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Working Paper Series 01/2022

**Looking for growth imperatives
under capitalism:
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by Louison Cahen-Fourot

**Post-Growth
Economics Network**

Looking for growth imperatives under capitalism: money, wage labour, and market exchange

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Abstract

First, I update and wrap up the discussion on a monetary growth imperative, namely the argument that debt-money bearing interest triggers real GDP growth. I provide a detailed account of the different versions of the argument and show why none of them hold. In all cases, the argument is shown to be inconsistent in macro-accounting terms or to be at odds with the functioning of the monetary system. The general solution to the monetary growth imperative is that a sufficient share of wealth must be put back in circulation, for example via higher consumption out of wealth or taxation. Moreover, I show that a monetary growth imperative could equally well occur in an economy without debt-money or interest. However, the solution to the monetary growth imperative entails a sustainability paradox: more wealth put back in circulation allows to reach a stable full stationary state but may be environmentally unsustainable. I also highlight convergences between the critique of the monetary growth imperative and the monetary circuit literature. Second, I address the criticism that no net wealth accumulation is unrealistic. It requires to explain why there is accumulation in the first place. Building from post-Keynesian and institutionalist perspectives, I argue that we need to locate the analysis at the level of the definitional social relations of capitalism: market exchange and wage labour. Growth imperatives are emerging properties of these two social relations. I develop a critique of steady-state economics and underline the ontological difference between a *zero-growth* capitalism and a *post-growth* economy.

Keywords: growth imperative; capitalism; paradox of profit; ecological macroeconomics; post-growth

JEL codes: E21; E24; E43 ; B52 ; P1

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1 Introduction

Although remaining controversial, post-growth approaches like degrowth or steady state economics slowly make their way towards the public debate and policy-making, as exemplified by the Intergovernmental Panel on Climate Change report (2022). While the growth critique is widening in audience, a discussion is ongoing on the origins of the needs for growth in capitalism (hereafter referred to as growth imperative). Not only is this discussion relevant to better understand fundamental mechanisms of capitalism. It is also relevant to provide policy perspectives for a social-ecological transformation.

At the macroeconomic level, the concept of a growth imperative refers to the need for a society to grow its economy (in real GDP terms) to be socially and politically stable and to reproduce itself coherently over time, i.e., to foster social cohesion, and individual and collective wellbeing. A growth imperative can arise from multiple sources and may not be the product of a single factor. Therefore, a growth imperative is not growth itself. Non-growing economies can incorporate growth imperatives. This is the case of capitalisms that stagnate or are in recession. The combination of zero growth and a growth imperative may generate many social problems, such as growing income and wealth inequalities, unemployment, etc.

Most of the discussion on growth imperatives in ecological macroeconomics has revolved around the existence of a *monetary* growth imperative (hereafter MGI). A MGI refers to a structural need for growth originating in the very nature of money and/or in core mechanisms of the monetary and financial system. The MGI discussion has focused on the compatibility of money created as debt bearing positive interest with a non-growing economy, i.e., a stationary state or degrowth economy. Some scholars argue for the existence of the MGI or treat it as an established feature (Arnsperger et al., 2021; Binswanger, 2009, 2015; Costanza et al., 2013; Douthwaite, 2000; Farley et al., 2013; Hickel, 2016, 2020; Lietaer et al., 2012; Loehr, 2012; Mellor, 2010, 2016; Sorrell, 2010).² A body of works provided rebuttals using stock-flow consistent models (Barrett, 2018; Berg et al., 2015; Cahen-Fourot and Lavoie, 2016; Hein and Jimenez, 2022; Jackson and Victor, 2015; Richters and Siemoneit, 2017; Strunz et al., 2017).

History likes to take detours and history of economic thought is no exception. In fact, the MGI discussion strongly echoes the paradox of profit in the monetary circuit that preoccupied circuitists and post-Keynesians since Robinson (1956). This paradox has been solved in many ways (Bellofiore, 2020; Rochon, 2005; Zezza, 2012), to which some arguments of the critical MGI literature are identical, as we shall see. It is therefore another occasion to steer further connection between post-Keynesian and Ecological economics.

Moreover, the reformulation of the profit paradox discussion as the monetary growth imperative discussion adds an environmental sustainability dimension. Indeed, it is likely impossible to absolutely decouple real GDP from the natural throughput necessary to produce it. Infinite GDP growth in a finite world is thus considered impossible or highly questionable from an Ecological economics perspective (Haberl et al., 2020; Hickel and Kallis, 2020). In turn, the monetary

² However, some of the authors mentioned here do not hold these views anymore. For instance, Tim Jackson and Peter Victor are co-authors of Costanza et al. (2013) but later deconstructed the MGI (Jackson and Victor, 2015).

system would be ecologically unsustainable if its very fundamental mechanism — the way money is created — forces the economy to grow.

The main result of the debate is twofold: First, as the post-Keynesian side of the discussion has shown, there is no such thing as a simple accounting and mechanistic link between the creation of money as debt bearing interest and GDP growth. Second, positive interest rates are possible in a non-growing economy, but they require that enough of accumulated wealth is put back into circulation.

It is important to specify right away the scope of the MGI controversy. As narrow and down-to-earth as it might seem, it reduces for the most part to a discussion in national accounting. It abstracts from the institutional arrangements and the social relations into which money creation is embedded. To make this scope explicit, I will thereafter refer to it as the *macro-accounting MGI controversy*. It thus matters not to overstate the conclusions of this debate. The critical macro-accounting MGI literature refutes the existence of a macro-accounting MGI but does *not* conclude that there are no mechanisms whatsoever through which the monetary and financial system may steer GDP growth. This literature does not conclude either that the monetary and financial system is environmentally, socially, or economically sustainable. Finally, neither does it conclude that there are no growth imperatives altogether in capitalism.

A valid criticism raised against the rebuttal of the MGI is that it is not realistic as it is unlikely that no net wealth accumulation would occur (Arnsperger et al., 2021; Kimmich and Wenzlaff, 2021). Addressing this criticism requires to go beyond the purely accounting nature of the MGI discussion to discuss why there is accumulation in the first place. This requires adopting an institutionalist and social ontologist perspective.

I argue that we thus need to locate the analysis at the level of the definitional social relations of capitalism: market exchange and wage labour. Structural growth imperatives need to be understood as emerging properties of these two social relations. By structural growth imperatives, I mean growth imperatives that are contingent upon a specific kind of socio-economic formation — capitalism — but not contingent upon specific kinds of capitalism, social and cultural norms, or the business cycle. That is, growth imperatives that are structurally incorporated into any kind of capitalist economy.³

The research question of this article is therefore twofold. First, it is to update and wrap up the discussion on a monetary growth imperative, discuss its main results and their actual scope. Second, it is to go beyond the accounting reductionism of the MGI discussion to consider other possible sources of growth imperatives from post-Keynesian and institutionalist perspectives.

