nonetheless vary in the speed at which it spreads through the economy. Thus, by theorizing the process of financialization, we also demonstrate that the paradox of monetary profit, whilst having a "practical" solution, does not have a "theoretical" solution. We conclude with reflections on our findings and what this means for research on financialization in monetary production economies in the 21st century.

Financialization or financial development?

As noted above, we develop our analysis inductively, building up a narrative that leads us to our theoretical contributions below. This requires us to revisit concepts that, in and of themselves may well be familiar, but which need at least a brief restatement as part of the theory-building process. In this section, we draw a distinction between the concepts of financial development and financialization. In so doing, we draw a distinction between "mainstream"[1] and "heterodox" economic views. This distinction, elaborated on below, manifests as viewing the roles of money as, respectively, passive/neutral or active. Financialization, with its active role for money, is thus linked directly to the work of heterodox scholars. Most notably, Magdoff and Sweezy (1987) attempt to theorize the state of stagnation in mature capitalist economies using Marx's narrative of the evolution of capitalism. They emphasize the need to return to Marx's focus on capital accumulation to be able "to examine the roots of the stagnation-financialization contradiction" (Magdoff and Foster 2014, 3).

[1]By this, we do not refer to any particular school of economic thought. Rather, we use the term "mainstream" or "orthodox" to refer to those who hold the view that the main functionality of money is as a medium of exchange, created exogenously either by the central bank and/or private banks through the fractional reserve system. It thus follows for orthodox scholars that causality flows from the monetary base to the formation of interest rates, not the other way around. This is key to understanding the differing views of heterodox and mainstream scholars in what follows, regarding the creation of money. We acknowledge that this is a simplification, made for analytical clarity and brevity but without loss of generalisability – for example, we do not reflect on the multiplicity of views within and between these groupings on short term versus long term effects. For further detailed analysis of the debates around the language and focus of "orthodox" and "heterodox," see Lavoie (2022, 6).

That said heterodox economists have, in turn, split broadly into two camps around the understanding of the origins of financialization (Sawyer 2013). The reemergence of a focus on the origins of financialization lying in deeper economic history can be seen as a reaction to those heterodox scholars who see financialization instead as a more recent phenomenon, arising out of the deregulatory neoliberalism starting in the mid-late 1970s. In what follows, we argue that financialization needs to be seen in its deeper historical context. We also highlight the general omission in those debates of a *theoretical* mechanism that can explain the shift in capitalist economies, from a (productive) monetary production economy to an (unproductive) economy based on investment in financial "speculation." It is this that we label the "credit-debt reproduction mechanism." We begin with three key factors that define mainstream/orthodox views on the role of money and financial institutions in the economy, contrasting each with heterodox perspectives.

First, is the *neutrality of money* (see Wray 2012, 4). Two key elements can be identified: First, money and money issuers, (specifically private banks that create credit) are not seen as part of the real economy. They represent neutral links between real commodities or real assets. Second, money and credit are not different from one another but have the same functionality as a medium of exchange. An increase in money or credit in circulation has a nominal impact, but not a real impact, on economic variables.

Heterodox scholars, by contrast, believe in the endogenous theory of money, in which money exists as a debt to finance production; and its supply is demand-led. Therefore, it does have an impact on real variables such as investment, production, and employment (see Kaldor 1982; Kregel 1998; Lavoie 2022; Minsky 1986). In the dichotomic orthodox account, it is almost forgotten that money (created by central banks) does not create debt, while credit does, with its ensuing financial obligations.

Second, is the *passive role of financial institutions*. Reflecting the neutrality of money, financial institutions have a passive intermediary role in connecting savers to investors, nationally or internationally (see Levine 2005). Credit can be created through loanable funds, which are constrained by and derived from the volume of savers' deposits; and can be expanded through the fractional reserve mechanism. Therefore, the volume of credit a bank can lend depends on the volume of deposits it receives from its customers. In this respect, there is again no reason to believe that credit is different from money; the supply of money is thus exogenous.

Heterodox scholars, by contrast, believe that the causal direction is the reverse: bank lending leads to the formation of bank deposits, thus such lending has an active role in the economy (see McLeay, Radia, and Thomas 2014). Moreover, the orthodox view that savers' deposits develop loanable funds in the economy is disputed, not only by scholars from multiple schools of thought (see, among others, Fontana 2007; Werner 2005, 2014a, 2014b) but also by the monetary authorities (ECB 2011; Jakab and Kumhof 2015; McLeay, Radia, and Thomas 2014).

