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Louison Cahen-Fourot

Central banking for a
social-ecological transformation

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Louison Cahen-Fourot*

Institute for Ecological Economics, Department of Socioeconomics,
WU Vienna University of Economics and Business

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Abstract

In the perspective of a social-ecological transformation, this article sets the discussion on the future of central banking back in the context of ecological limits to growth. It first surveys the literature on proposals to introduce sustainability in central banking. It then draws from the conceptualization of money as a social relation to discuss central banks' mandates, independence, governance and instruments. This article therefore adopts a normative stance. Central banks should be politically accountable with a renewed governance and committees composition. In line with the endogenous nature of money, their mandate needs not to include price stability and should

*Corresponding address: Welthandelsplatz 1, 1020 Vienna, Austria, louison.cahen-fourot@wu.ac.at This research was supported by funds of the Oesterreichische Nationalbank's Jubiläumsfond (Austrian Central Bank, Anniversary Fund, projects number 17641 and 18651). I am indebted to Emmanuel Carré, Theresa Gäckle and Colleen Schneider for useful comments and remarks on previous versions. The chapter also benefitted from very useful and stimulating discussions with Emmanuel Carré and Jézabel Couppey-Soubeyran. All remaining errors are mine.

focus on fostering full employment, social cohesion and relevant economic development within the ecological limits of the planet. Three policy instruments are then discussed to shift the nature of central banks' operations from responsive to prescriptive: differentiated target interest rates, credit control and qualitative tightening in assets purchasing programs.

1 Introduction

A growing topic is the integration of environmental issues into central banking. The ecological crisis includes amongst other biodiversity loss and overexploitation of natural resources in the form of materials. The terms “sustainability” or “environmental issues” thereafter will refer to the multiple dimensions of the ecological crisis and not only to climate change.

A few figures are helpful to contextualize the reflections developed in this article. The CO₂ concentration in the atmosphere is approaching 417 ppm.¹ This is already above the median CO₂ concentration compatible with 1.5 degrees pathways by 2100 (Masson-Delmotte *et al.*, 2018). As Masson-Delmotte *et al.* (2018, p. v) put it, *“limiting warming to 1.5°C is possible within the laws of chemistry and physics but would require unprecedented transitions in all aspects of society”*. Prospects are no better for biodiversity: The planet is now experiencing a sixth mass extinction of living species at a rate 1000 times higher than the natural extinction rate (OECD, 2019a). Furthermore, the material basis of our societies is continuously widening. This leads to additional natural resources exhaustion, greenhouse gases emissions and biodiversity loss. Material extraction has more than tripled since 1970, global primary material use is expected to double by 2060 together with growing in-use material stocks and material efficiency has declined globally since 2000 (Haberl *et al.*, 2020; OECD, 2019b; Schandl *et al.*, 2018).

Therefore, in the current state of knowledge and at the macroeconomic scale, there is no data to support a scientific discourse on green growth and green capitalism (Hickel and Kallis, 2020) — broadly defined as the possibility of pursuing growth and capital accumulation without unsustainably impacting the environment. This necessitates absolute decoupling: the concomitant rise of economic production and decrease of environmental inputs and outputs. Absolute decoupling of GDP with GHG emissions is unseen in the data (Schröder and Storm, 2020) but reaching net-zero emissions is technically feasible although highly challenging for heavy industries. Moreover, reconciling this objective with GDP growth requires assuming rates of energy efficiency improvement historically unprecedented and constantly above GDP and population growth rates (Bouckaert *et al.*, 2021; Energy Transitions Commission, 2018). When speculative assumptions on technological improvements are taken away, degrowth scenarios appear as the safest way

¹<https://www.bloomberg.com/graphics/carbon-clock/>, accessed June 11, 2021.

to limit climate change by 1.5 degrees, even if their political feasibility remains difficult (Keyßer and Lenzen, 2021). Absolute decoupling between GDP, energy and materials is unseen in the data (Haberl *et al.*, 2020) and it is far from certain that it would even be possible due to the physical constraints imposed by the second law of thermodynamics (Ayres, 1999; Glucina and Mayumi, 2010).

The underlying premise is, therefore, that twenty-first century-fit central banking needs to consider the ecological constraints bounding production processes. This article is therefore written in a post-growth perspective. The general problem is the one of a social-ecological transformation: How can we organize society and design its key institutions in a way that is compatible with the ecological limits of the planet, e.g. which does not make economic growth a necessary condition for political stability, social cohesion and collective and individual well-being?

