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The Structure–Agency Relation of Growth Imperative Hypotheses in a Credit Economy

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ABSTRACT

Growth dynamics are often explained by insatiable wants or anthropological constants, modelled as preferences and behavioural axioms. By contrast, structural perspectives postulate a growth imperative due to macroeconomic or monetary system-inherent properties. Reconciling both perspectives, we develop a relational structure–agency framework to evaluate growth imperative hypotheses. We analytically separate the credit structure (including balance-sheet mechanics and nominal uncertainty) from institutional structure, and describe decision norms for households, entrepreneurs, commercial banks, central bank, and the state. Our framework suggests that the interplay of credit principles, income-dependent saving and portfolio saving rationales prevent the interest rate from adjusting downwards and thereby cause mature credit economies to stagnate. Underemployment results in growth policies becoming the dominant norm – seeking, under budget constraints, to overcome declining growth rates. Our method helps identifying agency to resolve this imperative. Preventing real asset inflation to relieve monetary policy at the effective lower bound appears essential.

KEYWORDS

Stagnation; institutional macroeconomics; social ontology; monetary theory; land value tax

Introduction

Mature economies are revealing a pattern of declining growth that is likely to continue (Gordon 2016). The experiences in Japan for more than two decades and elsewhere following the financial crisis 2007–8 have given rise to a renewed discourse on secular stagnation (Baldwin and Teulings 2014, Benigno and Fornaro 2017). Declining growth rates seem ecologically desirable, since current economic activity levels heavily conflict with sustainable resource use (Haberl *et al.* 2011), and absolutely decoupling economic growth from resource use is unachievable (Hickel and Kallis 2020). However, declining growth rates can also be related to unemployment, public debt, and social inequality (Stockhammer and Klär 2010), making them undesirable from a socio-economic perspective. Is growth needed or even imperative? Conversely, can a non-growing economy be socio-economically sustainable and maintain full employment (Kallis *et al.* 2012)? In this paper, we refine existing hypotheses surrounding this apparent dilemma by developing a structure–agency framework for institutional macroeconomic analysis.

Frequent starting points for problematising economic growth are individual profit seeking, striving for higher income and wealth, consumption patterns, and underlying treadmills (Binswanger

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2006). Resulting prescriptions seek to change individual and social preferences accordingly. Yet, even conspicuous consumption, positional goods or aspirational goals can only very partially explain seemingly insatiable economic growth demands (Sanne 2002).

At the institutional level, the use of GDP indicators is considered another growth driver (van den Bergh 2009), as a collective focal switch to other measures might reduce attention to economic growth (Roth 2017). In contrast, a fundamentally structural growth imperative hypothesis is based on credit creation, which dates back to the work of Soddy in 1926 (Kallis *et al.* 2009). The obligation to repay debts, including interest, would require unconstrained credit creation and therefore continuous economic growth. More fundamentally, a stationary economy would become impossible, as insufficient growth provokes a downward spiral (Binswanger 2012).

Growth imperative hypotheses rarely reflect their implicit social ontology and, therefore, theories as well as policy implications remain constrained. Whereas methodologically individualist approaches neglect the structural determinants of agency (Colander 1993), structural approaches downplay the capacity of agency to transform structure (Bhaskar 1998, Emirbayer and Mische 1998). Seeking to reconcile these two poles, we present a novel and more nuanced heuristic framework and 'practical social theory' (Archer 1998, p. 194) applicable for characterising the 'laws of motion' (Boyer 2010) of a credit economy. First, we develop an analytical framework combining structural principles, institutions and actors' decision norms motivated by actors within given structural settings. Based on this analytical framework, we theoretically derive a growth imperative resulting from stagnation – a state here defined as insufficient economic growth to create full employment. Stagnation, unlike Mill's classical stationary state without unemployment, has a normative-negative connotation (Spahn 2001). We argue that the interplay of structural principles and decision norms (income-dependent saving and portfolio rationales) keeps the interest rate persistently above the level needed for full employment. Consequently, a political growth imperative results from an urge or compulsion to overcome stagnation.

Finally, we derive potential practical implications for transformative agency to resolve the growth imperative, distributed among different actors. We show that taxing land, for example, as the most important real asset category, could relieve the central bank's monetary policy at the effective lower bound where real asset flight occurs, and helps to overcome the growth imperative. A comprehensive analysis of practical implications needs further research.

A Structure–Agency Framework for Institutional Macroeconomics

To explain the structural embeddedness of behaviour, we draw from classical institutionalism (Rutherford 1996), economic sociology (Swedberg and Granovetter 1992, Beckert 2003) and neo-intuitionalism in organisational analysis (Scott 2008). From this perspective, institutions are not necessarily functional or enabling economic efficiency. However, such approaches risk an 'over-socialized' conception of actors (Wrong 1961), subject to 'structural reification' (Bhaskar 1998) without volition, which has led to demands for a theory to account for reflexive dynamics and change of structure based on agency. A critical realist philosophy of science emphasises the ontological distinction between structure and agency by treating them as analytical categories in their own right (Archer 1998). In addition, a nuanced treatment of structure appears crucial (Fleetwood 2008), and helps to situate institutions as emergent structures, contingent upon, and caused by more fundamental macroeconomic structural principles.

Structure as Principles

A crowd of people at a soccer game has a pre-existing organising structure that is irreducible to individuals' aggregated interactions. This emerging and enacted structure exerts constraining or enabling formative powers on the individuals and fosters the dynamics of the crowd as a whole (Lawson 2013). We argue that, in a credit economy, in addition to such *institutional* structure,

there is a form of structure beyond rules, norms, and habits, defined here as *structural principles*. Credit is such a structure, with strongly emergent causal (or rather formative) properties, irrespective of its actual geo-historical evolution (Lawson 2016). Although accompanied by cultural structures and varying accounting rules, the balance principles are always and everywhere the same. As frequently pointed out by Keynesian economists, the monetary macroeconomic level in a credit economy follows rules which differ decisively from a simple aggregation of microeconomic decisions (Holt and Pressman 2001). Based on formal mathematical laws with their own identities and quasi-mechanistic causalities, as in *Saldenmechanik* (Stützel 1978), a credit economy generates emergent (proximately causal) downward formations. Below, we briefly sketch these laws in terms of balance-sheet mechanics and their formative power in the paradox of thrift.