Third, there is the question of *market efficiency in the allocation of resources*. According to the efficient market hypothesis, agents are rational and make their decisions based on the information (public or private) available to them (Fama 1991; Malkiel 2003). This theory dismisses any long-term abnormality or disproportionality in terms of profit, size, and resource allocation in financial markets. Abnormalities simply cannot last long in the presence of speculators and arbitrageurs, because their activities bring any abnormality into equilibrium by reallocating resources. Thus speculation has been described as a stabilizing factor in such markets (Friedman 1953, 175). Mispriced assets (real or financial) will revert to their normal price, and the possibility of having bubbles in the market is zero. From this, any permanent increase in the size of the financial sector is attributable to the proportionate development of the real sector. Therefore, the size of the financial sector depends on demand from the real sector for financial services.

Heterodox scholars, even those who would not attach themselves to the heterodox school, challenge the idea of market efficiency and the rationality of agents. This can be based on dynamic instability of financial markets (Keen 1995), the role of institutions in shaping the allocation of resources (North 1991), or the failure of markets given the presence of imperfect information (Stiglitz 2000).

The three factors above, individually and jointly, demonstrate the difference between passive and active views of money, seen in the terms "financial development" and "financialization," respectively. This, in turn, results in opposite perspectives on whether or not the process so described makes a positive or negative contribution to economic activity and growth (King and Levine 1993; Rajan and Zingales 1996). Having thus established in our theory-building the importance of financialization as an active driver of economic activity, indeed of economic structure, we now reflect briefly on the two distinct heterodox views of financialization.

Heterodox approaches to financialization

The notion of financialization has emerged from heterodox writings, in an effort to understand stagnation in capitalist economies. Over time, two distinct understandings of the origins of financialization have become clear in this literature. We reflect on these now.

Financialization as a new phase of capitalism

This view sees the origins of financialization in neoliberal policies that drove deregulation, both within and between capitalist economies, from the late 1970s to early 1980s, onwards. Epstein (2005, 3) identifies financialization, neoliberalism and globalization as the defining characteristics of a new era of capitalism. These have been seen as being driven by the pressure of competition and the need to maintain profitability, with financialization representing the "systemic transformation of mature capitalist economies" (Lapavitsas 2013, 793).

Financialization has seen a shift of power amongst non-financial agents, from labor to capital and from company to shareholders. This has been explained as the result of a "finance-dominated regime of accumulation" characterized by an increase in the profits of the financial sector and the "sluggish growth" of investment in the real sector, along with a "polarization of income distribution" that makes the economic system susceptible to financial bubbles, and eventually financial crisis (Stockhammer 2012, 48). Making a profit through traditional channels becomes more challenging and, in some cases, riskier compared to some financial activities (Lapavitsas 2013).

Those scholars who hold this view of the origins of financialization also see the possibility of *reversing* this process. With financialization arising out of neoliberal deregulation, they believe *de-financialization* can be achieved through tighter regulations, the separation of investment banking from commercial banking (Sweeney 2019), "democratic pressure," "the resistance of financialised citizens" and an increase in the role of state and syndicates in the economy (Karwowski 2019, 1020). Reorientation of the finance industry, and prohibition of risky speculative activities, will return financial institutions to their essential functionalities (Lawrence 2014; Ülgen 2017) by "re-establishing the command of the social and collective over the private and individual for the modern era" (Lapavitsas 2013, 792).

Within this perspective, there are disagreements over the exact start of the financialization process, ranging from the 1970s to the early-1980s with different studies focusing on different aspects of financialization (*inter alia* Christopherson, Martin, and Pollard 2013; Greenwood and Scharfstein 2013; Hein 2012; Krippner 2005; Orhangazi 2008; Palley 2013; Van Treeck 2012). That said, they agree that this broadly-defined period covers the origins of financialization.