In section 2, I provide a detailed account of the MGI controversy: I discuss the argument in favour of and against a MGI including the latest reformulations and contributions. In section 3, I begin by deepening the MGI discussion through showing that a MGI could take place in a world with neither debt-money nor interest rates. I then discuss sustainability implications of the solution to the MGI

³ I leave aside the issue of population growth as it is not specific to capitalism but is a transhistorical issue. In any sort of socio-economic formation, if population grows above what is needed to ensure basic survival or, better, a decent life for all, production must grow. Of course, a decent life is partly a subjective notion that is not independent of the socio-economic organization characterizing a society and its dominating ideology. In that regard, the cultural approach to the need for growth is very widespread in Ecological economics (Jackson, 2017; Victor, 2008). However, culture and ideology are themselves never independent of the social relations they are embedded in (Koch, 2018).

controversy and wrap-up the whole discussion. Section 4 is devoted to explain why there is accumulation in the first place, through discussing growth imperatives as emerging properties of market exchange and wage labour. This in turn provides the basis for some epistemological remarks on how the question of growth and capitalism is tackled by some ecological economists. This section concludes with some policy considerations. The conclusion wraps up the article and delineates some research avenues.

2 The macro-accounting monetary growth imperative argument and its rebuttal

The macro-accounting MGI argument has been declined in several versions, to which I respectively refer as the *debt-interest*, the *debt-store of value* and the *non-bank debt* MGI arguments. In what follows, I first describe each of the three versions of the argument. I then sum up the rebuttal of the *debt-interest rate* version and show that the *debt-store of value* and the *non-bank debt* reformulation are no more consistent.

2.1 Three shades of monetary growth imperative: the *debt-interest*, *debt-store of value* and *non-bank debt* versions

The *debt-interest* argument is the core of the controversy. Although not explicitly expressed in the framework of the monetary circuit, it is identical to the paradox of profit. When money is created by commercial banks as credit, the principal plus interests must be repaid but only the sum corresponding to the principal is created. Therefore, a permanent scarcity of money exists, triggering an infinite loop of money creation that can be only sustained if economic output grows as well. Otherwise, debts would be impossible to pay back and inflation would make money worthless. The logical conclusion reached by the proponents of the *debt-interest MGI* is that money creation as debt bearing interest is intrinsically unsustainable.

The *debt-interest* argument has been recast in two other arguments (*i*) emphasizing the store of value function of money and (*ii*) making debt itself the core issue (Arnsperger et al., 2021). The *debt-store of value* argument starts from the conclusion reached by the macro-accounting MGI critical literature: debt-repayment cannot happen if there is net wealth accumulation, e.g., money is hoarded as a store of value and withdrawn from circulation. This prevents the debtors from earning enough to meet their debt repayment and thus forces them to borrow to pay back existing debts. The *debt-store of value* argument then goes on: An infinite loop of money creation occurs that "locks in" future growth because GDP needs to rise multiple times the amount of debts to allow for them to be repaid.

In fact, the *debt-store of value* version is equivalent to the *debt-interest* one but simply adopts a different perspective. Through locating the issue in the store of value function of money, it seeks to maintain the validity of the *debt-interest* argument even in a world without interest rates (or interest rates set to 0).

Finally, the *non-bank debt* argument focuses on the role of debt itself. It stems from the observation that the total stock of debt in the economy is far greater than the available quantity of money to repay it. This is because non-bank institutions borrow money and re-lend it. Therefore, for one money unit available to pay back debts there are several money units of debt. Debt repayments would thus require a continuous creation of new money because one money unit can only repay one

money unit of debt. This would result in an ever increasing debt requiring GDP growth to be repaid, as in the *debt-store of value* argument. Here again, the aim is to show that a MGI can occur even in a world without interest rate since the issue would be debt itself.

2.2 There is no absolute incompatibility between debt, interest, and a non-growing economy

As the macro-accounting MGI critical literature has shown, the condition to reach a full stationary state where the debt and wealth of each sector of the economy remain constant⁴ is that a sufficient share of wealth must then be put back into circulation (Cahen-Fourot and Lavoie, 2016; Jackson and Victor, 2015; Richters and Siemoneit, 2017). This allows for a net profit to be made (assuming a constant capital stock) and for interest to be paid.

It is therefore important that money circulates enough to allow for the reflux principle to operate. Money created as credit will be spent for production and consumption. It will then be ultimately used by some agents to pay back debts and interests, reducing the outstanding stock of debt (Kaldor and Trevithick, 1981; Lavoie, 2014; Le Bourva, 1992; Robinson, 1956). At this very moment the monetary circuit is closed: The money that was created by banks in the form of credit returns to banks in the form of debt repayments and is destroyed. Consequently, the balance sheet of some agents shrinks because their assets and liabilities decrease: the supply of money in circulation and the agents' balance sheets endogenously adjust to economic dynamics.

In fact, this solution is already one suggested to the paradox of profits in the monetary circuit: For the circuit to close, it is necessary to treat interests paid to banks as an income that will be then used either for paying wages to banks' workers, dividends to banks owners, goods from firms or financial assets issued by firms. This way these financial flows can come back to firms either in the form of consumption expenditures or new funding, what Graziani (2003) refers to as final finance. The consequence of this stock-flow consistent circuit is that firms receive an income that is more than what they had borrowed in the first place. Indeed, they borrow what they need to produce but also receive income from consumption of other sectors (e.g., consumption from banks' workers).

The solution to the macro-accounting MGI involves dissaving money to turn it into a circulating flow while this solution to the paradox of profit involves keeping flows circulating. If not treated as an income, the financial flows going to banks are a hole in the model and the circuit cannot close (Bellofiore, 2020; Robinson, 1956; Rochon, 2005; Zezza, 2012). The macro-accounting MGI argument is therefore identical to a monetary circuit with stock-flow inconsistencies.

As Richters and Siemoneit (2017) clarify, the rate at which wealth needs to be put back in circulation for an economy to be fully stationary — and to remain in that full stationary state — needs to be sufficiently high relative to the rate of wealth accumulation (e.g., the interest rate). In a dynamic setting, this includes people saving during their work life and spending out of wealth afterwards, so that at every point in time some people save and other people dissave. Hein and Jimenez (2022) provide more details on the stable full stationary state value of

⁴ By contrast, a *simple* stationary state economy is an economy that does not grow in the aggregate but some stocks and flows may grow while other decrease.

consumption out of wealth.⁵ The authors show that the propensity to consume out of wealth relatively to the propensity to save out of profits has to be in between the interest rate and the profit rate at normal capacity utilization.

The models employed by the critical macro-accounting MGI literature focus on the debt-interest nexus. However, their conclusion can be generalized: it accrues to any stream of income that would result in accumulation of capital or wealth, e.g., profits, at a rate higher than the growth rate of GDP. This is the case of any rate of wealth accumulation in a stationary or degrowing economy. If one sector of the economy (say capitalist households or some firms) accumulate wealth or capital in an economy that does not grow (as in a simple stationary state economy), the other sectors must disaccumulate (otherwise the economy would simply grow again). The disaccumulating sectors will therefore increase their indebtedness. Household poverty will increase, and so will firms bankruptcies. For private agents at least, this is socially, politically, and economically unsustainable in the long run.