The early institutional economists Commons and Veblen had already elaborated micro- and macroeconomic implications of the credit economy, with close relations to Keynesian thought and existing fertile common ground (Vatn 2009), but the potential for integrating institutional with macroeconomic reasoning has remained largely untapped (Wäckerle 2013). To bridge these gaps, supported by arguments regarding the macrofoundations of microeconomic behaviour (Colander 1993), we suggest integrating macroeconomics within a relational structure–agency framework, as summarised in Figure 1. We then apply this to the credit economy and growth imperative hypotheses.

Structure as Institutions

Most social sciences and humanities share an idea of institutions shaping action. According to Streeck (2011, p. 153), institutions 'precede actors and regulate their behaviour with the force of legitimate authority, even though actors may have internalised the norms enforced on them'. From this angle, a growth imperative could be considered a constrained mental (cognitive) infrastructure or social imaginary (Reichel and Perey 2018).

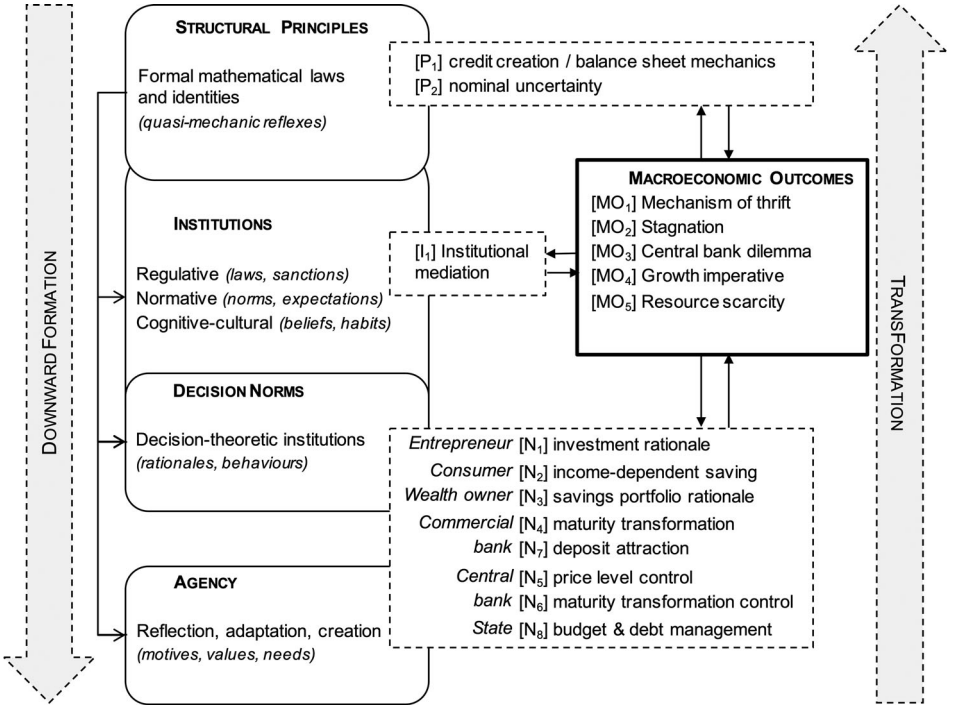

Figure 1. A structure–agency framework depicting the key components of the credit economy.

Among other existing categorisation schemes, institutions can be sorted into regulative, normative, and cognitive 'pillars' (Scott 2008). The regulative pillar consists of laws, regulations and organisational rules. Resulting from collective choices, such rules are not self-enforcing and require legitimation. The normative pillar consists of self-enforcing established expectations, such as professional norms within which the members of a professional group are socialised. The cultural-cognitive pillar is an evolutionary product of internalised routines and habits. Such institutions may have their origin in solving technical or social coordination problems but, over time, become unquestioned, routinised, and socially expected behavioural guidelines. Institutional evolution is not necessarily a selection process towards increasingly rational and effective institutions. Institutions often persist and endure (Weik 2015).

Decision Norms

Rational choice theory typically models optimising behaviour, such as utility maximisation, based on behavioural axioms. In contrast, economic sociology and (evolutionary) institutional economics emphasise the structural embeddedness of preferences, tastes, rationality and market behaviour (Swedberg and Granovetter 1992, O'Hara and Stagl 2002, Beckert 2003). Comparative experimental studies in economics support the argument that rationality is not a universal anthropological constant (Camerer *et al.* 2004). Yet, there are norms of rational behaviour that are functional for 'surviving' in the structural context of any credit economy, commonly modelled as 'behavioural equations' in macroeconomics. As soon as credit relations expand, actors are inescapably affected by balance sheet mechanics and need to calculate in monetary terms: production processes are rationalised to be able to sell products at prices above costs to repay debts, including interest (Heinsohn 2008). As Durkheim noted: 'As an industrialist I am free to apply the technical methods of former centuries, but by doing so I should invite certain ruin' (as cited in Bhaskar 1998, p. 219). Such self-enforcing norms are not prescribed or socially sanctioned but, rather, end up being preferred, as long as others act accordingly (Dequech 2009), making them cognitive norms shaped by shared mental models. We label this sub-set of institutions decision norms, to indicate representative rationales and practical, situational responses to structural contexts. With this, we also highlight the non-universality and structure-relational embeddedness of decision norms. Decision norms can thus explain stabilised expected behaviour but rarely satisfactorily explain the variation of norms, let alone institutional change and more fundamental structural transformation.

Actors and Agency

The notion of agency seeks to account for volition and intentionality behind human action, including the power of actors to intentionally or unintentionally maintain and transform structures. Agency refers to morphostasis (reproduction) as well as morphogenesis (change) – an 'actor's ability to have some effect on the social world – altering the rules, relational ties, or distribution of resources' (Scott 2008, p. 77). Agency is a 'temporally embedded process of social engagement, informed by the past (in its habitual aspect), but also oriented toward the future (as a capacity to imagine alternative possibilities) and toward the present (as a capacity to contextualise past habits and future projects within the contingencies of the moment)' (Emirbayer and Mische 1998, p. 963). Critical realism reconciles the proximate causal power of structure with the intentions of actors striving towards goals (Archer 1998). Structure pre-exists individuals and is a necessary condition for and limitation upon agency, without being able to completely determine (reify) actors and their behaviour (Bhaskar 1998).

We have chosen an open, non-axiomatic approach to studying how agency is motivated. Several needs and values have been proposed as bases for motivation (Alkire 2005). The manifold sources of self-interest or other-regarding preferences remain outside the scope of our framework. Moreover, we cannot assume fully structure-conscious rationalities, as 'people, in their conscious activity, for the most part unconsciously reproduce (and occasionally transform) the structures' (Bhaskar 1998, p. 215) they encounter, indicating the morphostatic aspect of agency.