As a key social relation, money is to a great extent at the core of socio-economic dynamics. Indeed, our economies are monetary economies of production: most of production and exchange occur through money (Rochon and Seccareccia, 2013). The economic circuit cannot start without money being created in the first place. The institutions governing money have therefore a crucial role to play in the social-ecological transformation to come. By money as a social relation I mean the trust-based general equivalent expressing economic value, linking decentralized producers and consumers, allowing them to take part in the market and enabling different kinds of activities — market and non-market — to cohabit on a given territory and in a given community. From its general acceptance as the legitimate unit of account stem the usual attributes as mean of payment (in particular, of debt settlement), mean of exchange, and store of value (Aglietta *et al.*, 2018; Théret, 1999). In recent history, new capital accumulation regimes (Labrousse and Michel, 2017) of capitalism were often accompanied by new monetary regimes. A monetary regime is the combination of monetary policy, financial and capital flows regulations and lender of last resort mechanisms (Guttman, 2002). The form of money, the modalities of monetary creation, the dynamics of its circulation and the foundations of its value have evolved through time and deeply impacted the way the economy works. The institutionalization of money both triggers and is the product of social evolutions (Guttman, 2002; Ould Ahmed and Ponsot, 2015). What is really at stake here is therefore the emergence of a new monetary regime as an indispensable feature of a new accumulation (or, in a post-growth perspective, non-accumulation or disaccumulation) regime based on new social compromises

geared toward sustainability.

The discussion on greening monetary policy and central banking has mainly consisted in adjustments, some of them quite deep, to integrate environmental considerations into a pre-existing non-ecological system. 21st century central banking, although fashioned in the context of capitalism and legitimized as practices stimulating economic growth, need therefore to be at the same time compatible with a post-growth world. Nonetheless, such a change does not require to reinvent the wheel. Monetary history is full of tools that have proven efficient and useful in different times and places and that appear relevant for the era to come. The research question of this article is prospective and normative: it is to sketch some elements² of a monetary regime fitted for a social-ecological transformation.

The article is structured as followed: I briefly survey the literature on current proposals to reform central banking in section 2. Section 3 is devoted to discussing money as a social relation, its non-neutrality and the consequences for central banking. Section 4 draws some lessons and perspectives for governance, political accountability and mandates. Section 5 is devoted to the instruments of monetary policy. To conclude, I discuss some theoretical and institutional consequences of a new monetary regime built upon these proposals.

2 Proposals for reforming central banking and monetary policy towards sustainability

The autonomy of banks in money creation prevents sustainable sectors to be sufficiently financed (Campiglio, 2016). This is an important point to underline since credit control policies have been criticized on the ground that they prevent optimal equilibrium from emerging (Bezemer *et al.*, 2018). A wealth of proposals have been developed in the literature to gear financial flows towards sustainable activities.

²I leave aside exchange rates management and shadow banking. Financial regulation is discussed in chapters by Svartzman and Dafermos.

2.1 Integrating sustainability into risk management and redirecting monetary flows

The proposals enter two main categories: (i) risk management through integrating sustainability concerns into risk assessment and macroprudential measures and (ii) redirection of monetary flows through reforming monetary policy instruments. To green macroprudential regulation, authors have in particular suggested to introduce differentiated reserves, liquidity and capital requirements. Reserves differentiation consists in requiring less reserves for banks' lending to sustainable activities. For instance, banks would collect sustainability certificates delivered by an official third-party body from firms to which they lend and use these certificates as parts of their reserves. Capital differentiation could be achieved through implementing brown penalizing or green supporting factors to acts on the risk associated with assets depending on their degree of sustainability. Less sustainable assets would count as riskier: Lending to activities associated with these assets would penalize banks in terms of fulfilling prudential ratios. Similarly, in the case of liquidity differentiation, less sustainable assets would count as less liquid. Of course, the effectiveness of these measures depends on the extent to which microprudential policies really represent a constraint on banks for lending.