2.3 The *debt-store of value* monetary growth imperative

The *debt-store of value* reformulation relies on four implicit assumptions. First, wealth must be accumulated at a rate higher than the growth rate of GDP. This is consistent with the empirical regularity that the rate of return is higher than GDP growth, as most famously documented by Piketty's $r > g$ (2013). Indeed, such an inequality is to be expected as soon as the propensity to save of capitalists is below 1 (that is: capitalists consume part of their income instead of fully accumulating it, e.g., through investing in productive capital). This is shown by the Cambridge equation $r = g / s_c$, with r the rate of return in the economy, g the capital accumulation rate and s_c the saving rate of capitalists. However, $r > g$ is not necessarily incompatible with a full stationary economy implying constant share of profits and wages. Incompatibility arises only when $r > g / s_c$. In that case the rate of return is too high to sustain the accumulation rate, consumption from capitalists is insufficient, and income distribution shifts towards a higher share of profits and a lower share of wages (López-Bernardo et al., 2016). A full stationary state cannot be reached unless the saving rate of capitalists decreases with regards to the rate of return, as shown by the macro-accounting MGI critical literature.

Second, the *debt-store of value* reformulation only makes sense assuming a very high preference for liquidity. However, wealth is accumulated in many forms out of which liquid money is but only one. This has implications for the monetary growth imperative: as pointed out by Graziani in his discussion of interest payments in the monetary circuit, "*It is not saving as such, but rather 'hoarding' within saving, i.e. an increase in liquid holdings by households, which may create difficulties in getting the finance firms need to pay interest if banks do not accept an increase in firms' debt towards banks.*" (cited in Bellofiore, 2020, p. 59).

More fundamentally, since the argument seeks to do away with interest rates, it is self-contradictory to assume that money would be used as a store of value except if one assumes inflation completely away too. It is precisely the interest rate that institutes money as a store of value (Svartzman et al., 2020). Otherwise, even with a very low inflation rate, wealth in the form of money would lose its

⁵ Consumption out of wealth refers to autonomous consumption that is, consumption that does not directly depend on current income.

value. No one would make the choice to accumulate wealth as money in high proportions.

Even if one accepts that without interest rates wealth would still be accumulated in the form of money, the rebuttal of the general *debt-interest* case with positive interest rates logically applies to the specific *debt-store of value* situation with no or 0% interest rates. If there is no interest rate, the rate at which accumulated wealth needs to be put back into circulation for model to converge to a full stationary state can be infinitesimally small, close to 0 (assuming there are no other ways to accumulate wealth, i.e., propensity to consume out of income is equal to 1). Indeed, in that case, only the exact same amount that was borrowed needs to be paid back and no net profits are needed to match interest payments.

Third, the *debt-store of value* reformulation assumes that hoarding agents are not themselves indebted and would not need using this hoarded money to pay back debts in the future and/or will never use that money in significant proportions over their entire life. This is a very strong and restrictive assumption to make. From a dynamic circuit perspective, wealth accumulated as money is therefore not necessarily problematic as it can be used to pay back debts later in time.

Fourth, this reformulation also assumes that debt repayment occurs at a pace preventing debtors to adapt their expenditures to cope with it, e.g., debts would need to be repaid all at once. This thus requires GDP to grow multiple times the amount of the debts. However, only in a static model does the stock of debt need to be repaid in one period. This does not necessarily apply in a dynamic framework. Again, this result is already present in the paradox of profit literature. In his solution using a dynamic monetary circuit, Rochon (2005) shows that firms do not need paying back their loans in one single period but over several periods. In a dynamic setting, at every period, a fraction of the income flow is devoted to debt repayments. If more money needs to be devoted to debt payments, debtors can reduce their final consumption expenditures to pay back their debts instead. This is true even if debtors' income stays constant or even decreases, to the extent that their income stays high enough for debtors to keep sustaining their needs while repaying debts. This would reduce GDP and the debt stock altogether, as in a balance sheet recession (Koo, 2011, 2013) where agents seek to reduce their indebtedness rather than to borrow further. Alternatively, debtors can borrow to pay back their existing debts while maintaining their consumption level, which would keep GDP and the debt stock constant altogether, consistently with a full stationary economy.

As the critical macro-accounting MGI literature recalls, there is thus no need for GDP (or profits and wages) to grow. Debts (and/or interests) continue to be repaid even when the economy converges towards the full stationary state. This is a very common result in the stock-flow consistent modelling literature (Caverzasi and Godin, 2015; Godley and Lavoie, 2012; Nikiforos and Zezza, 2017).

Therefore, even in the presence of some money hoarding, there is no automaticity in the emergence of an ever-increasing money supply. It depends on the modalities of debt repayment determining the *payments-to-income* ratio (or the *payments-to-(income+wealth)* ratio) — i.e., the amount being repaid at each period and the number of years the debt repayment is spread over — and not on debt-money itself.

Indeed, the problem might equally well be formulated in terms of the denominator rather than in terms of the numerator of the *payments-to-(income+wealth)* ratio, i.e., in terms of wage stagnation, loss of income due to

unemployment, loss of profits due to economic turmoil, etc. All factors that are not necessarily related to debt but that are ultimately politically mediated like debt. Because there is no divine will or mathematical impossibility that prevent debt repayment from being renegotiated and adjusted, the issue is primarily political before being of an accounting nature. It is mainly an issue of power balance between debtors and creditors. In a dynamic setting, even in the presence of debt-money used as a store of value, there is no mechanistic accounting causal link between the way money is created (as debt) and GDP growth.

2.4 The non-bank debt growth imperative

The non-bank debt growth imperative rests on the empirical observation that there are more debts issued than currency units to repay them. The puzzling reality is even worse: the world appears as a net debtor with more liabilities than assets due to tax evasion and hidden assets in tax heavens (Lane and Milesi-Ferretti, 2007; Zucman, 2013). However, the argument of a non-bank debt growth imperative relies on two inconsistent assumptions.

First, it assumes that one monetary unit can only pay back one unit of debt. However, this is overlooking one key aspect of non-bank financial institutions: they cannot create money and are just financial intermediaries. Therefore, they must themselves borrow money from banks before they can lend. If these agents are being repaid as creditors, they will eventually use this money to repay their own debts as debtors. Therefore, the same monetary unit can be used to repay several non-bank debts and there is no need to create new money. Indeed, when a dollar is used to repay a debt to *any* agent that is not a bank, it is not withdrawn from circulation as when it is used to repay a debt to a bank.

Second, the argument treats the aggregate stock of debt as net debt instead of gross debt. In fact, many financial institutions, be they banks or non-banks, are mutually indebted. Therefore, settlements amongst these financial institutions involve very little money transfers relatively to the total volume of transactions. Transactions involve credit clearing netting out money balances instead, which has for centuries been part of monetary systems (Rochon and Rossi, 2013). The remaining liabilities after clearing involve liquidities to be settled, which represents much less money.