Whereas decision norms situate practices in a given context, the morphogenetic aspect of agency refers to the reflexive capacity of actors to purposefully alter behaviour and institutions and, thereby, initiate structural transformation (Bhaskar 1998). Structural principles and institutions comprise a social structure, exerting downward formative powers on actors and, consequently, shaping decision norms and constraining (though not completely impeding) agency. With such a framework, it becomes possible to conceptualise the growth imperative as a structural macroeconomic outcome that exerts downward formations constraining self-directed decisions. We now apply this framework to the credit economy, developing an argument for our claim.

Growth Dynamics in a Credit Economy

Neoclassical models typically perceive money as a neutral veil facilitating exchange, and credit as the consequence of prior savings. However, in two-tiered banking systems, credit is the primordial step for providing means of payment. This understanding can be traced back to the early central banking theory of Thornton and Bagehot (Thornton 1802, Riese 2004, Mehrling 2010). Our perspective on the credit economy builds on post-Keynesian and circuitist approaches (Rochon 1999, Graziani 2003), balance sheet mechanics (Stützel 1978, Godley and Cripps 1983), and Monetary Keynesianism (Betz 2001, Riese 2004, Schelkle 2005).

Structural Principles of a Credit Economy

Using money in a credit economy requires several institutions such as laws or banking practices, as well as legitimation and acceptance of those institutions within a community. While there is extensive research on the historical emergence of institutions around money, social ontological reasoning suggests to focus on universal properties irrespective of their geo-historical evolution (Lawson 2016). In this sense, a credit economy is built on nominal credit relations manifested in balance sheets.

A fundamental precondition for such generalised credit relations is the nomination and acceptance of a unit of account (*numeraire*). Once accepted, all nominal assets and liabilities of actors involve the financial sector and are mirrored in the assets and liabilities of financial institutions (Graziani 2003). Any financial transaction between two actors then necessarily leads to respective changes in banks' balance sheets of both. Within this system, all financial assets and liabilities must necessarily balance out to zero. In other words, there is no net stock of money and there are no savings if all debts are cancelled out. If someone saves income, others are forced to remain in debt. The saving decision is fundamentally relational.

Credit implies the simultaneous creation of an asset and a liability in the balance sheets of the crediting bank and its debtor. No *ex-ante* saving is necessary. Yet, savings are necessary to refinance credits *ex-post*, which is perfectly in line with the theory of endogenous money (Spahn 2001). When granting a credit, a bank becomes liable to provide money to a debtor, but, simultaneously, creates a claim on the debtor in the form of an asset. The debtor, utilising the newly created asset by withdrawing money from her account, makes a payment, and the money ends up in the receiving actor's account. The crediting bank must then provide the liability credited to the debtor, which ends up in the bank account of the receiving actor. The crediting bank now needs to *refinance* its assets *ex-post* via the interbank market or private deposits, as explained later.

The debtor can use this credit for productive investment purposes. The producer of such physical production capital receives an income, which can then be saved. Without income, no savings can emerge. Since there is no net stock of money, a credit must precede savings. Consequently, investments determine savings: 'Keynes' intellectual revolution was to shift economists […] to thinking in terms of a model in which a dog called *investment* wagged his tail labelled *savings*' (Meade 1975, p. 82). This *reversed causality* – loans create deposits and investments precede savings (Rochon 1999) – is a cornerstone of Keynesian macroeconomic thought, implying that assets can only be created through debts, and a reduction of debts necessarily requires a reduction of nominal

assets (Stützel 1978). No debts, no money, and no economic activity apart from non-measured subsistence activities. Consolidating these ideas, we derive our first structural principle:

Structural principle P_1: Credit creation / balance sheet mechanics

Credit is contracted on the basis of a generalised nominal unit of account (numeraire). Credit simultaneously creates debts (liabilities) and nominal wealth (assets) on balance sheets.

Meanwhile, some scholars base their growth imperative hypotheses on the credit principle and interest payments (Binswanger 2009, 2012, Kallis *et al.* 2009). As the act of credit creation produces only the amount required to redeem the debt (principal), continuous credit expansion would be necessary to enable interest payments. Therefore, according to this line of argument, credit expansion would require growth. However, as we argue, if wealth owners were to completely spend their income, including interest income, then debtors could sell their products or services on the market and generate the income needed to repay all debts, including interest. Debtors would not have to sacrifice consumption to repay interest, and the economy would not contract.

When fully consumed, interest payments as such simply imply income transfer, as is already apparent in eighteenth century economist Quesnay's *Tableau Économique*, where he presumed that by saving, unsold goods would result in missing input for subsequent production processes, reducing output, economic surplus and consumption (Pressman 2007). In his sequence of tables, Quesnay therefore focused on complete consumption. Without net savings and accumulation, a stable redistribution economy would, in principle, be possible (Freydorf *et al.* 2012, Wenzlaff *et al.* 2014, Cahen-Fourot and Lavoie 2016, Richters and Siemoneit 2017). It would be redistributive, due to interest income enabling wealth owners to consume more than debtors, and stable, because the economy would not contract. This hypothetical world is unrealistic, but the model proves that interest payments or profits *as such* do not constitute a growth imperative.

More realistically, some income is saved, shifting the problem from the assumed missing money for interest payments to actors' saving decisions. Saving decision norms can vary and are contingent upon environmental and societal uncertainties. In pre-monetary societies, environmental uncertainties were collectively borne and only became individualised with the advent of the credit economy (Heinsohn 2008). Nevertheless, in most economies, some individual uncertainties regarding future obligations are reduced by compulsory public health or social insurance systems, which seek to ameliorate – to employ Marxist terminology – the self-destructive tendencies of capitalism. Consequently, P_1 simultaneously *enables* and *forces* actors to save.

Holding nominal wealth (deposits, bonds), however, bears the risk of incalculable losses, due to currency inflation or depreciation. Such depreciation is only possible if wealth is measured in terms of real assets or prices of foreign currencies. This uncertainty effects *how* actors allocate savings between nominal and real assets. Nominal uncertainty constitutes our second principle:

Structural principle P_2: Nominal uncertainty

The generalised numeraire of a credit economy generates nominal uncertainty, because nominal wealth can depreciate relative to other numeraires (foreign currencies), real assets, or commodities.