To green monetary policy instruments, proposals include (i) green central bank financing, (ii) lending quotas and incentives, (iii) integrating environmental, social and governance (ESG) factors into assets eligibility criteria and (iv) green quantitative easing. Green central bank financing consists either in central banks directly financing sustainable activities or to lend to public development banks that would finance sustainable activities. Lending quotas imposes to banks to lend defined proportions of their total volume of loans to specific sectors. To incentivize lending to sustainable activities, proposals include implementing green targeted long-term refinancing operations (GTLTRO): lower interest rates and longer maturities would be conditional on the banks' volume of lending to sectors complying to environmental standards as well as to the compliance of the pledged collaterals. Enhancing asset eligibility criteria with ESG factors means essentially adopting a qualitative tightening policy, which I discuss later. This could lead to green quantitative easing, which narrows down the assets universe eligible for purchase by central banks in order to avoid improving the financing conditions of unsustainable activities and to improve those of sustainable activities (Aglietta *et al.*, 2015; Bolton *et al.*, 2020; Campiglio, 2016; Campiglio *et al.*, 2018; Dafermos

et al., 2020; Matikainen *et al.*, 2017; Rozenberg *et al.*, 2013; van 't Klooster and van Tilburg, 2020; Weber and Calza, 2021).

A number of central banks have already implemented this type of policies. In terms of micro- and macroprudential policies, central banks of Brazil, Netherlands, Switzerland and China have integrated some sustainability or ESG criteria. Differentiated reserves are at work at the central bank of Lebanon. In terms of monetary policy, credit quotas and guidance are used by central banks of China, India and Bangladesh. Differentiated interest rates in the form of preferential refinancing or subsidized reserves are used by central banks of Japan and Bangladesh (Campiglio *et al.*, 2018). Green bonds are accepted by the central bank of China as collateral for its mid-term lending facility and the European Central Bank has invested into green bonds through its Corporate and Public Sectors Purchasing Programs (CSPPs and PSPPs) (Barnes and Livingstone, 2021; De Santis *et al.*, 2018). In a sample of fifty-six countries, D'Orazio and Popoyan (2019) find that 10 countries have implemented mandatory regulations, 13 have implemented voluntary regulations and 25 are discussing new regulations. Developing and middle-income countries are leading the way.

2.2 These proposals remain embedded in a market-led understanding of the social-ecological transformation

These proposals aim at rearranging existing central banking operating framework through greening the balance sheets of central banks, banks and financial institutions. We can see here the underlying persistent influence of the original belief that ensuring price stability ensures financial stability (Schwartz, 1995). Recent history has opposed a striking refutation of this hypothesis and has made financial stability an objective of its own for central banks acting as regulators. Now the reasoning seems to be that through greening balance sheets of the financial system, climate stability will be achieved and, therefore, feedback climatic effects will be spared and thus price and financial stability preserved. Price and financial stability are the channels through which sustainability is brought in and are used to legitimize both its introduction in central banking and renewed interpretations of central banks mandates, especially in high income countries.

These proposals therefore do not challenge the market-led logic behind contemporary central banking. The approach in terms of risk management rather than

in terms of environmental objectives stems from this market-logic: if environmental risks are correctly addressed in asset pricing, balance sheets and operating frameworks, markets will do. This logic was already pervasive in the foundational discourse of [Carney \(2015\)](#) on the tragedy of the horizons. Underlying this logic is the – very strong – assumption that financial market need just be accompanied to green the economy through creating incentives to green financial institutions’ balance sheets. As I recall in sub-section 3.3, implicit in this approach is a naïve and abstract conceptualization of the market that ignores its fundamentally social nature.

The social-ecological transformation needs long-term planning and clear objectives, which are both currently missing in the integration of sustainability as indirect objective in central banking. For instance the purchase of green bonds through assets purchasing programs (APPs) is not enough in the absence of clear environmental objectives standing for themselves, to which the programs would be subjected in line with public policies of social-ecological transformation. Relying mostly on a market-led logic might lead to act contradictory to environmental policies. However, adopting such planning and objectives might be contradictory to the principle of market neutrality (see sub-section 3.3 and section 4).

Finally, concerned with the adequacy to the existing mandates and governance of central banks, these proposals remain technical: their implementation would rearrange central banks operations but would not transform the nature of central banking itself. They remain embedded in a conceptualization of central banking as the “science” of maintaining price and financial stability. They do not adopt a conceptualization of central banking as the politics of reflecting the social contract embedded in money through its role as guarantor of the payment system, which might lead to other objectives.