Financialization as a process emerging from the birth of the monetary production economy

This second view sees financialization as a process that began on a macro-scale with the birth of the monetary production economy. Some scholars therefore use the term "historical capitalism" to distinguish it from later epochs of capitalism (see Arrighi 1994; Braudel 1981, 1984). This view sees the neoliberal deregulatory policies in the 1970s–1980s as facilitating a *more rapid* expansion of financialization, but which itself "has deeper roots that are unrelated to neoliberalism" (Kotz 2008, 1). We first outline the key features of the monetary production economy, before establishing its links to financialization. In so doing, we also show how this understanding of financialization differs, by definition, from the mainstream understanding of "financial development" presented above.

The term "monetary production economy," or simply "monetary economy," as Keynes (1933)[2] called it, refers to an economic system in which money is not "a neutral link between transactions in real things and real assets," a view consistent with heterodox understandings of money that underpin financialization. In such an economy, production starts with an initial amount of money, in the expectation of getting more money at the end of the production period. Using Marx's circuit of money capital, the monetary production economy can be represented as M-C-M′. In this economy, monetary profit ($\Delta M = M'$-M) is the objective of production. This stands in contrast to the "real exchange economy" in which money works as a medium of exchange between two different commodities (C-M-C′), or does not "enter into motives or decisions" (Keynes 1933) at all (such as the barter economy, C-C′), consistent with the orthodox view of money that underpins the notion of (passive) financial development.

One of the pioneering scholars to examine the underlying capital accumulation process in its historical context is Arrighi (1994), who introduced the concept of "systemic cycles of accumulation" for an economic system based on Marx's theory of the circuit of money capital (M-C-M′). His unique interpretation differs significantly from Marx's initial account, but supports the second perspective above on the origins of financialization. The development of capitalism since the 1970s should be seen "in the light of patterns of recurrence and evolution, which span the entire lifetime of historical capitalism as a world system. Once we stretch the space-time horizon of our observations and theoretical conjectures in this way, tendencies that seemed novel and unpredictable begin to look familiar" (Arrighi 1994, 4).[3]

[2]All of the terms quoted in this paragraph are taken from an online version of this source, that does not have individual page numbers.

[3]We do not accept the idea of *longue durée* capitalism introduced by Braudel (1982) and used by Arrighi (1994), on the grounds that the term "capitalism" cannot be attributed to an economic system that existed in the 13th century. For such systems, in which money and credit have had progressive roles, we use the term "monetary production economy," which includes capitalism. This view accords with Marx's concept of "primitive accumulation," as a response to the accumulation crisis. This dates the emergence of capitalism as understood on these terms to approximately 500 years ago (Federici 2014, 62 *et seq*). This timeline is also reflected in historical research by Keynes, presented below.

Arrighi splits the M-C-M' circuit into two phases, each covering a specific extended period. The initial phase (M-C), represents a period of "material expansion" (Arrighi 1994, 2), with a specific regime of accumulation, distinguished by "investment in fixed capital that creates the potential for regular increases in productivity and mass consumption. For this potential to be realized, adequate governmental policies and actions, social institutions, norms, and habits of behavior (the 'mode of regulation') were required" (Arrighi 1994, 2). This is the phase in which capitalism can be identified by its specialization in mass-scale production, investment, and trade as the main source of profit accumulation.

This productivity and profitability will eventually be weakened through "market saturation and capitalist competition" (W. I. Robinson 2011, 273). This leads to the second phase (C-M'), the period of the "rebirth of financial capital" and its expansion, in which "the locus of accumulation shifts to finance capital; *haute finance* comes to dominate the hegemonic power by manipulating financial services to sustain profit-making" (W. I. Robinson 2011, 273).

To understand why this shift happens, we need to look at the ethical foundation of capitalism in which capitalists do not remain under any restriction and are under no obligation to follow any specific specialization when it comes to profitability. They are free to invest in any profitable project; and it does not need to be in line with national or international priorities (Braudel 1982). Hudson (2015, 133–134) provides examples of such behaviors, even at the beginning of the Industrial Revolution, when financiers refused to finance the railway industry in Britain for a long time until they obtained monopoly ownership rights that legalized the maintenance of their "rent-seeking privileges."

This "eclecticism," Braudel (1984, 246) argues, happens in all capitalist economies through financial expansion, with investment moving away from production and commerce to find more profitable opportunities in financial activities. Braudel (1984, 242–246) provides examples of "commission trade" and "acceptance trade," either for buying or selling, that was practiced in Holland, Italy, Germany, and France, and which were all based on credit expansion "4, 5, 10 or 15 times the specie in circulation." Braudel gives many examples of merchants from various countries who abandoned their commercial activities to gain profit from speculation and renting money; and explains how the economic power of a nation rises with production and commerce and then declines through the expansion of financialization, which is the "sign of autumn" (Braudel 1984, 246).