By forming actors' decisions, credit creation (P_1) based on a numeraire has universal mechanistic and inescapable downward consequences. However, although nominal uncertainty (P_2) necessarily follows from nominal generalisation and credit mechanisms (P_1), this uncertainty can vary within different institutional contexts, including monetary policy regimes, central bank independence, social welfare systems, or collective bargaining with trade unions.

Institutional Structures in a Credit Economy

The geo-historically developed institutional structure is contingent upon the credit economy, but levels of regulation, public goods provision, or social protection vary significantly across countries

and epochs (Streeck 2011). Also normative expectations vary, for example concerning fair prices or interest rates, as do cultural institutions concerning the tolerance of inequality or tax levels. Meanwhile, institutions such as labour market regulations or social security systems are not considered to disturb but, rather, strengthen the functionality of a credit economy (Schelkle 2005). High degrees of protection via public social security systems tend to reduce nominal uncertainty (P_2), as does independent central bank governance. Institutional complementarities (Amable 2016) also exist with regard to credit regulations and banking practices. In our framework, institutional structures complement structural principles and decision norms: Credit requires institutionalised financial intermediaries, predominantly banks; sales require institutionalised markets; and buying land requires institutionalised law. Institutional structures can mitigate or reinforce growth dynamics, but remain constrained by structural principles:

Institutional structure I_1: Mediation between structural principles and actors

Whereas structural principles are the universal emergent properties of a credit economy, institutional structures are geo-historically contingent. Institutional structures complement and mediate between structural principles and actors' decision norms.

Actors and Decision Norms

To model the key mechanisms and circuits of a credit economy, here we consider the basic decision norms of three economically relevant actors: *entrepreneurs*, *consumers*, and *wealth owners*. Moreover, these individual actors are part of one or multiple collective actors, each following their own decision norms: *banks*, *central banks*, and *the state*.

Entrepreneurs: Income generation requires initial credit-based investment, enabling production processes to start. Although savings finance some investments, savings as such could not exist without a credit taken elsewhere, since all financial assets and liabilities always balance out to zero (P_1). Investments are realised by entrepreneurs, who are constrained by expected demand, labour costs determined by wage levels, capital depreciation, and capital costs determined by interest rates. As Keynes (1936, p. 212) stated, 'the prospective yield with which the producers of new investment have to be content cannot fall below the standard set by the current rate of interest'. No matter whether entrepreneurs employ capital through equity, debt or retained revenues, the opportunity costs of capital make it unlikely for them to accept returns below the market rate in the long run. Conversely, entrepreneurs do not require positive net profits above the market rate of capital costs, that is, after paying returns on equity (dividends), interest, and taxes, because they generate their income through wage and risk premiums. Entrepreneurs also invest in the hypothetical but empirically less frequent case of full competition, where no positive net profits are generated. Interest and dividends are costs to entrepreneurs and transitory payments to wealth owners. An appropriate reward for the working time is analytically considered a wage and not profit, although this is empirically difficult to separate. Therefore, we propose:

Decision norm N_1: Entrepreneurial investment rationale

Entrepreneurs assess profitability and invest in production processes in return for wage and risk premiums, based on expected consumption demand (see consumers' N_2, below), production costs, and the minimum financial capital costs, influenced by wealth owners, who finance investments (see N_3, below).

This also includes cases where entrepreneurs provide capital in their role as wealth owners, or financial entrepreneurs, but these actors are still faced with two separate decisions regarding investing and financing. Furthermore, the entrepreneurial decision is frequently treated as the investment function of a firm. The firm, however, is a collective actor that consists of entrepreneurs, workers and wealth owners, as principals of firms providing equity or debt capital. The firm itself is, therefore, already covered by the component actors' decision norms and does not require additional consideration for our purposes.

Consumers: We follow Keynes' assumption of the marginal propensity to consume, implying that saving is predominantly a function of income, not the going interest rate (Keynes 1936, p. 96). This hypothesis has been refined to include intertemporal considerations, aspects of income uncertainty and relative income, but current income dependence remains the most important explanatory variable (Palley 2009). Economic experiments (Duffy 2008) and observational studies have also generally confirmed that income levels and not interest rates determine marginal saving rates (Bosworth 1993). A weak correlation between saving decisions and interest rates (Schmidt-Hebbel and Servén 1999) actually points towards a reverse causal relationship between interest-dependent income and savings. Irrespective of whether permanent or only current income is considered, the relative share of consumption generally decreases with higher income. Actor decisions to normally save out of income are mediated by institutional settings (I_1), interrelated with uncertainty (P_2). In order to buffer against nominal liabilities arising from future unexpected events, precautionary (not speculative) saving beyond planned, postponed consumption becomes rational:

Decision norm N_2: Income-dependent saving

Individual saving and consumption rates are a function of income, not interest rates. In addition to postponing consumption, saving can buffer actors against unpredictable future liabilities.

This decision norm also makes the mechanism of equilibrating savings and investments more intricate than the loanable funds model suggests. According to the loanable funds hypothesis, actors' time-preference functions make saving sensitive to interest rates, such that an increase in savings decreases the interest rate and, thereby, increases and equilibrates investments. Within a Keynesian framework, however, increased savings neither increase investments nor decrease the interest rate. Even worse, investments and total income could decline to meet the low consumption demand induced by increased saving. If the interest rate does not directly equilibrate savings and investments, how is it determined and what is the equilibrating mechanism? As developed in the following, not the rationale *whether* to save but *how* to save is crucial.

Wealth owners: In order to explain the existence of a positive real interest rate along with systematically underutilised capacities, including unemployed labour, Keynes (1936) introduced the concept of liquidity preference (*LP*). In contrast to the neoclassical concept of interest as an intertemporal price equilibrating the supply and demand of capital, *LP* allows interest to be theorised as 'a non-temporal price to be paid from current income in order to curb the agents' liquidity preference, i.e. to make them willing to part with money and stay illiquid in the current period' (Spahn 2001, p. 36). Note that the *LP* hypothesis is not to be confused with the loanable funds hypothesis, where investments require prior savings. Rather, the *LP* hypothesis applies to an endogenous credit economy, because credit needs to be refinanced. The *LP* explains the typical upward slope of the term structure of interest rates, where rates on long-term savings and time deposits are normally higher than on liquid deposits (see Figure 2). Holding money (as the most liquid asset) creates a non-pecuniary liquidity premium, implying a lower risk of wealth loss, as compared to long-term nominal wealth, which tends to be subject to uncertain price changes, default of debtors or banks, or simply extra costs when unforeseen liabilities occur that require turning time deposits back into cash before maturity. All of these relative uncertainties associated with long-term nominal wealth emerge from P_2. Unlike risk-neutral actors, risk-averse actors seek to protect their wealth by avoiding such uncertainties. Consequently, risk taking by giving up the non-pecuniary liquidity premium requires interest as a pecuniary compensation (Spahn 2001, Riese 2004). Liquidity does not compensate for a maturity premium but, rather, for the risk of nominal wealth losses due to interest rate changes (Marglin in press). However, as Marglin points out, asset markets determine '*only* the spread between the yields on the assets that comprise the market' (in press, Ch. XII).