3 Implications of the monetary growth imperative controversy

I first show that the mechanisms argued for by the MGI proponents could well occur in an economy without debt-money and interest rates. This makes plainly apparent that the blame on debt and interest is mistaken and misleading. Second, I describe a paradox of the solution to the monetary growth imperative controversy, namely that it is both a condition for environmental sustainability and a potential source of environmental unsustainability. From there I delineate a few policy implications and wrap-up the controversy through opening towards the next step in the discussion on growth imperatives.

3.1 Indebtedness can occur in a world of debt-free money, therefore any non-growing economy needs very strong redistributive mechanisms

In any monetary economy, payments need to be made. This is in fact a mere tautology: By definition, a monetary economy is a payment economy. Any monetary economy thus incorporates a *payment imperative*. Because of this payment imperative, the dynamics depicted by the pro-macro-accounting MGI

literature could very well happen in a world where money would be issued debt-free and where there would be no interest rate.

Indeed, every time we make a payment to someone or something we at the same time settle a debt. Any monetary economy is nothing else than a network of debt relations (Aglietta et al., 2018; Graeber, 2011). Therefore, monetary relations are always at the same time debt relations, and monetary transactions debt settlements. For instance, when I go to the bakery, I am indebted for my two croissants (eating just one is too frustrating) until I hand in the money to the baker. In that case, I only stay indebted for, say, three seconds but still, I therefore extinguish my three seconds-long debt the moment I hand in the money. The example becomes clearer if we imagine a situation where I have forgotten my wallet. The gentle baker tells me it is ok, I pay next time. I am then indebted to the baker until I hand in the money a few days later. Be it for three seconds or a few days, I was in debt to the baker. This debt is only extinguished the moment I hand in the money and make the payment for the croissants.

Let us assume a world without debt-money. In this world, there is initially no money and no market economic activity whatsoever. Suddenly a government pops up and decides to implement markets and money. Money is initially just created *ex nihilo* by the state that pays firms to produce the goods and services it needs. The money created is thus not recorded as a debt but returns to the state in the form of taxes.⁶ Firms then use this quantity of money to pay wages to workers. Out of this money, households consume part of it, save some of it and pay taxes. The part consumed goes back to firms who pay additional wages, thus generating more income for households who would then consume part of it, save some of it and pay taxes etc. All of this in one period. At the end of the period, the government receives back part of the money it created through taxes and the difference between government expenditures and taxes is equal to the savings of households. There is therefore a government deficit: the government is thus indebted (to itself, in that case). Suddenly then, just by the mere fact of the accumulation of wealth through savings by households, debt reappears.

Now, for the government to be able to stabilize or reduce this deficit in the next periods, households must at each period consume enough of their previously accumulated wealth. That way no matter their propensity to consume out of disposable income, net saving is 0 or negative. This way all stocks and flows in the economy eventually remain constant and the government's debt does not increase forever. The economy reaches a full stationary state. This narrative example of a world without debt-money is formalized in Godley and Lavoie (2012, chap. 3).

We can elaborate a bit more on this example. Let's imagine that the government introduces private property of the means of production. Households are split between those receiving wages and those receiving profits. Those receiving wages spend it all in consumption while those receiving profits spend only a part of it, thus accumulating wealth. Society has not yet realized all the possible social effects of wealth accumulation so there is no wealth tax. Profits not spent back into consumption are therefore a leak out of the economy. Suddenly the state realizes it has a financing issue with an ever-increasing public debt. It decides to

⁶ I make this fictional assumption for the sake of the argument. In fact, one could argue that money created like that remains a debt: It is an interest-free debt that the state owes to itself and that is thus cost-free for the state. In that case, the monetary circuit closes when money goes back to the state in the form of taxes.

rise the tax rate in the hope that the tax collected in the end of the period would match the government expenditure at the beginning of the period. This tax rate is so high that workers cannot make ends meet anymore. To avoid dying, workers have no choice but to keep consuming and to delay payments to firms. They thus become indebted to the firms and so to the capitalists since an unmet payment is a debt. Meanwhile, public debt still increases because part of public spending kept being leaked through saved profits.

Therefore, debt appears again by the mere mechanism of wealth accumulation. Without mechanisms ensuring that accumulated wealth is sufficiently taxed and redistributed, both public and private debt can rise infinitely in a zero-growth economy. All of this without debt-money, interest or private banks intervening in the process. Be it with or without debt-money in the first place, the only way to escape the *payment imperative* and the debt-relation is thus to exit the monetary economy altogether.⁷

If, at some point, capitalists decide not to accumulate wealth anymore but to spend it, this needs to be matched by a corresponding increase in goods and services. Otherwise, high rates of inflation would occur, eliminating wealth and effectively stripping money of its store of value function. Inflation would thus act as the regulating mechanism in place of redistribution.

These examples are like the *debt-store of value* version of the MGI argument deconstructed above. However, this shows that such dynamic does not require debt-money and interest to occur but just money (and no inflation). However, the condition for an economy to reach a full stationary state and to remain there has political implications.

First, strong mediating institutions and mechanisms must operate to ensure sufficient wealth and income circulation and redistribution. When such mechanisms and mediating institutions are missing or insufficient, economic inequalities and indebtedness arise. For instance, various pre-capitalist societies had debt jubilees and interest rate forbiddance mechanisms to mediate the over-accumulation of wealth of the few and the resulting over-indebtedness of the many (Hartley and Kallis, 2021; Hudson and Van de Mierop, 2002). A second political lesson is that it is unsure whether a full stationary economy could be a kind of capitalism (Cahen-Fourot and Lavoie, 2016).

3.2 The sustainability paradox of the condition for a stable full stationary economy and the issue of fictitious capital

The solution to the MGI and the paradox of profits has ecological implications, too. Financial assets are an accumulation of claims on future production whose value stems from a discounted expected future income that has yet to be generated. Ultimately, they are only worth something if they can be turned into liquidities carrying actual purchasing power. These claims must thus be eventually socially validated by a market production forming the counterpart of the accumulated financial capital. Consumption out of wealth can then occur when this financial capital is liquidated against money. Otherwise, financial value remains fictitious with no real counterpart and financial assets are thus a kind of fictitious capital.

If the money to purchase these financial assets is borrowed for that purpose, it would not correspond to an existing volume of goods and services. An additional

⁷ In fact, even in a non-monetary society, debts could still exist in the form of symbolic debts (Graeber, 2011; Théret, 2009). In that sense escaping the debt-relation would require exiting society.

production would thus be necessary for consumption out of wealth to happen. Otherwise, there would be too much money as compared to the existing volume of goods and services, and inflation would wipe out the value of the liquidated financial wealth.

Therefore, the very condition to stabilize a full stationary economy may be itself a source of a growth imperative due to financial wealth accumulation in the past that must be matched by a real counterpart. This is a possible *fictitious capital growth imperative*.