Phillips (2006) identifies the same pattern, in Spain, the Netherlands and Great Britain in the 16th, 18th and 19th centuries, when these leading economic powers of their time displayed their superiority through production and trade, but then experienced a deterioration in power when their financial sectors started to direct monetary capital toward rent-seeking and speculation activities. Thus financialization is a "sign of late-stage debilitation, marked by excessive debt, great disparity between rich and poor, and unfolding economic decline" (Phillips 2006, 268).

In a similar vein, Keynes (1930, 149) claims that the rise of civilizations and their wealth comes through enterprises and their ability to make a profit through their investment projects, which in turn depends on the availability of money and "the behavior of the banking and monetary system." In his historical analysis of Spain, France, and England, he states that the accumulation of wealth in these countries happened when more precious metals were in circulation and "profit inflation" was higher than "wage inflation." This was the situation in Spain from 1520 to 1590, in France from 1530 to 1700 and in England from 1550 to 1650. According to Keynes (1930, 158–159) "In these golden years, modern capitalism was born," but with a specific characteristic that has not left us through the intervening centuries, namely, the shortage of money in circulation, whether it is commodity money (gold/silver), currency (backed by a fixed portion of gold/silver) or fiat currency (backed by nothing).

The history of capitalism in the second approach is, therefore, the story of the rise and fall of developed economies, in which prosperity starts with production and trade, but ends up with financial activities that do not produce any wealth, but rather create bubbles through speculation on existing assets. This is the situation that Keynes (1936, 103) and Strange (1986, 1) called, respectively, "casino capitalism," in which the "financial system is rapidly coming to resemble nothing as much as a vast casino."

One challenge with this second heterodox understanding of financialization is the level of generalization in its analysis of capitalism as a whole. This downplays the importance of institutions and the cultural aspects of individual nations regarding the evolution of capitalism and the speed of the financialization process. Capitalism has diverse manifestations across nations (Hall and Soskice 2001). Ultimately, however, financialization pushes all toward the same destiny, although the speed of the financialization process varies across countries.

Crucially for what follows, as compelling as the second heterodox understanding of financialization is, compared with the "modern" perspective, it does not show the exact transformation mechanism by which a productive capitalist system changes into a financialized system. There is almost no analytical discussion of how financial sectors in mature capitalist economies grow stronger and become able to accumulate more capital than other sectors. The principal contribution of this paper is to propose a theoretical solution to this missing analytical link. We argue that it can be explained by reference to the paradox of monetary profit and its empirical manifestation, the shortage of money in circulation. This analysis also underpins the conclusion that the paradox of monetary profit itself does not have a theoretical solution. It is then the speed at which the shortage of money comes about that determines the speed of financialization in different capitalist economies.

The paradox of monetary profit

Central to understanding capitalism and its transformation from a competitive and productive system to a financialized unproductive monopoly system, is an analysis of its source of monetary profit. Marx (1885, 201) reports that one of the opponents of the economist Thomas Tooke (1774–1858) once asked Tooke a question about the source of money for the realization of profit, using the circuit of money capital (M-C-M′), but "neither Tooke nor anyone else has answered it so far." Thus the paradox of monetary profit and the circuit of money capital (M-C-M′) were known before Marx, but it was he who first disseminated it in his theory of surplus value in the earliest German publication of *Das Kapital* in 1885.

The paradox refers to the impossibility of the realization of monetary profit in the capitalist economy, to which we would add: from a theoretical point of view. Even mainstream scholars acknowledge the existence of this puzzle. Mankiw (2016, 57) shows that in neoclassical income distribution theory, economic profit should be zero because the total value of production should be equal to the total value of distributed income. Nonetheless, he tries to justify the existence of profit by separating "accounting profit" from "economic profit." This is consistent with a traditional view of capitalism where the owner, producer, investor and beneficiary are one and the same, but this view overlooks the role of credit and financial institutions in the creation of debt.