Put differently, the *LP* can only explain the slope of the term structure of interest rates but not its level. Compared to long-term nominal wealth, money is secured against losses in nominal assets but not against wealth losses in real terms. Such a securitisation would require indexation or controlling

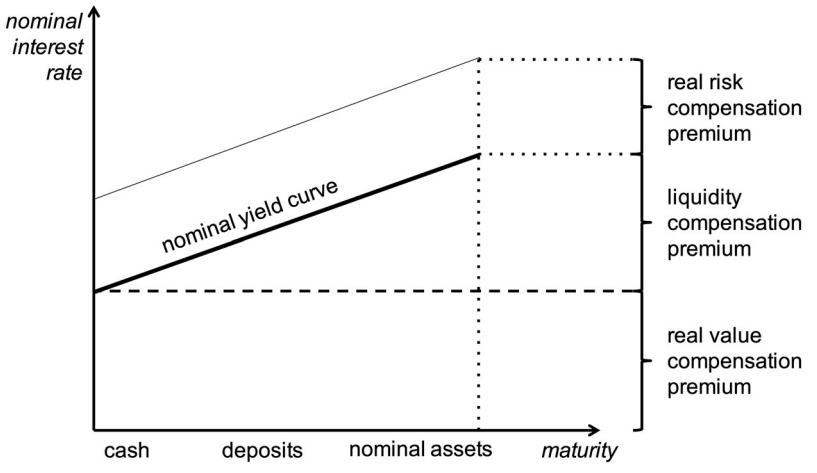

Figure 2. Interest rate composition of the term structure of interest rates.

real-asset inflation with monetary policy. When land prices double, for example, one million Euros can only buy half the land that it could beforehand. Consequently, Monetary Keynesianism has introduced real value preference (*RVP*) to explain the interest rate *level* as a compensation for holding nominal instead of real assets (Betz 2001, pp. 102–4). Empirical studies support this proposition by identifying a shift to real estate during periods of inflation uncertainty (Piazzesi and Schneider 2016). Note that the *RVP* includes gold, art or other assets and implies a premium from hoarding that is different from rents resulting from productive employment of the assets. We derive the 'portfolio decision' (Rochon 1999, p. 292) of *how* to save as follows:

Decision norm N_3: Saving portfolio rationale

Real value preference (RVP): Real assets are preferred over nominal assets, because the latter are not secured against losses in real value.

Liquidity preference (LP): Liquid nominal assets (money) are preferred over illiquid nominal assets because the latter imply higher risks of wealth losses.

We conclude that wealth owners first claim pecuniary compensation for holding nominal instead of real assets, and second, for holding long-term assets instead of liquidity, as shown in Figure 2. Figure 2 also illustrates the real risk premium, which accounts for *investment-specific* default risks, whereas the real asset premium accounts for the *general* risk of devaluation of nominal assets. Before we introduce the banking system, let us evaluate some prominent growth imperative hypotheses in the light of the findings so far.

Some hypotheses argue positive profits require the total economy to generate surpluses through growth, because firms reduce investments as soon as net profit expectations decline (Gordon and Rosenthal 2003, Binswanger 2009). This argument needs refinement for at least three reasons: First, entrepreneurs' investment decision does not require profits but entrepreneurial income (see N1), unlike the financing decision by wealth owners (N3). Second, net profits, just like interest income and economic rents, could hypothetically be consistent with a stationary economy, if profits were consumed. It is the combination of profit and the marginal propensity to consume of those who receive profit that is essential for a growth imperative. Net saving is the necessary condition. Third, the implicit assumption of firms having the power to keep gross profits (including costs for debt or equity) systematically above normal market returns remains largely unexplained. Indeed, markets are rarely perfect, and forms of industrial relations, financialisaton and other physical and institutional factors influence profits. Although institutional structures may allow firms to extract

superprofits (Marx) or quasi-rents (Schumpeter), these excess sources of income are institutionally contingent and not to be conflated with the market mechanisms that determine a minimum market return through the saving portfolio decisions of wealth owners (see N_3).

Beyond regimes of financialisaton, extra profits typically result from natural monopolies and restrained competition, product innovation (often secured by property rights), and capital- or labour-saving process innovation.

The latter, technological change, is another argument for a growth imperative. A frequent assumption is that labour-saving technological change explains unemployment and even a growth imperative (Rezai *et al.* 2013). If technological change generates surpluses, labour's bargaining power determines whether these surpluses occur as profits or wages. The decisive question, again, is whether these incomes are consumed or saved. In the real credit economy, unlike Quesnay's hypothetical complete consumption, distribution matters: If unemployment is high and labour's bargaining power weak, profits accrue to wealth owners, who have a higher propensity to save (N_2). If bargaining power is high, wages increase. Then, productivity gains could be channelled into working-hour reductions. We conclude that neither the entrepreneurial norm (N_1) nor technological change as such support an unconditional growth imperative hypothesis. Income-dependent saving (N_2) and the saving portfolio decision (N_3) direct us towards theorising a growth imperative, nonetheless. This, however, requires integrating the banking system into our framework.

Commercial banks: Banks do not need deposits (savings) to provide credit *ex-ante* but, rather, to refinance credit *ex-post*. Refinancing lending is possible through wealth owners' deposits, interbank- or central bank credits. To reduce costs, banks typically leave a gap between the maturity of liabilities (mostly deposits) and assets (mostly loans), termed maturity transformation.

Decision norm N_4: Maturity transformation

Banks maximise profits from interest margins between loans and deposits by optimising maturity transformation, keeping liabilities shorter termed than assets.