However, this *ex post* social validation is not guaranteed. It depends on the conditions of production, be they economic, social, political, or environmental (Durand, 2015, 2017). These conditions of production are the site of contradictions and conflicts generated by the accumulation process (O'Connor, 1988, 1991). They must be transformed to ensure the social validation of financial wealth, that is to satisfy the interest of financial wealth owners. Such transformation has been a characteristic trait of finance-led capitalism (Boyer, 2000; Braun, 2022).

There is thus a sustainability paradox to the condition for a stable full stationary economy. On the one side, putting wealth back into circulation allows the economy to reach a stable full stationary state. This is a requirement of ecological sustainability once we acknowledge the existence of ecological limits to growth. On the other side, the realization of financial wealth into real value through consumption out of wealth implies a volume of goods and services that may not be sustainable at all. This questions, for instance, the compatibility of funded-pension systems with a social-ecological transformation, which are one of the main driver of financialization (Aigner et al., 2022; Braun, 2022).

3.3 Conditions for a stable and sustainable full stationary economy, and implications for economic policies and relations of production

To the conditions derived by Richters and Siemoneit (2017) and Hein and Jimenez (2022) for a stable stationary state economy, we can therefore add a condition for it to be ecologically sustainable. The propensity to consume out of wealth must be a function not only of the propensity to save. It must also be of the maximum flow of consumption compatible with ecological limits, for a given level of technological development. Barth and Richters (2020) derive the solution for reaching a stable economic-ecological full stationary state. They show that it is not sufficient for the ratio of the propensity to consume out of wealth to the interest rate to be high enough relatively to the saving rate. This ratio must be significantly higher such that the stationary state reached is within the ecological stability frontier.

This conundrum has implications for the greening of monetary and fiscal policy, and for the property structure and management principles of firms. First, in a social-ecological transformation aiming at transitioning towards a full stationary state, central banks would have an important role to play in the conduct of interest rates. Target interest rates should be low enough to steer downwards rates of return so to ensure that consumption out of wealth can be compatible with a sustainable volume of goods and services.

Second, property structures and management principles of firms should balance the interests of different stakeholders — workers, owners, consumers, public authorities, and civil society. This is necessary to break with the shareholder value maximization dogma (Lazonick and O'Sullivan, 2000) and

tame down financial returns expectations at odds with long-term socio-economic development and environmental sustainability. Generalizing cooperative firms could be a solution (Blauwhof, 2012).

Of course, this conundrum can be partly alleviated if wealth is invested into environment-friendly technology leading to more ecological production processes. This would require a shift towards a macro-financial regime fostering long-term patient capital (Braun, 2022). However, although there is much room for progress, environmental efficiency can only be improved to a finite extent, as thermodynamics indicates (Glucina and Mayumi, 2010). Tremendous questions then arise as to whom would and should finance the ecological transition in a world of ecological limits and low returns on investment. Private incentives to invest would be seriously eroded. Third, fiscal (including industrial) policy would then need to step in to carry on the necessary investments to reshape our societies in an ecological way.

3.4 Wrapping up the macro-accounting monetary growth imperative controversy

Consumption out of wealth allows to converge to a stable full stationary state in the presence of debt and interest. The propensity to consume out of wealth must take adequate values relatively to the rate of interest (or, more generally, to the propensity to save) and the normal rate of profit (Hein and Jimenez, 2022; Richters and Siemoneit, 2017). This applies in both static and dynamic settings where wealth is spent later in time. Moreover, a sector can well accumulate wealth at an unsustainable rate even in an economy without debt-money or interest.

Authors pointing out at debt and interest mistook some means for causes: the fundamental issues are accumulation and distribution. The problem is one of stocks, not flows. The solution is to turn stocks back into flows through expenditure and redistribution. Therefore, the root cause of the growth imperative embedded in capitalism is not to be found in the basic mechanisms of the monetary system such as the way money is created. Neither is it to be found in the nature of money.

Some pro-macro-accounting MGI authors have taken issue with this solution, depicting it as unrealistic because in capitalism agents always seek to accumulate (Arnsperger et al., 2021; Kimmich and Wenzlaff, 2021). Kimmich and Wenzlaff (2021) attempt at reviving the MGI through a structure-agency argument. They investigate what they consider structural principles of a credit economy and related behavioural norms: a structurally high interest rate implies a lack of investment causing a tendency to stagnation and persistent underemployment. This is due to the interplay of the preferences for liquid financial assets over illiquid ones and for real assets over financial assets, themselves determined by radical uncertainty. This compels the government to pursue growth policies.

However, their argument faces serious issues. First, it requires a natural rate of interest and reducing the central bank to a simple market actor. The authors thus ignore the central bank role in the social construction of markets and money, in the determination and conduct of interest rates, and so finally in the determination of the preference for liquidity. Second, the argument ignores that the preference for liquid financial assets over illiquid ones is a characteristic of finance-led capitalism but needs not be a structural feature of *any* credit economy (Fantacci, 2013). Third, the reasoning confuses consumption expenditures in goods with saving as it assimilates accumulation of unproductive real assets with hoarding.

Thus, the authors effectively treat the corresponding flows of money as unavailable for further productive or consumption purposes by sellers/producers of these assets. Their argument therefore turns out to be stock-flow inconsistent. Fourth, despite the authors will to de-historicize their analysis, their explanation appears at odds with a decade of zero and negative central banks interest rates, sometimes passed on to customers.⁸

The critique of the lack of realism is nonetheless a valid and important one. However, it shifts the nature of the discussion beyond national accounting. To shed light on growth imperatives one must therefore explain why there is accumulation in the first place. This is what I turn to in the next part.

4 What makes capitalism capitalism: wage labour, market exchange, and the origins of growth imperatives

The perspective of the *macro-accounting MGI* controversy is rather narrow and reductionist: It abstracts from the social structures into which money creation happens. Svartzman et al. (2020) suggest to bring them back in through approaching the discussion with institutionalist lenses. The argument focuses on the institutionalisation of money as a store of value: the progressive generalization of interest rates from the Middle Ages onwards was instrumental in the legitimization of money as a store of value. Therefore, interest rates turned money into a commodity that can be accumulated infinitely.

While not a growth imperative, what Svartzman et al. point out to is the historical process of institutional complementarity between financial and accumulation practices in shaping economic systems. The authors provide compelling historical evidence that interest rates are instrumental to and in capitalist money. It makes little doubt that the emergence of modern financial practices and integrated banking systems were instrumental in the generalization of the definitional social relations of capitalism, which require a stable money (Ingham, 2009).

Capitalism is often defined as the system based on the accumulation of capital. This highlights the predominance of the dynamics of capital. However, it is also falling into the functionalist trap of defining a system by its outcome (Amable, 2016). Such a definition therefore bears the risk of remaining tautological and of obscuring the political economy of growth imperatives. Capitalism is better defined as a system of social relations (Streeck, 2011).