In a model of a political economy in which total income is divided between two main classes, capitalists and workers, Marx (1885, 204) explains the paradox as follows:

> The capitalist class remains consequently the sole point of departure of the circulation of money… The capitalist class as a whole cannot draw out of circulation what was not previously thrown into it.

Thus, if the total wage in the whole system paid to the workers is W, it would be impossible for the capitalists (as a class) to make a total revenue (TR) higher than W, so the difference, TR-W, is the shortage of money in circulation (Figure 1).

In the best possible scenario for the realization of profit, workers can spend all of their wages on the goods they have produced in the whole system ($C = W$). Empirically, this means that the capitalists as a class cannot make any profit unless the shortage of money for the realization of profit

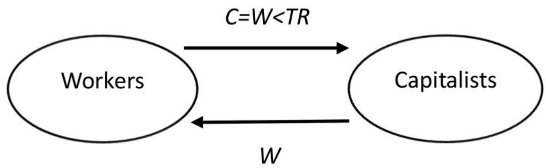

Figure 1. The flow of money between capitalists and workers.

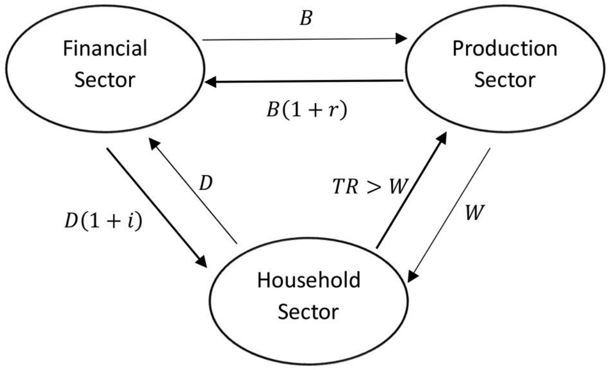

Figure 2. The flow of money between household, financial and production sectors.

is somehow financed. Thus, the paradox of monetary profit manifests itself in the form of a shortage of money in circulation.

Figure 2 adapts and extends this simple model. First, it replaces Marx's classes with economic sectors. Second, it incorporates a third sector, to show the flow of financial transactions between the household, production and financial sectors. Crucially, however, the same issue of monetization of profit remains for the banks' profit and households' return on their deposits. Following Graziani (2003), in a pure credit economy with no government, when banks lend an initial amount of money to the production sector (shown by B in Figure 2), given a fixed supply of money in circulation, no sector is able to monetize their excess return or profit without the creation and injection of extra money into circulation by banks. This is because banks do not just transmit liquidities between agents but they create more liquidities needed for the realization of profit or excess return. In this model, the excess returns or profits for the financial and household sectors, that cannot be monetized with the initial amount of money in circulation (i.e. B), are $B * r$ and $D * i$, respectively.

Bruun and Heyn-Johnsen (2009) believe that neither Marx, as the disseminator of the paradox, nor Keynes who dealt with aggregate income determination in his *General Theory*, solved this paradox. Smithin (2016) has also claimed that the puzzle remained unanswered by Marx, but this claim is only partially correct. In Volume 2 of *Capital*, Marx presented what we are calling a practical, but not a theoretical, solution based on the idea that the capitalist will be the final owner of the surplus value by putting his own money into circulation for his consumption.

Given this distinction, a theoretical solution is equivalent to an endogenous and self-sustained solution in an interval of one period (or circuit). A practical solution would be considered either to be an exogenous and temporary solution; or to be any solution based on a multi-period dynamic model (according to Post Keynesian Stock-Flow-Consistent models, or some Circuitists' multi-period dynamic analyses). This is also unsustainable given the permanent need for extra money/credit injections. As soon as these injections cease, the system collapses. A multi-period analysis brings in money/credit from other periods for the realization of profit. This is the meaning of a practical solution that transmits or circulates debt from one period (circuit) to another.[4] Logically, however, it does not and cannot be seen as a theoretical solution to the paradox. QED.

Marx's practical solution for the paradox of monetary profit

In Volume 2 of *Capital,* Marx explains the paradox simply by saying: "How can they [capitalists] continually draw £600 out of circulation, when they continually throw only £500 into it?" (Marx 1885, 204). According to Marx, "surplus value" (profit), as a value embedded in commodities,[5] will be realized when capitalists put fresh/new money into circulation for their consumption. The source of this money could be either their own money or bank credit (Marx 1885, 195, 256).