Under competition, the private vice of profit-seeking maturity transformation becomes a public virtue, since margins are reduced, and lending rates drop. Deposits can be used for transactions and simultaneously refinance long-term loans. However, there is a trade-off between desirable low lending rates and undesirable bank illiquidity risks arising from excessive maturity transformation. Introducing the central bank will explain how this trade-off is managed.

Central bank: In a two-tiered banking system, one central bank function is that of a *lender of last resort*, stabilising the credit market by preventing liquidity shortages, bank runs and contagion (Thornton 1802, Mehrling 2010). More fundamentally, however, we consider the function of limiting maturity transformation via monetary policy to protect the currency from inflation or depreciation induced by capital flight (Riese 2004). Imagine a hypothetical banking system with a common numeraire, endogenous money creation and competition between commercial banks but without a central bank: every bank maximises lending, and no bank would need deposits, which means that all loans were short-term financed. The social cost for the whole system would be high inflation potential, because without interest compensation wealth owners are likely to shift portfolios into foreign currencies or real assets (N_3). Consequently, national nominal assets would inflate.

The instrument for controlling inflation and inhibiting portfolio shifts is the policy rate at which commercial banks can lend from the central bank (Gnos and Rochon 2007). This central bank reaction function was discovered by Wicksell, 'the founder of monetary macro theory' (Spahn 2001, p. 40), who postulated that the *policy rate* should respond to the *natural rate*, as determined by (non-monetary) forces of capital supply and demand. However, except for times of true capital scarcity, such as in post-war economies, post-Keynesian reasoning has discredited the idea of a persistent and positive natural rate, as strongly formulated by Leijonhufvud: 'denial of the loanable funds

mechanism makes a nonsense of the very notion of a 'natural rate' of interest. The Wicksellian theme is lost' (Leijonhufvud 1981, cited in Rogers 1989, p. 22).

From our viewpoint, however, Wicksell's reasoning on the policy rate remains valid, if we only replace the determinants of the natural rate with *LP* and *RVP*. His idea of monetary policy reacting to market forces – implying that the central bank is a market participant, rather than acting above the market (Riese 2004) – remains crucial. A positive policy rate creates the incentive for commercial banks to pay interest on deposits, as an alternative to central bank credit. More importantly, the norm of short-term central bank credit leaves commercial banks unsure about short-term adjustments of the policy rate. It would then be risky to refinance long-term loans (assets) with weekly central bank credits (liabilities) or only with short-term deposits. This explains why interest is paid on deposits, so banks need to plan refinancing costs for the longer term.

The discretionary policy rate allows the central bank to react to economic conditions that could otherwise induce inflation, as inflation uncertainty would induce portfolio shifts (N_3) away from holding nominal wealth in the national currency. Paid interest on nominal assets creates a willingness to hold nominal wealth, because it compensates for loss of real value premiums. These functions – forcing banks to re-transform maturities by favouring deposit attraction as well as inhibiting portfolio shifts – translate into two central bank decision norms:

Decision norm N_5: Control of maturity transformation

Central banks provide short-term refinance credit to commercial banks at a policy rate sufficient to limit maturity transformation (N_4).

Decision norm N_6: Control of price levels

Using the instrument of the policy rate, central banks target price stability (constant but low inflation levels) to reduce nominal uncertainty and, thereby, create wealth owners' willingness to hold nominal wealth (N_3).

Commercial banks reconsidered: The introduction of a central bank and its decision norms requires an extension of the decision norms of commercial banks. Banks' maturity transformations to reduce costs (N_4) are limited by the short-term nature of central banks' refinance credits (N_5) and resulting uncertainty arising from possible policy-rate changes. Excessive maturity transformation risks becoming unprofitable when interest rates on short-term liabilities exceed rates on long-term assets (Hellwig 1994). This explains why commercial banks pay interest on deposits. Therefore:

Decision norm N_7: Deposit attraction

Due to uncertainty about changes in policy and money market rates, banks attract long-term deposits by paying interest to limit maturity transformations.

State: For our purpose, consideration of the state is limited to its economically relevant fiscal dimensions. In line with Keynesian reasoning, we consider the state an economic actor under budget constraints as part of the income circuit. Budget management involves tax and transfer regimes, public spending ratios, and debt levels. When introducing the macroeconomic rationale of the state, a preference to strive for growth becomes apparent. Economic growth serves actors best – both as consumers and wealth owners – and simultaneously improves the state's fiscal condition (van den Bergh 2009). Higher employment increases tax revenues and decreases transfer obligations (Wenzlaff 2019). Note that this does not require an additional public choice perspective of democratic party competition. We summarise the economic rationale of the state into one global norm:

Decision norm N_8: Budget and debt management

The state adjusts spending via taxes and debt. Tax levels are constrained by national income, whereas debt levels are constrained by the differential between interest rates and future economic growth rates. Stimulating growth and employment receives policy priority.

Macroeconomic Outcomes

The interactions of actors' decision norms ($N_{1\text{-}8}$) with structural principles ($P_{1\text{-}2}$) jointly produce mechanisms that lead to a growth imperative. We have argued above that purely structural growth imperative hypotheses do not hold if all interest *and* profit incomes are consumed. But what happens if savings increase?

From the Paradox of Thrift to Stagnation

According to the loanable funds model, savings are invested via financial intermediaries. As a consequence, effective demand – defined as consumption plus capital goods demand – could never fall short, since decreased consumption is replaced by entrepreneurs' capital goods demand. Increases in savings would reduce interest rates and, thereby, stimulate investments. From a Keynesian perspective, increased savings are not automatically invested and can therefore decrease effective demand. Keynes (1936, p. 358) discussed the intellectual history of this seeming paradox, dating back to the seventeenth century. By means of actors' decision norms, a dynamic version of the paradox with endogenous investments can be derived. In a loanable-funds world, investments increase with higher savings and savings increase with a rising interest rate. These causal relationships do not exist when interest rates are determined by portfolio rationales (N_3) and saving rationales (N_2) depend on income. This 'analytical distinction between choices affecting the disposition of income and choices affecting the disposition of wealth' (Tobin 1965, p. 671) is crucial for deriving a dynamic paradox of thrift. Saving (N_2) reduces consumption demand, and portfolio choices (N_3) prevent the interest rate from dropping beneath *LP* and *RVP*, whereby entrepreneurs are prevented from realising investments that could increase total demand (N_1). This paradoxical mechanism operates, although in principle entrepreneurs never face a shortage of credit (P_1). We conclude:

Macroeconomic outcome MO_1: Mechanism of thrift

In cases where LP and RVP (N_3) hold, increased saving can restrict investments and therefore reduce rather than expand total income and realised ex-post savings.