It can therefore be useful to frame the following discussion using Regulation Theory. Regulation Theory, and Marxist economics, define capitalism as the socio-economic organization emerging from the *generalization*, *the combination* and *the dominance* of the market relation and the wage relation (Boyer and Saillard, 2002; Brenner and Glick, 1991). Of course, the market and the wage relations are not outside money and the monetary system: They are monetary relations. They are shaped by power struggles between labour and capital, and amongst capitalists to access money to abide by the *payment imperative* inherent

⁸ As is for instance the case in Denmark since 2019 for the most liquid savings account (<https://www.thelocal.dk/20211019/why-are-danish-bank-customers-facing-increasing-negative-interest/>, accessed May 5th, 2022). This may be understood as (i) an attempt to shift the preference for liquidity to direct savings towards less liquid assets, thus improving the liquidity of financial and other markets, and (ii) as a mean to improve the multiplier effect of public expenditures through increasing the marginal propensity to consume.

to any monetary economy. However, they are not determined by money in the first place but by political mediations and institutions.

These fundamental social relations find a concrete expression in and are mediated by institutional forms. These institutional forms combine into a mode of regulation and include: the wage-labour nexus, the monetary regime, the form of the state, the form of competition, the integration in the international regime and the social relation to the environment (Boyer and Saillard, 2002; Cahen-Fourot, 2020).

In what follows, I locate the analysis at the most abstract and fundamental level, “underneath” that of the institutional forms: the one of wage labour and market exchange. Indeed, the mode of regulation can vary from one capitalism to another. However, the market and wage relations are invariants of capitalism as they are defining features of any kind of capitalism. It follows that to understand the origins of growth imperatives in capitalism, we need to look at the capitalist relations of production themselves. To the institutionalist turn of the discussion, it is therefore necessary to add a social ontologist perspective (Lawson, 2016a, 2016b). Such perspective focuses on these invariant features common to all capitalist socio-economic formations that distinguish them from socio-economic formations of other types (e.g., non-capitalist societies), independently of their specific institutional arrangements.

In what follows, I first detail the market and wage relations. I then argue that the combination of these two social relations is the root cause of growth imperatives, which are emergent properties of capitalism.

4.1 The market and wage relations

The market relation is a particular organization of production and exchange in which what is produced is to be sold against money. Production is made of commodities that are exchange values. In turn, money gives access to other commodities. It implies private property since what is produced needs to be sold but can also include state-owned companies selling their production on a market, as in state capitalism. Therefore, there is no such thing as a market without money and historically the appearance of money predates that of markets (Aglietta et al., 2018; Graeber, 2011; Ingham, 2009).

The wage relation is a particular form of labour organization through a property separation between producers and the means of production. This separation translates into a monetary compensation for the workers while the owners of the means of production earn the distributed profit. The producers sell their labour force against money but the wage relation is more than just a market relation: It usually implies hierarchy and submission of the workers to the owners of the means of production (Boyer, 2015).

Both the market relation and the wage relation are anterior to capitalism. Markets and forms of wage labour existed in some pre-capitalist societies. What distinguishes capitalism from other socio-economic organizations exhibiting markets and wage labour are the generalization, combination, and dominance of these relations. In capitalism these two fundamental social relations are *generalized* in the sense that they constitute the main way to organize production and distribution. They systematically *combine* in the sense that one gets hired to produce something that will be sold, while non-market production (e.g., public services or unpaid labour) is used as a support to market production. They *dominate*, because refusing to take part in the market and the wage relations is

tantamount to social exclusion. How do these two fundamental social relations relate to growth imperatives?

4.2 The market relation, competition and radical uncertainty: from a microeconomic to a macroeconomic growth imperative

The market relation entails competition and radical uncertainty regarding survival of firms that is, radical uncertainty about future access to money (Orléan and Diaz-Bone, 2013). Firms' production and market share growth is a way to tackle this radical uncertainty and to ensure survival on competitive markets: growing allows for controlling their market to the largest extent possible (Lavoie, 2014). As such, market competition can be seen as an intra-capitalist class struggle where capitalists compete amongst themselves to ensure their survival.

Uncertainty intrinsic to markets creates a need for growth at the microeconomic level: a microeconomic growth imperative. We can define a microeconomic growth imperative as the need for an economic agent to grow its revenue to stabilize its existence. Richters and Siemoneit (2019, p. 129) provide a similar definition: "*exterior conditions that make it necessary for an agent to increase their economic efforts as to avoid existential consequences*". Such a microeconomic growth imperative is inherent to the market relation. This needs not cause growth at an aggregate level if the growth of some firms cancels out with the shrinking of others. However, there are various ways firms can deal with this microeconomic growth imperative that may translate into a growth imperative in the aggregate.

To understand how, it can be useful to adopt the perspective of the microeconomic Cambridge equation. A firm can choose to invest in productive capital to outcompete other firms and gain market shares. The Cambridge equation tells us that if one firm wants to accumulate more capital, it needs to increase its profit rate to finance its expansion. The firm can decide to spend more but has no direct control over increasing its revenue or sales, which depend on effective demand. To increase its profit rate, the firm has only direct control over its production costs. It can decide to decrease these costs to increase its profit margin and so the profit, and in turn the profit rate if the increase in profit is higher than the growth in capital stock.

However, if the individual behaviour of a firm becomes the collective behaviour of many firms seeking to expand to outcompete on their market, this may create a realization problem at the macroeconomic level. First, the downward pressure on production costs (e.g., wages) shifts the organic composition of capital towards an increase in the fixed capital's share. This is the Marx/Hicks-effect or Marx-biased technological progress: When labour costs become too high according to their profit expectations, capitalists may invest in new machines and technologies to increase productivity and substitute capital for workers (Hein, 2014; Hein and Tarassow, 2010).

Rezai et al. (2013), Jackson (2017) and Richters and Siemoneit (2019) make technological progress the root of growth imperative. From it the authors derive a political growth imperative as governments must ensure low unemployment in face of structurally employment-decreasing technology. However, technology needs to be comprehended within the social relations it is embedded in. These relations determine both the direction of technological progress and the uses of technology. In that regard, the same technologies can be used for different outcomes. Marx-Hicks effects show that technological progress embedded in the

market and wage relations is indeed used to maintain or increase the profit rate. Embedded in other relations of production, productivity gains could be, e.g., redistributed as working time reduction instead. Although it might be counter-intuitive at first sight, technological unemployment is not the cause but a consequence of the growth imperative inherent to the market relation and a channel through which it materializes.

Kimmich and Wenzlaff (2021) also conclude on unemployment being the cause of the growth imperative, because of a structural tendency towards stagnation of credit economies. Although they do acknowledge the possibility of mediating differently the impacts of stagnation on employment, their analytical framework prevents them from acknowledging that unemployment is an outcome contingent on specific social relations of production.

Second, competition pressures to decrease costs so to increase the profit margin may negatively affect aggregate demand. As the Kaleckian paradox of cost tells us, this entails a decrease in the aggregate profit rate (Kalecki, 1969; Rowthorn, 1981). In turn, these negative dynamics can feedback on individual firms and lead them to bankruptcy, causing an economic crisis. Therefore, only if it results in aggregate growth can the microeconomic growth imperative embedded in the market relation be sustained in the long run. Joffe (2011) adopts an equivalent definition of capitalism as I do here and makes the organization of the capitalist firm and competition the root causes of growth under capitalism. However, the author remains in a Smithian framework where negative demand effects of input costs reduction is completely absent.