3 Reconsidering central banking in light of money as a non-neutral social relation

Anthropologist, historians and institutionalist economists have shown that money cannot be defined in an instrumental manner by its attributes. It needs to be comprehended as a social relation ([Ingham, 1996](#)).

3.1 Money is a social relation

Money is anchored in the representation of the social whole: its legitimacy arises from social compromises between the different spheres of society. Although heterogeneous, all accept money as the universal expression of value and, through this, adhere to the community. Money is therefore legitimate to the extent that it relies on symbolic and socio-political sources, and that it acts as the social bond and ombudsman providing credit for economic development and enabling people to settle their debts, in particular to the community through taxes (Orléan, 2013; Théret, 1999). This collective acceptance as a social bond is what gives money its socio-political nature.

Three levels of trust underlie this legitimacy: methodical trust is the individual belief stemming from the observation of collective behaviour that everyone else will accept money; hierarchical trust is the confidence in the authorities managing money, e.g. central banks, to enforce the monetary regime and to ensure the status of money as the common unit of account; ethical trust is the adherence to the collective set of values that ensure social cohesion and lie at the core of individual membership to the community. Ethical trust supports hierarchical trust, which itself supports methodical trust. The state stabilizes ethical trust through establishing it on a set of rules governing the monetary regime. The central bank enforces the monetary regime but never legitimately replaces the forces that shape the social compromises supporting this monetary regime. A trust-based money can then only be a good coordinating instrument if it embodies a good social compromise (Ould Ahmed and Ponsot, 2014; Théret, 1999).

If these social compromises evolve, this must, therefore, be reflected in the monetary regime and in the way this regime is governed. Indeed, central banks itself must submit to the collective values into which money is anchored and that give money its legitimacy. It follows from this that new social compromises pushing towards alternative policies — and possibly towards alternative socio-economic systems — imply an alternative management of money (Aglietta and Brand, 2013). This justifies a new governance of central banks and pleads for a deeper political and democratic accountability: political accountability before parliaments as well as an adequate representation of society within central banks' committees. Such a re-embedding of central banks within the political sphere appears as a necessary condition to build and legitimize a new monetary regime geared towards a social-ecological transformation.

3.2 Money is non-neutral

The nature of money as social institution and the endogeneity of the money supply makes it intrinsically non-neutral. First, money is the language through which market exchange occurs and through which the political sphere imprint its mark on the economy. As mean of payment linking agents, money conveys information that is used by the central bank to take decisions that will, in turn, impacts on the economic system (Aglietta *et al.*, 2018; Ould Ahmed and Ponsot, 2015). It is a political medium and an organic link that bonds states and central banks. This organic link is manifest in the guarantee of central banks' capital by states. However, it is incomplete if, conversely, central banks do not guarantee public debts and do not directly finance states.

Second, money non-neutrality is also due to the endogeneity of the money supply and the monetary nature of market economies: without money, no production and exchange can occur. Therefore money not only enables economic activity but it also shapes it depending on where it flows. This has implications for central banking.

3.3 Money as a social relation, the endogenous money supply and the responsive nature of central banking

From what precedes and in what follows, I contend that both the socio-political nature of money and the endogeneity of the money supply are contradictory with the political independency of central banks and require a new governance and new objectives. By political independence I refer to the power of central banks to act unrelatedly with public policies decided by democratically elected governments, e.g. the absence of coordination of monetary policy with fiscal policy or with environmental policy.

The art of central banking is still widely conceptualized as purely technical and apolitical “science” although central banks are a public institution producing a fundamental public good: the payment system (Fontan *et al.*, 2018; G. Vallet, 2019). However, the depoliticization of committees and decision making is a very strong concern of central banking good practices (Morris and Lybek, 2004). This is highly problematic on five grounds.

First, the apparent depoliticization provides a misleading and fictional picture: nominations to executive functions in central banks are more often than not highly

political. The FED provides a good example, with people being nominated by the US President and confirmed by the Senate. In the case of the ECB, the politicization is more implicit as nominations to the executive board are the result of negotiations amongst Eurozone countries. Therefore, the perception of central bankers as apolitical people conducting monetary policy following a robust established science is largely undue. Strong interests are a stake through executive nominations and it does matter that citizens have more control over this process.