This does not mean that the capitalist pays for his/her own produced goods. It does not make sense to buy from yourself to make a profit. To understand the meaning of purchasing for consumption, consider two capitalists, A (who produces consumer goods) and B (who produces capital goods). By bringing their fresh money into circulation, they buy the products of each other and both capitalists can monetize their profits. This idea was summed up by Robinson as: "[T]he workers spend what they get; the capitalists get what they spend" (quoted by Asimakopulos 1989, 269).

Although innovative, there are three issues with this solution. First, in a monetary production economy, the capitalist's objective of production is monetary profit and not, as Marx calls it "the surplus value incorporated in

[4]Based on this analysis, the Minsky Moment happens when one or more parts of the system cannot circulate debt anymore and a huge debt will appear after each economic and financial crisis. We saw this in the 2007-2008 economic and financial crisis when the US household sector could not participate in the process of debt circulation.

[5]This is a view shared by Smith (1776). He presents examples such as the Spaniards' first question when discovering unknown lands, which was whether there was gold or silver to be found; and the Tartars' frequent question to Plano Carpino, a French monk, if there were plenty of sheep and oxen in France. He concludes that the Tartar notion of wealth, defined by commodities, might be closer to the truth than the Spaniards' focus on "money" or its proxy.

the commodities,"[6] which may not be monetized in the market. Money in such a system has value beyond being a medium of exchange. Marx's solution is in contrast to M-C-M′, as it represents an important characteristic of a monetary production economy in which "production begins with money on the expectation of ending with more money later" (Wray 1999, 1). So, for capitalists, the realization of monetary profit is more important than purchasing for individual consumption, even where this individual consumption is in the form of consumption of capital goods, i.e., investment.

This is the line that differentiates capitalists from entrepreneurs and it seems that Marx, with his focus on class, does not consider this when he analyses the paradox of profit (see Taymans 1951). The first group are looking for profit, either in production *or speculation*. The source of profit for capitalists is not important as they have no specific interest (production or non-production, national or international). This is why Braudel (1984, 246) uses the term "eclecticism" to explain the mindset of capitalists over the centuries. In contrast, entrepreneurs have a different mindset about their objectives when it comes to production. Maximization of profit, regardless of source, is not necessarily the main purpose of their investments.

The second issue in Marx's writings on what we call a "practical solution" to the paradox concerns the notion of "individual consumption." In Marx's writing this is ambiguous, because in the context of a model with different sectors (household, production, etc.), rather than sociopolitical groups (capitalists, workers) as Marx framed it, capitalist consumption is already considered in household consumption.

Third, Marx's solution is valid if the capitalist is both a producer and a financier. This means the capitalist must be an entrepreneur who focuses on maintaining the business beyond profit maximization. In a credit-led economy where the producer and financier belong to separate sectors, however, applying Marx's practical solution to the paradox means that the producer (or capitalist producer, as Marx has in his mind) must accept a debt-profit cycle in which they must borrow more and accept another debt obligation to extract the initial profit. This can be justifiable if all producers increase their time horizon and chase the profit of the first period, by keeping their optimism and incentives and carrying on their investment for the second period of production. This was reiterated by Kalecki's (1935, 297) view that "capitalists … determine … their profits by their consumption and their investments," but this profit-chasing process will not be sustainable for the whole productive capitalist class.

[6]This quote is taken from an online version of *Capital*, Volume II, Chapter 17, Section 1. This version does not have page numbers.

Despite these three reservations, Marx introduced a novel practical solution, one that has been disregarded in the analysis even by some circuitists and post Keynesian scholars who have claimed to find a solution for the paradox (see Keen 2010, 2011; Messori and Zazzaro 2005; Nell 2002; Parguez 2004; Renaud 2000; Rochon 2005; Zezza 2012). That said—and significantly in the present context—such studies do not distinguish between different types of solution: practical versus theoretical. Ultimately, the paradox does not have a theoretical solution over a circuit period and an extra source of money/credit is needed to deliver a practical solution.