Figure 3 depicts the causal mechanisms between income, saving and portfolio decisions along with the recursive effect of savings on total output.

The dynamic thrift paradox can be used to explain long-term macroeconomic outcomes, especially persistent underemployment beyond cyclical deviations (Stockhammer and Klär 2010). Keynes already proposed that 'the interest rate may fluctuate for decades about a level which is chronically too high for full employment' (1936, p. 204). Some scholars have reformulated this reasoning to focus on short-term frictions, such as 'rigid wages' (Modigliani 1944). In contrast, post-Keynesians have developed different lines of argument regarding persistent unemployment as an involuntary feature of the credit economy. We adopt the idea of underemployment as a long-term structural equilibrium in a credit economy (Betz 2001) by integrating the mechanisms of *LP* (N_3) and marginal consumption propensity (N_2) to explain systematic insufficient demand.

This tendency of underemployment keeping the economy under its potential implies *stagnation* (Baldwin and Teulings 2014). While some theories of stagnation also consider supply-side factors, the 'possibility of involuntary unemployment due to weak aggregate demand' (Benigno and Fornaro 2017, p. 36) is increasingly accepted as the core issue of stagnation, here defined as the state of an economy which would require higher levels of national income to reduce unemployment (Kimmich and Wenzlaff 2012, Wenzlaff *et al.* 2014). Therefore:

Macroeconomic outcome MO_2: Stagnation

The mechanism of income restriction (MO_1) can create persistent underemployment, which results in income levels and growth rates below an economy's potential.

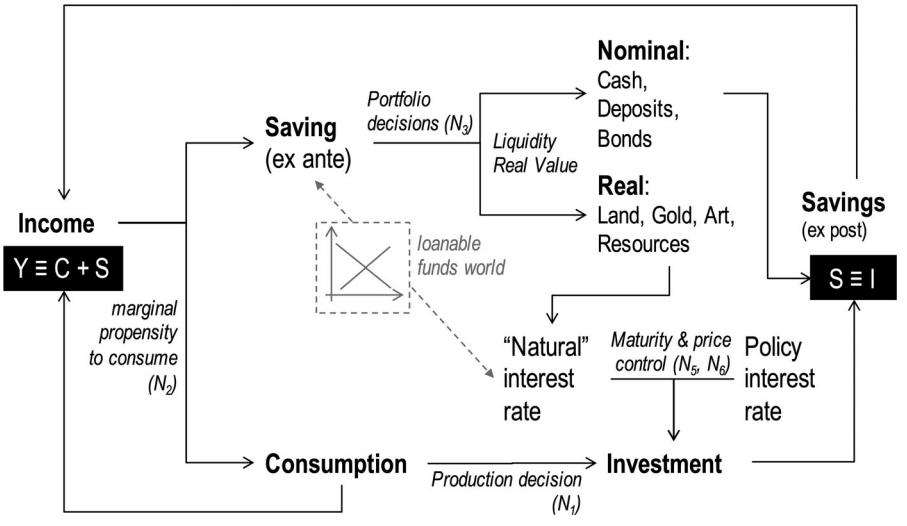

Figure 3. Causal mechanisms in a credit economy. National income is defined as income from consumption and investments (Y≡C + I). Savings result from income not consumed (S≡Y − C). Consequently, also S≡I must hold.

Central Banks Reconsidered

Monetary Keynesianism provides a strong argument for persistent unemployment via the link from *LP* and *RVP* (N_3) to central bank policy. The central bank being a market participant, and following its norms (N_5, N_6), implies the maintenance of a policy rate equilibrating the *asset* market instead of the *labour* market but at the cost of underemployment and stagnation – the 'prevention of a wage–price spiral is the duty of monetary policy, unemployment may be a by-product' (Spahn 2001, p. 43). This outcome conflicts with the budget norm of the state (N_8), which is best served by full employment. A sufficiently high real interest level equilibrating the asset market implies a low level of economic activity and also entails the danger of turning into deflation, with disastrous cumulative effects (Spahn 2001). Conversely, a low policy rate in favour of N_8 risks asset price inflation, creating nominal uncertainty with regard to real values. We see that price level targets (N_6) restricted to the core inflation of commodities cannot control asset price inflation. As observed in the decade since the financial crisis, lowering central bank rates close to zero, like unconventional Quantitative Easing, does not stimulate investment in production processes anymore, but, rather, triggers real asset inflation, indicating that RVP becomes effective. This constitutes the key central bank dilemma (Kimmich and Wenzlaff 2012):

Macroeconomic outcome MO_3: Central bank dilemma

The central bank is trapped in a dilemma: controlling price stability (N_5) by controlling maturity transformation (N_6) versus stimulating investment and employment (N_8).

The Growth Imperative

Our considerations so far have sought to explain why capital accumulation cannot drop the interest rate, as was assumed in classical political economy. Conversely, the interest rate can prevent further accumulation, as capital must remain scarce to earn the market interest rate (Proudhon 1849). In Keynes' words: 'The question why capital is scarce is […] best regarded as being, in the long run, the same question as to why the rate of interest exceeds zero' (Keynes 1934, cit. op. Spahn 2001, p. 32).

The interest rate not only causes unemployment but also sustains income inequality by establishing an income-transfer channel to wealth owners. Inequality reduces potential effective demand,

because high-income actors have relatively higher saving rates. In other words, sustained income inequality contributes to increases in savings. This mutually self-enforcing interplay of savings, determined by the marginal propensity to consume (N_2), and the interest rate, determined by portfolio preferences (N_3), constitutes an urge for growth:

Macroeconomic outcome MO_4: Growth imperative

The tendency of a credit economy to systematically generate unemployment and inequality implies that higher growth rates would help to temporarily overcome unemployment (N_8). In this sense, the economy's actors are subject to a growth imperative.

Yet, this imperative, as defined above, does not imply actual growth but, rather, that the economy would have to grow to mitigate unemployment and inequality, albeit without ever transcending stagnation. In this paradoxical situation, the same underlying cause of declining growth and stagnation (i.e. the non-adjusting interest rate) also prompts actors to push for growth, especially the state, to keep the system functioning (N_8).