Second, the socio-political nature of money entails that the legitimacy of central banks rests upon the social compromises leading to the universal acceptance of money. Political independence is tantamount to isolating central banks from these social compromises. *De facto*, this dis-embeds central banks from society, in a polanyan movement accompanying the dis-embeddedness of financial markets and subjecting society to market logics.

Third, because the different components of society are not represented within committees, it effectively makes central banks blind to the political consequences of their policies. It is now widely acknowledged that quantitative easing policies had distributional consequences.³ They increased wealth inequalities in favouring stocks and likely also real estate owners. The dogma of the ECB's market neutrality — purchasing financial assets according to their share in total market capitalization — led to distorting financing conditions of private firms towards carbon intensive activities (Dafermos *et al.*, 2020; Fontan, 2017; Fontan *et al.*, 2018; Matikainen *et al.*, 2017; van 't Klooster and Fontan, 2019). This might potentially have slowed down the energy transition and goes contra policies decided by democratically elected government. Further it fosters financing of carbon intensive activities and therefore increases climate-related financial instability risks (Dafermos *et al.*, 2020).

As it has economic, financial, environmental and social consequences, market “neutrality” is neither market and politically neutral. It is a pure ideological fiction grounded in an understanding of the market as a self-adjusting total whole isolated from society and conveyor of an absolute truth agents and institutions should abide by. This understanding of the market is naïve even within the neoclassical core framework as it ignores the non-systematic convergence towards equilibrium of perfectly competitive markets (Debreu, 1974; Mantel, 1974; Sonnenschein, 1973). Further, it ignores that markets are social constructs existing in very various forms

³See the chapters of the first section of this book.

and requiring pre-conditions to exist – collective action, political deliberation, law and money. This naïve and abstract understanding of markets leads to treat society as a market auxiliary (Douai and Montalban, 2015; Polanyi, 2001). It does not allow to consider the role of other institutions – including the central bank – in the social construction of markets. Finally, since money is non-neutral and there is no such thing as a market without money, the very nature of money precludes any kind of market neutrality of monetary policy. No more than money neutrality does the concept of market neutrality have any sound conceptual and policy-relevant foundations.

Fourth, depoliticization of central banks – real or apparent – exacerbates the lack of democratic legitimacy in an era where central banks have increasingly ventured into the political realm through their expanding powers after the 2007 crisis. The post-crisis action of central banks reflected a stronger sense of accountability before the financial industry rather than before citizens, as central banks' independence is seen as a credibility signal sent to financial markets (Fontan *et al.*, 2018).

Fifth, not only is political independence of central banks problematic in a world where money is a social relation resting on political compromises. It is equally problematic in a world of endogenous money supply. The determination of the money supply by the volume (how much money is demanded?) and of its destination by the composition (for what purpose is money demanded?) of economic activity creates *de facto* a structural tendency for central banks to be a responsive rather than a prescriptive institution regarding developments of financial markets and of the productive structure of the economy. In theory, central banks are forward-looking institutions and have a say on economic developments through their refinancing role of banks. In practice, refusing to refinance a bank would be tantamount at creating havoc in the economic and financial system. This say is therefore extremely tenuous, for central banks are essentially limited to accompany economic dynamics rather than to fashion them. This is reflected in their daily operations, which are essentially of a responsive nature. At no point do central banks exert quantitative control over the amount of reserves for that would cause huge fluctuations in the short-run interest rate. They proceed to balance sheet operations to smooth the amount of reserves and ensure that their target interest rate is reached. Central banks accommodate any refinancing need expressed by commercial banks at the target interest rate (Lavoie, 2014).

Political independency of central banks in spite of both the socio-political nature of money and the endogenous money supply is therefore tantamount at *de facto* dependency to the economic and financial system. This is reflected in the influence of the market constituency through the structural power exerted by financial markets over monetary policy and financial supervision (Fontan *et al.*, 2018; G. Vallet, 2019). It is further reflected in the responsive nature of central banks' operations. This calls for a new governance, new objectives and a renewed set of instruments.

4 Renewing central banking: bringing society back in, shifting objectives

These five points indicate that central banks are ill equipped to accompany, let alone foster, positive social changes. Challenging their independence is thus not about re-politicizing them — they never stopped to be political institutions making political choices. It is about rebalancing their politicization in a way that unveils the non-neutrality of monetary policy, and is consistent and evolves with democratically deliberated societal goals, e.g. a social-ecological transformation.