From Marx's point of view, the source of the money needed for the realization of profit cannot be generated endogenously from what was initially put into circulation, but comes exogenously from the capitalists' own pockets or bank credit. This is important specifically when we are dealing with a pure credit economy, where the source of money in circulation is credit issued by the financial sector. According to Seccareccia (1988, 51, quoted in Rochon 2005, 128), even "production is a process of debt creation." Therefore, the source of monetary profit for all profit-seeking sectors must be fresh/new money or credit that is brought exogenously into circulation by financiers, without which the shortage of money would be exposed. This shortage cannot be seen easily in the real world because credit expansion, budget deficit spending, and/or trade surpluses provide short-term practical solutions (by injecting extra money/credit) that cover the shortage temporarily, but this credit expansion covers it at the price of creating more debt and, eventually, a further shortage of money in the future. It is not so much the process that is visible in the real world, but its debt-laden consequences.

Financialization and the paradox of monetary profit

Through the foregoing narrative, we now have a theoretical framework to connect Keynes's historical observations on the scarcity of money and Marx's view on the paradox of monetary profit, which manifests a shortage of money in circulation. This leads us to the role of banks as the traditional financial institutions in a simultaneous and sequential creation of credit and debt. This is the system that we call the *credit-debt reproduction mechanism*, which has two functions: creating credit and the associated debt which is bigger than the initial amount of credit (varying with the level of interest rates); and making a continuous demand for more credit endogenously (given the shortage of money in circulation) to repay the interest.

These two mechanisms work together with synergistic power: credit expansion by the lender conceals the shortage of money in circulation provisionally, at the cost of rising debt for non-financial sectors in the future.

The accumulation of debt in the household and production sectors, in turn, creates a new demand for money/credit just to pay for the profit of the lenders. So, we argue that money cannot be fully destroyed because the principal is paid, but not the interest. In a purely credit-led monetary production system, where there is no government to supply "helicopter money" (money with zero-debt obligation), another line of credit is needed to pay the interest. The demand for extra credit to repay the interest will continue in a diminishing manner. Under such a system, credit reproduces itself endogenously through the creation of new but smaller debt.

To show this mathematically, consider a purely credit-led economic system. If the average interest rate is *r*% and it remains constant for unlimited periods, the long-term multiplier for the shortage of money (that leads to extra demand for credit) to repay just the interest (i.e., the profit of the banking system) will be $r/(1-r)$. This means for the initial credit, say K, the initial shortage to repay just the interest is $K\times r$ and, by borrowing this amount, we need an extra $K\times r^2$ for the next period just to repay the interest. If this process of borrowing goes on for unlimited periods, the total amount of the shortage (or extra credit required) to pay just the interest on the initial credit K, will be:

$$(K \times r) + (K \times r^2) + (K \times r^3) + \ldots = K \times \frac{r}{1-r}$$

This amount will go up exponentially if r goes up. As r approaches one, demand for extra credit will be unlimited. Thus, the whirl of the credit-debt reproduction mechanism creates extra demand for money/credit that is always above supply, even in the absence of any exogenous shock. This increases the weight of money/credit and the money/credit issuer in all investment decisions. But this extra demand for money/credit is not limited to paying interest. Given the intense competition to keep or extend profitability in the capitalist system, economic agents cannot survive if remaining idle without new investment or a new technological innovation. Sooner or later, they must either leave the market or accept more competition, more investment and/or more debt.

It thus follows that all sectors in the monetary production economy will eventually rely on credit, provided either by the traditional banking system or by the shadow banking system. The latter includes such operators as various funds that are less regulated by the monetary authorities. A good example is the construction companies that must borrow to build houses; whilst, on the demand side, households must also borrow to buy those houses.[7] The entire system gradually and permanently relies on the services

[7]UK data from the Office for National Statistics show that, in 1992 (Q2), the average house price for first-time buyers was £47,000, 2.6 times higher than the average income of borrowers in that year (£18,000). By 2023

provided by the ever-growing importance of creditors. They become "too big to fail."[8]

The accumulation of debt for non-financial sectors, on the one hand, leads to the decline of efficient demand and investment in the real side of the economy. On the other hand, this increases the size and power of financial institutions as they are the only driving force of the system, expanding the debt cycle from one period to the next. This will continue until one part of the system cannot participate in this debt cycling any more. This is a pattern seen in almost all economic and financial crises.