Land and Resource Scarcity

Apart from the already widely discussed ecological conflicts of economic growth (Haberl *et al.* 2011), we emphasise here a different effect that stems from holding natural resources as portfolio assets in a context of stagnation. Extending the real asset portfolio to natural resources intensifies when central banks reduce interest rates and experienced nominal uncertainty rises (P_2). The effects resulting from interest rates that are too low is vividly illustrated by the global empirical trend of portfolio shifts into real estate (Piazzesi and Schneider 2016) and agricultural land acquisition (Visser 2017), and becomes increasingly problematic in a resource-constrained future (Stratford 2020).

Note that, as mentioned above, the non-pecuniary premium of holding real assets is independent of arbitrage considerations concerning resource rents (Allais 1962). Furthermore, there is a circular, mutually re-enforcing relationship, as growing portfolio shares of resources (N_3) that are kept idle increase scarcity and resource price levels, aggravating nominal uncertainty (P_2). An established finding is the recessionary effect of resource scarcity on income and consumption, with repercussions on the growth imperative (MO_4). With increasing natural resource scarcities, this effect is likely magnified. Therefore:

Macroeconomic outcome MO_5: Resource scarcity

The development and expansion of property rights for physically finite resources and their appropriation creates economic scarcity and thereby generates a real value premium (N_3). Economic resource scarcity has the potential to generate inflation and can thereby increase nominal uncertainty (P_2).

While labour scarcity potentially leads to inflation and, therefore, requires monetary policy reaction by central banks to assure price stability (N_5 and N_6), natural resource scarcity may not be encountered in a similar manner. There is, for example, an ongoing debate regarding how, if at all, monetary policy should react to domestic inflation prompted by oil price shocks (Kilian 2014). This research generally endogenises the effects of demand on global resource scarcities and, thereby, analyses whether growth is inhibited by natural resources.

Exploring Transformative Agency

The macroeconomic outcomes yield some general directions towards resolving the growth imperative. A common proposal suggests implementing alternatives to the GDP indicator. Yet, products must be sold, income generated, and debts redeemed (Heinsohn 2008) – and GDP measures provide an indication for investment decisions. They become necessarily pervasive, omnipresent, and persistent (van den Bergh 2009) as a result of the growth imperative.

Similarly, firms' profits do not seem to constitute a growth imperative. Entrepreneurs may even develop or support alternative, more social- and sustainability-oriented (for example cooperative) business and finance models. However, the real structural constraint of balance-sheet mechanics (P_1) – the fact that production requires credit, and sales must cover all costs, not only wages and capital depreciation, but foremost interest or dividends – remains.

This turns our attention towards *wealth owners*. However, we cannot expect wealth owners to abstain from returns by engaging in practices such as ethical banking. Such practices of minorities could only flank regulations established by the state or central bank.

On the side of *consumers*, lowering consumption levels alone would be ineffective. Addressing the growth imperative requires lowering income via working-hour reductions (Sanne 2002, Rezai *et al.* 2013), since increased savings would otherwise fuel the growth imperative. Institutional structures such as trade regimes or labour unions can collectively constrain or mediate such agency.

The *central bank* has been presented here as a market participant reacting to market forces. It responds to wealth owners' *RVP* and *LP* (N_3) with a corresponding policy rate (N_5), seeking to ensure an optimal level of maturity transformation (N_6). If the policy rate was nothing more than a political variable or convention (Gnos and Rochon 2007), the central bank could reduce it to stimulate full employment. As illustrated with the central bank dilemma above, however, reducing the policy rate would increase the expectations of inflation and, therefore, induce portfolio shifts towards real values, creating real asset inflation. Although there are various solutions to the technical challenges of overcoming the zero lower bound on nominal interest rates (Buiter 2009), the problem of *RVP* creating asset price inflation would not be resolved thereby. Conversely, real asset taxation would liberate central banks to implement negative interest rates without creating real asset inflation.

The *state* could resolve the central bank dilemma by taxing real assets, creating quasi-carry costs and reducing their real asset premium and thereby lowering their attractiveness in relation to nominal assets. The central bank could then regain agency for lowering the policy rate. There are indications that this taxation reduces real asset premiums and prevents bubbles in the context of real estate (Crowe *et al.* 2013). The taxation of land has received renewed attention to recapture rents, is already implemented in several countries (Ryan-Collins *et al.* 2017), and has been early acknowledged to lower interest rates (Allais 1962). Real asset premiums are also reduced by different land and resource governance modes or public housing regulations, including cooperative ownership and commons.

Conclusions

We have developed a structure–agency framework to investigate growth imperative hypotheses in mature credit economies. Such hypotheses have received increasing attention, given the widely acknowledged lack of ecological, social and economic sustainability of mature economies, which are also typically coping with stagnation, unemployment, and inequality.

Our framework distinguishes and relates *structural principles*, *institutions*, *decision norms*, and *agency*. Balance sheet principles result in macroeconomic emergent properties that can neither be explained by aggregating individual action nor by institutional evolution alone. The saving decisions of one actor inescapably lead to downward formative effects on all other actors.

Our application informs the discourse on growth imperative hypotheses by refining some prominent hypotheses. The mutually self-reinforcing interplay of savings accumulation, based on the marginal propensity to consume, and interest rate determination, based on liquidity and real value preference, generates stagnation. Fostering growth becomes the dominant policy response to counter underemployment.

Our results point towards agency on the levels of *institutions* and *decision norms*. We believe that one promising option to reduce real interest rates is the taxation of real assets, especially land, which reduces the lower bound for effective monetary policies, including negative nominal interest rates.

Simultaneously, land value taxation reduces growth dependency of the state budget. While technically easily feasible, political acceptance is difficult and requires a power-relational political economic analysis. In contrast, it seems unlikely – though imaginable – that monetary structural principles, as 'real' constitutive structures of complex modern societies, such as the use of a numeraire, can be transformed (Weber 2018). This implies fundamental changes of societal differentiation and re-embedding of economic activity (Aigner and Scholz-Wäckerle 2019). We do not make any claims concerning the feasibility of monetary reform proposals, however, although our framework could facilitate such a comparative analysis in future research.

To formally test our hypothesis, we suggest advancing models that take into account micro- and macroeconomic balance sheet foundations, including real value preference and currency hierarchies. Central banks' agency remains constrained by their hierarchical positions within global currency markets (Betz 2001, Spahn 2001, Schelkle 2005, Kaltenbrunner 2015). Also, institutional complementarities need further attention, as land and resource governance, public housing or asset taxation regimes could potentially mitigate the growth imperative. An institutional macroeconomics perspective becomes essential.

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