4.1 Central banks' governance and political accountability

Reforming central banks governance and political accountability can be done in two complementary ways. First, ideally, central banks should be politically accountable before parliaments and come back under a more direct control of citizens. Second, immediately, it requires to reform the composition of the various committees. The composition of central banks' committees determines the rationality of central banks in interpreting the information coming from the payment system and in taking their decisions (Aglietta *et al.*, 2018). The composition of committees also favours regulatory capture by vested interest due to sociological and ideological proximity as well as revolving doors between central banks and the finance industry. For instance, representatives of the finance industry are by very far the most numerous in the ECB's twenty-two advisory committees (Fontan *et al.*, 2018; G. Vallet, 2019). As for every place of power, the sociology and career backgrounds of committee members matters.

A renewed governance would combine the necessary technical expertise on

money and finance (which may not only come from economics and finance but also from history, anthropology or sociology) with a wider expertise equipping central banks with the ability to foresee the impacts of their policy on society and the environment. This requires committee members with various backgrounds (also in social and environmental sciences), gendered balanced (G. Vallet, 2019) and ideally of various social and ethnic origins. It further requires to impose a significant and sufficiently high number of representatives outside of the financial industry: Beyond other sectors of the economy, labour unions and environmental organizations should have reserved seats in advisory and executive committees. Some high income countries central banks already exhibit such arrangements. The law regarding the FED's board states that "*the President shall have due regard to a fair representation of the financial, agricultural, industrial, and commercial interests, and geographical divisions of the country*".⁴ The central bank of Australia's board includes members of various public and civil society organizations, including environmental ones.⁵

Without changing anything else to their current legal and operating frameworks, such a shift in representation within central banks' committees would already be an interesting step forward to align monetary policy with societal goals. This would limit the risk for the central bank to be misaligned with social demands and to deepen its democratic deficit. In neoclassical terms, this could be expressed as populating monetary committees in line with the median voter's preferences.

4.2 Emancipating central banks' mandate from price stability: an ecological post-Keynesian view

Dikau and Volz (2019) find that over a sample of 133 central banks, 12% have explicit sustainability objectives in their mandate, 29% have mandate to support governments' policy that may include sustainability goals and 59% have no mandate ensuring they would tackle environmental issues. However, even amongst the latter, central banks could engage with those issues through their traditional objectives of price and financial stability: environmental issues, most prominently climate-related risks, are likely to impact prices and financial outcomes (Battiston *et al.*, 2017; Bolton *et al.*, 2020, Svartzman, this volume). A major concern of cen-

⁴<https://www.law.cornell.edu/uscode/text/12/241>, accessed June 10, 2021.

⁵<https://www.rba.gov.au/about-rba/boards/rba-board.html>, accessed June 10, 2021.

tral bankers, however, is conflicts amongst objectives that may not be all satisfied in the meantime – that is to say trade-offs (Couppey-Soubeyran and Kalinowski, 2021; Weber and Calza, 2021). A major cultural and theoretical shift in the “science” of central banking is thus needed when it comes to the objectives and their hierarchy included in their mandates.

Both the endogeneity of the money supply and the socio-political nature of money pleads for getting rid of the objective of price stability. In theory, inflation can be a monetary phenomenon in two cases: (1) if a net monetary creation occurs in a situation of full employment and full capacity utilization, where the output cannot be increased anymore to match the additional stock of money; (2) if confidence in money decreases to the point where people are reluctant to accept it as the universal unit of account.

The first case corresponds to the monetarist view that posits an exogenous control of the money supply by central banks. This view remains the official central banking doxa and the main source of inspiration of central banks’ mandates despite practices geared towards targeting interest rates instead of the money supply (Fontana and Palacio-Vera, 2003; Fullwiler, 2017). Obviously, in a world of endogenous determination of the money supply, it does not make sense, as post-Keynesians have known for long. The endogeneity of the money supply is now recognized by central bankers (McLeay *et al.*, 2014) and by New Keynesian economists as shown by the replacement of the LM curve by the MP curve (a Taylor rule) in the textbook three equations model (Carlin and Soskice, 2009). However, New Keynesians still consider that monetary policy has a direct impact on inflation through the difference between the central bank’s interest rate and the natural interest rate à la Wicksell. If the central bank’s rate is lower than the natural interest rate, inflationary pressures appear because of over-activity. We see that underlying the natural rate of interest is the same understanding of the market as for the concept of market neutrality. The theory of the natural rate of interest further assumes that the central bank does not affect it by its operations. To the contrary, post-Keynesians deny the existence of a natural interest rate or posit that there exists a multiplicity of it. If there is no such thing as a natural rate of interest, this allows for more creativity in central banking because then the focus can be on something else than inflation (Lavoie, 2014). Finally, even if there were a natural rate of interest, the extent to which the interest rate plays a role in investment decisions and thus on the level of economic activity is uncertain.