Of course, the firm can also finance its growth by borrowing. However, it is then constrained by the admissible level of risk from lenders and concomitantly by the interest rate. Following the Kaleckian principle of increasing risk, an increase in indebtedness relatively to the firm's equity rises the financial risk for the firm and for the lender (Lavoie, 1996). This may translate into an increased interest rate paid by the firm, raising further the financial pressure. Faced with an increased need for investment due to competition and an increased need for borrowing to finance that investment, the firm may find itself beyond its financial frontier where it cannot support its financial needs for long (Lavoie, 2014). If too many firms find themselves in such a situation a financial crisis may occur because of defaults on debts and debt-deflation dynamics preventing the monetary circuit from adequately closing. Here again the only way the microeconomic growth imperative inherent to the market relation can be sustained in the long run is through aggregate growth. By this competition-crisis dialectic, the microeconomic growth imperative emerging from the market relation translates into a macroeconomic growth imperative.

Moreover, a firm's expansion curve is not linear. Beyond some rate of expansion, the cost of expanding increases and the relation between the accumulation rate and the profit rate may turn negative (Lavoie, 2014). A firm can then find itself in a conflict of objectives between growing its production and sales to ensure its position on the market or increase its profit to abide by its shareholders' expectations.

This explains why competition embedded in the market relation may not always result in productive investment. Firms can deal with competition through growing their financial profitability instead (Dallery, 2009; Dallery and van Treeck, 2009). This can be achieved through laying off workers, relocating to countries with cheaper production costs and accumulating financial assets instead

of productive capital (Auvray et al., 2021; Auvray and Rabinovich, 2019; Ivanova, 2019; Milberg, 2008; Milberg and Winkler, 2010; Stockhammer, 2004). However, this shifts the distribution of value added away from wages, towards profits (Kohler et al., 2019). Therefore, the offshoring-financialization nexus increases downward pressures on wages and negatively affects aggregate demand while increasing the tendency towards the accumulation of financial wealth. This may result in the same realization problem as depicted above, which may only be avoided if sufficient aggregate growth occurs. Moreover, the accumulation of financial wealth fosters the macroeconomic growth imperative emerging from insufficient wealth being put back in circulation. There is therefore a *market relation growth imperative*.

4.3 The wage relation entails a structural income distribution conflict that can only be normalized through aggregate growth if capitalists and workers seek to increase their income

The wage relation lies in a property separation between the producers and the means of production that translates into a distribution of output between wage and profit. The wage relation therefore incorporates a structural conflict over the distribution of income between the producers and the owners of the means of production. This conflict may not be always visible or effective and its intensity depends on how it is mediated. However, it is always latent due to the mere separation between workers and means of production. The only way this conflict can be mediated while ensuring an increase in the income of both workers and capitalists is through the rise of aggregate income. The wage relation thus makes growth necessary to stabilize the structural distribution conflict it incorporates.

However, this is not yet a growth imperative in itself: it remains to be explained why workers and capitalists would seek an increase in their income in the first place. This is where the wage relation and the market relation combine into a system of social relations whose outcome is eventually accumulation of capital and a need for growth. Profit does not appear just thanks to capital. It needs workers to be produced and consumers to be realized. This implies paying wages, but firms face pressures to increase their profit margin. Since output of a given period is a finite quantity, profits can only grow without decreasing workers' income if aggregate income in the next period grows as well. A growth imperative thus emerges from the combination of the market relation and of the wage relation.

4.4 Growth imperatives are emergent properties of the wage and market relations that are mediated by institutions

Growth imperatives are not the result of some intentional design. They are an emergent property of the capitalist relations of production. These emergent properties can be alleviated or exacerbated depending on how the market relation and the wage relation are mediated. The conflicts and contradictions arising from these two relations are temporarily normalized in between major crises through the emergence of socio-economic compromises that are politically mediated and institutionalized. A given set of institutional forms — the mode of regulation — stabilizes and shapes a particular type of capitalism with specific patterns of accumulation, the accumulation regime.

A new kind of capitalism may arise when underlying compromises are contested and a crisis remediates them in new institutional forms. A crisis can even give rise to a new socio-economic formation altogether if the contestation is

about the fundamental social relations of this system themselves beyond the institutional forms mediating these relations (Aglietta, 2015 [1979]; Boyer and Saillard, 2002). Crises can then be also interpreted as moments where given accumulation regime and mode of regulation do not fulfil growth imperatives anymore.

5 Implications of growth imperatives as emergent properties of market exchange and wage labour

In this final section, I first draw lessons of growth imperatives as emergent properties of the fundamental social relations of capitalism for post-growth economics. I then delineate policy perspectives for a social-ecological transformation acknowledging the ontological difference between a *zero-growth* capitalism and a *post-growth* economy.

5.1 Post-growth capitalism is an oxymoron: a short critique of institutional relativism and functionalism in steady-state economics

Because growth imperatives are embedded in the social relations that define capitalism, a capitalism emancipated from growth imperatives — a *post-growth* capitalism — is a contradiction in terms (Blauwhof, 2012; Smith, 2010). However, there is nothing *a priori* that makes capitalism without growth impossible — a *zero-growth* capitalism: a non-growing economy could well still be articulated upon capitalist relations of production. The era of secular stagnation provides a compelling historical example. Moreover, different modes of regulation characterizing diverse capitalisms exhibit diverging GDP growth rates and include varying degrees of state intervention from minimal state to state capitalism.

Some ecological economists thus relativize the link between capitalism and growth. A steady-state economy, they claim, could well be a capitalism (Jackson, 2017; Lawn, 2005, 2011). Framing growth imperatives as an issue of the mode of regulation of capitalism, Lawn argues that “*many observers fail to recognize that the current “growth imperative” is the result of capitalist systems everywhere being institutionally designed to grow. They need not be designed this way to survive and thrive.*” (2011, p. 1) He further explains that

“critics of steady-state capitalism have failed to prove its non-viability. What they have repeatedly done is explain why a particular type of capitalist system—namely, one that is institutionally designed to grow—must grow. (...) The error generally made is to believe that a capitalist economy that is designed to cease growing once it reaches its optimal scale cannot survive and thrive. (...) Steady-state capitalism is the best and most democratically compatible system on offer to achieve the broader goal of sustainable development” (2011, p. 24).

Not all steady-state economists characterize their proposal as a capitalism. Daly opts instead for a steady-state economy organized around private property and market allocation of resources with minimal state control, and argues that this is different from both capitalism and socialism (Daly, 1991, 2010; Farley and Washington, 2018). Of course, market economy and capitalism are two different concepts. However, it is unclear how exactly Daly’s steady-state economy differs from a steady-state capitalism as advocated by Lawn, except if considering that capitalism is nothing. For otherwise, the Dalyist depiction of a steady-state

economy retains all the definitional social relations of capitalism. Such a conceptualization therefore lacks substantial elements backing the claimed distinction between a steady-state economy freed from growth and a capitalist economy relying on growth.