The credit-debt reproduction mechanism provides the necessary conditions for non-financial companies to move toward financial activities; to gain greater income or profit out of their traditional channels in a shorter period; and, in some cases, to keep the company's attractiveness in the eyes of money holders (shareholders and lenders). For example, many firms, even blue-chip companies that normally have strong balance sheets, use the stock buy-back strategy to increase the value of their companies in the financial market. This makes their balance sheets look healthier to encourage shareholders and lenders to keep their money in the company. The idea behind the buy-back strategy is to increase the share value of a firm through financial activities, instead of by investing in new projects or increasing real assets. Firms that follow this strategy can improve some financial ratios (such as returns on equity and returns on assets) by reducing the asset and equity side of their balance sheet, changes considered positively by financial markets.

Therefore, the point of departure from investment in the real sector is when capital becomes scarce and more expensive, which in turn makes all long-term investment decisions less profitable and therefore less justifiable. The shortage of money in circulation and the expansion of credit-debt as a temporary practical solution is the beginning of the financialization process. This leads, eventually, to an economy following "a pattern of accumulation in which profits accrue primarily through financial channels rather than through trade and commodity production" (Krippner 2005, 174). In a financialized economy the transfer happens automatically from making a profit through production, to making it through lending and speculation, that is, from M-C-M' to M-M'.

(Q1), the figures were £253,000 and £57,000 respectively, a difference of 4.4 times. Accessed July 30, 2023. https://www.ons.gov.uk/economy/inflationandpriceindices/datasets/housepriceindexmonthlyquarterlytables1to19.

[8]Except that in some cases they did fail, with disastrous consequences. Lynch (2010) sets out a cautionary tale of Ireland's experiences before, during and immediately after the financial crisis of 2007/08, fuelled by reckless lending, enabled by lax regulation, and reinforced by poor policymaking decisions. We reflect that this combination of factors led to a very rapid manifestation of the credit-debt reproduction mechanism.

Conclusions

This paper develops a theoretical explanation of the path taken by monetary production economies from being *productive*, with investment primarily being directed toward production, to an *unproductive* economy where investment is directed primarily toward financial markets. We have, for the first time, theorized this process through a mechanism that we call the credit-debt reproduction mechanism.

We have shown the origins of the concept of financialization in heterodox economic thought, how it differs from more orthodox understandings of financial development as a passive role for money, and distinguished between distinct heterodox perspectives on this concept. The first sees financialization as a recent development and, crucially, one that can simply be reversed through a process of de-financialization. The second sees financialization as having much older origins, and not being reversible. We argue that, empirically, the stronger evidence supports this second understanding of financialization, but that this still fails to conceptualize how monetary production economies can become dominated by unproductive investment.

To find a solution, we turn to Marx's analysis of the paradox of monetary profit and its practical manifestation in the capitalist economy, the shortage of money in circulation. We do not offer a *theoretical* solution to the paradox of monetary profit. Indeed, we reiterate that there is no theoretical solution. Rather, we utilize Marx's *practical* solution, from which we derive inductively the concept of the credit-debt reproduction mechanism, which offers a theoretical mechanism to explain how monetary production economies transition toward financialization. When capital becomes scarce and more expensive, all long-term investment decisions become less profitable and therefore less justifiable. The shortage of money in circulation and the expansion of credit-debt as a temporary practical solution is the beginning of the financialization process that eventually leads an economy away from making a profit through production, to making it through lending and speculation.

By this theoretical argument, the link between the shortage of money in circulation and the credit-debt reproduction mechanism becomes apparent, resulting ultimately in the progression of all monetary production economies through various stages of financialization. That said, different capitalist economies transition from productive to unproductive investments at different speeds, reflecting the different stages of financialization by which capitalist economies can be categorized.

Whilst offered as a theoretical conceptualization of the consequences of financialization on capitalist economies, the credit-debt reproduction mechanism can also offer insights into empirical features of capitalist economies—although a detailed exploration of this is beyond the scope of the present research. Examples that could provide a focus for future research include drawing on this concept to revisit how the accumulation of massive debt precedes financial crises. It may provide a convincing justification for the impossibility of maintaining a fixed rate of conversion between gold and the dollar that eventually led to the collapse of the Bretton Woods Agreement in 1971–1973. The credit-debt reproduction mechanism could also provide theoretical support for Friedman's K-percent rule, instead of credit being supplied by banks. We, therefore propose that the credit-debt reproduction mechanism provides a new window through which mainstream and heterodox scholars can find common ground to collaborate in deepening our understanding of money, finance, and investment.

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