It follows that only the second case is of practical relevance. The role of central banks in achieving price stability lies in their action as the guarantor of the monetary regime and of the payment system integrity. As such, central banks ensure the permanence of money as the universal unit of account. It is through their role of enforcing trust in money that central banks act against inflation, not through monetary policy per se. It results from this that price stability needs not be the primary objective of central banking, or even an objective at all. The mere existence of central banks should be sufficient if they are legitimate and credible in their ability to preserve the payment system. To avoid a sudden and potentially destabilizing cultural shock, price stability could remain a cosmetic subsidiary objective for some time. This does not mean that monetary and financial stability should not be objectives of central banks anymore.

Drawing the logical conclusions from the double endogeneity of money, achieving monetary and financial stability lies in the ability to reflect broader social compromises. It is entangled with general socioeconomic stability and other policies, e.g. fiscal policy. However, current central banks' operating frameworks do not allow for addressing these interlinkages (Dow, 2017). Central banks' mandates should, therefore, be geared towards the complementarity of monetary policy with economic, social and environmental policies. This is in line with the post-Keynesian theory of central banking. As Dow (2017, p. 1543) puts it, "*economic and financial stability are the more appropriate primary goals of central bank policy, alongside government, from which monetary stability would follow. (...) Post Keynesian central bank policy includes such factors as concern with the distribution of income and wealth, and concern with the trust in institutions which support money as a social relation.*" An explicit ecological dimension needs to be added. A renewed mandate for a social-ecological central bank could go like this: The mission of the central bank is to achieve economic and financial stability through fostering full employment, social cohesion and relevant economic development within the ecological limits of the planet. The terms social cohesion and relevant will be the place of power struggles, as well as the precise definition of the planet's ecological limits. The exact interpretation of the mandate would thus be the result of the social compromises at play. At least would such a mandate create an institutional space for "*monetary contestations*" (Ould Ahmed and Ponsot, 2015) pushing towards a new monetary regime.

A renewed central banks governance is thus needed to implement such a man-

date, as discussed earlier. Combining this renewed mandate with a renewed governance and political accountability would transform central banks from a technocratic body of monetary regulation to a democratic institution of monetary emission. Further, such a mandate requires to break with the responsive nature of central banks' operations. In what follows, I discuss some instruments in line with such renewed mandate, governance and political accountability.

5 Renewing central banking: instruments for prescription rather than reaction

Despite the critical stance in section 2, the instruments discussed here retain a line of continuity with the proposals surveyed. They can thus appear much less radical than the discussion so far. In fact, they can be as revolutionary if embedded within a politically accountable central bank with appropriate governance and mandate as they can be gently reformist if integrated in current central banking arrangements. Radicalness lies less in the instruments themselves than in the distribution of power over them, in who gets to control them and who gets to decide for what purpose they are used.

In that regard, an important point is the need for a clear and strict taxonomy of activities in terms of their environmental (un)sustainability. A telling example is the European green taxonomy aiming at labelling assets in line with climate, pollution, circularity, natural resources and biodiversity considerations ([EU Technical Expert Group on Sustainable Finance, 2019](#)). It is aptly debated and contested to decide what environmental impact threshold for each category will determine the greenness of an activity, whether nuclear or natural gas should be included, or what is exactly a sustainable management of forest ([C. Vallet, 2021](#)). Also, the taxonomy aims at indicating what is green, but does not indicate what activities are “brown” and harming the European Union’s environmental objectives ([van ‘t Klooster and van Tilburg, 2020](#)). Ultimately, such a taxonomy is therefore the product of power struggles between different interests.