Some steady-state economics scholars therefore fall into (i) institutional relativism and (ii) a functionalist understanding of institutions. First, paraphrasing Brenner and Glick's (1991, p. 105) critique of Regulation Theory, a weakness of steady-state economics is its failure to take adequately into account the broader system of capitalist social-property relations that forms the backdrop to its succession of institutionally defined phases (from growing to zero-growth capitalism). This failure has prevented steady-state economics from going further than the critique of growth itself, to consider the deeper layer of social relations underlying various institutional arrangements in capitalism.

The growth critique is arguably one of the most important contributions to economic thought of the late twentieth century. However, the failure of steady-state economics to push its critique one step further logically results in the inconsistent and relativist claim that it is possible to get rid of growth while keeping a system of social relations that generates growth imperatives.

Accumulation and growth imperatives are regulated by the different sets of institutions but do not emerge from them. They emerge from the combination of the social relations that give capitalism its substance and make it a distinctive historical socio-economic formation, regardless of the specific institutions that distinguish a kind of capitalism from another. As emerging properties of the wage and market relations, growth imperatives are not the product of specific institutional configurations determined *ex ante*.

Second, the functionalist understanding of institutions in steady-state economics is then equally problematic. Such a functionalism lies in the interpretation of the emergence of a given set of institutions by observing their functions and complementarities *ex post*. Functionalism carries a teleological understanding of institutions explaining the beginning of the story by the end (e.g., *some capitalisms grow so they were institutionally designed to grow*).

However, an outcome says nothing about the historical process that led to the advent of given institutions. Institutions emerge from socio-economic compromises in specific historical contexts (Amable and Palombarini, 2008; Petit, 1999). They are the concrete manifestations of the social relations from which growth imperatives emerge. The outcome of a given set of institutions in terms of economic growth is undetermined: capitalisms do not grow because they were institutionally designed to. It is therefore an analytical mistake to confuse the historical origins of existing kinds of capitalism with the theoretical representation of the institutional arrangements that characterize them. Their historical construction is not the product of an *ex ante* design and the *ex post* observation of the regularities produced by these institutional arrangements do not explain their emergence (Amable, 2016).

Further, functionalism mistakes the outcome for the nature of the system (e.g., *some capitalisms stagnate so capitalism does not incorporate growth imperatives*). Yet, an outcome equally says nothing about the nature of a socio-economic formation: whether growth itself happens or not is of secondary importance here. What is relevant is whether the system needs to grow its economy to be socially and politically stable. Growth is not a built-in feature of capitalism, but growth imperatives are. This fundamental feature of *any* capitalist

economy questions the idea whether a capitalism may be institutionally engineered not to grow. Could a steady-state economy be built upon the same relations of production that characterize capitalism?

5.2 Some further policy considerations: the ontological difference between *zero-growth* capitalism and *post-growth* economy and the social-ecological transformation.

Deconstructing the institutional relativism and the functionalism of steady-state economics opens towards delineating two ontologically different political projects for an economy without growth. On the one hand: a *zero-growth* capitalism still embedding growth imperatives but regulated by institutions taming down as much as possible the inherent need for growth. Even very tightly regulated, remaining in an economy based on capitalist relations of production means keeping at the core of the organization of production and distribution the roots of the unsustainability of our societies. Whether such a taming down of growth imperatives could be sustained indefinitely, and, most importantly, in a democratic way, is an open question.

On the other hand: a *post-growth* economy whose production and distribution are reorganized in a way that eliminates growth imperatives altogether. This questions whether market exchange and wage labour could still be the main social relations organizing such an economy. This discussion calls for an article of its own. Wearing Polanyan lenses, a tentative answer is that entire parts of the economy would likely need to be decommodified, socialized and turned to non-market production, for instance those satisfying basic needs. Workers of these sectors would still be paid by wages, but these productions would be taken out of competition dynamics and income distribution conflicts and distributed as in-kind transfers.

Zero-growth capitalism and *post-growth* economy are therefore ontologically different. A *post-growth* economy would be most of the time a *zero-growth* economy. It could well exhibit temporary sectoral or even aggregate GDP growth if this is deemed socially necessary and environmentally sustainable. However, it would not rely on continuous growth to be socially and politically stable and to allow its members to thrive. *Zero-growth* capitalism, to the contrary, is an attempt to keep the need for growth in a double-locked safe but does not go past growth imperatives. This further clarifies why whether growth occurs or not is of secondary importance to assess if a socio-economic formation structurally relies on growth.

These two political projects need not necessarily be opposed. To the extent that some parts of the economy could be kept as market production, they could be regulated using some institutional arrangements suggested by steady-state capitalism advocates. However, these market sectors would be strictly limited in scope, re-embedded in more general non-market relations, and subjected to those. Property relations and management principles of private firms would need to be remediated. And/or, in a reformist and dynamic perspective, a *zero-growth* capitalism could be understood as a step in the transition towards a *post-growth* economy. This could be the task of a Green New Deal oriented towards going progressively past the institutions of capitalism. History indicates, however, that this reformist view may be plagued by naïveté. This does not make the need for a democratic, planned, rapid and peaceful social-ecological transformation any less relevant.

6 Conclusion

The discussion on growth imperatives under capitalism is far from being exhausted. It is nonetheless possible to take stock of some achievements, as summed up in table 1. The hypothesis of a macro-accounting monetary growth imperative seems to be ruled out. It has now been clearly shown that there is no simple accounting mechanism forcing real GDP growth because of debt-money bearing interests. The fictitious capital growth imperative hypothesis remains to be theoretically and empirically investigated and is an avenue of research for a subsequent article.

Assessing the existence of inherent needs for growth in a given socio-economic formation requires to identify its definitional social relations to analyse how the need to grow the economy might emerge from these relations. In this article, I contend that structural growth imperatives are emergent properties of the generalized, combined and dominating market exchange and wage labour, which are the two fundamental social relations of capitalism.

Structural growth imperatives discussed in this article	Hold/Does not hold
Debt and interest-based	
Debt-interest	Not root causes of growth imperatives but channels of accumulation
Debt-store of value	
Non-bank debt	
Financialization-based	
Fictitious capital	To be investigated
Class struggle-based	
Technological unemployment/Marx-Hicks effect	Not a root cause of growth imperative but a channel
Wage relation	Holds by definition
Market relation	Holds by definition

Finally, another suggestion for future research is to build indicators of growth imperatives to be used in empirical studies and applied research. That would allow for studying how the need for growth in capitalism has evolved through time and whether some modes of regulation in the diversity of capitalism alleviate or exacerbate growth imperatives. Interesting policy lessons for a social-ecological transformation could be drawn from such empirical research.

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The Post-Growth Economics Network links together researchers and practitioners accepting the existence of ecological limits to economic growth. Members work on issues such as, amongst others, ecological macroeconomics, environmental policy, economics of degrowth, energy economics and policy, climate change, fiscal policy for the socio-ecological transition, green monetary policy and green finance.

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