However, the taxonomy approach leaves aside two key issues. First, it does not tackle the issue of the volume of the production. Indeed, an activity can be environmentally sustainable up to some level of production and unsustainable beyond. Underlying here is of course the issue of ecological limits to growth.

Second, and related, the taxonomy approach gives a frame to assess assets in light of environmental standards but does not set clear environmental objectives. These two planning aspects are central to a social-ecological transformation and therefore need to be taken into account in the design of the instruments used by the central bank, in line with renewed democratic legitimacy and mandate. The choice of the taxonomy framing, what is included and what is not, and clear environmental objectives inscribed in monetary policy and aligned with environmental policies are a place of contestations that will determine the extent to which the instruments discussed here would effectively foster a social-ecological transformation.

I will discuss three complementary instruments acting through several channels of monetary policy transmission: (i) differentiated target interest rates to act through the interest rate channel, (ii) credit control to act through the credit channel and (iii) qualitative tightening in APPs to act both through the financial market and fiscal channels. The aim of these instruments is to shape and orient the economy in a given direction. They aim at being market non-neutral: where money enters the economy does matter ([van 't Klooster and Fontan, 2019](#)).

5.1 Differentiated target interest rates

I first argue for differentiated target interest rates to discriminate between sustainable and unsustainable activities, e.g. between the fossil and non-fossil economies. This proposal is not very different from a GTLTRO ([van 't Klooster and van Tilburg, 2020](#)) but would be based on clear and planned environmental objectives and not solely on the compliance of loans and collaterals to a taxonomy of green activities. It would create *de facto* two interbank markets, for liquidities aimed at each type of activities. This would further reveal to the central bank which banks lend to which kind of activity, better equipping the renewed monetary committees to adapt interest rates to reach the mandate objectives in clear coordination with governmental policies.

The system would work as a mix between the ceiling and the floor systems of interest rate targeting ([Lavoie, 2014](#)). On the ceiling side, the amount of clearing balances for loans to unsustainable activities would be set much below the demand for reserves for these loans. Banks in need of refinancing would compete on the interbank market to borrow these reserves, thus pushing the short-term interest rate upwards towards the central bank's lending facility rate on reserves for loans to unsustainable activities. Banks ending up with a net negative position would

borrow from the central bank at this rate, which could be regularly increased depending on the banks volume of lending to these activities and according to clear environmental objectives. For instance, an annual rate of decarbonisation of banks' balance sheet would be set in accordance with a climate objective of 1.5 degrees or less and the central bank short-term interest rate would increase at least according to this decarbonisation rate. Moreover, pledged collaterals not complying with environmental standards would become progressively ineligible as counterparts to liquidities, ensuring that banks would need to have a sufficient proportion of loans to sustainable activities in their balance sheet if they wish to continue lending to unsustainable ones.

Conversely, on the floor side, the amount of clearing balances for loans to sustainable activities would be set in a large excess amount, pushing the target interest rate downwards toward the lending facility rate on reserves for loans to sustainable activities. Banks would normally not need to borrow from the central bank but if they do they would borrow at this rate, which could be regularly decreased according to the evolution of banks' loans portfolio, to the pledged collaterals and to the environmental objectives. For both kinds of reserve, the central bank would then accommodate any bank in need at the corresponding interest rate. From the standpoint of banks, a "shadow" rate would thus emerge as the weighted average of both rates, depending on the volume of each kind of reserves that would be borrowed. The more the banks would lend to sustainable activities, the lower the "shadow" rate and the cheaper they would refinance themselves.

Note that the rate for loans to non-sustainable activities may eventually be infinitum: these activities would simply be denied the right to be financed at some point and excluded from access to money and the payment system. They would thus be removed from the division of labour as accepted by society. Differentiated target interest rates would then send a strong signal to banks as to where their liquidity preference should stand. This would contribute to fixing agents' anticipations and ensure monetary policy transmission through the interest rate channel. Unsustainable activities would face a strong liquidity preference of banks in fear of high uncertainty regarding the future of these activities. Near the end of the social-ecological transformation period, the liquidity preference of banks towards unsustainable activities will turn infinitum, and so the interest rate, when there is no more uncertainty but certainty that these activities will go extinct. Any loan to these activities would be doom to default and therefore be fully illiquid, eventually

turning into a liability to be absorbed by the banks' equity capital. Conversely, banks' preference for liquidity towards sustainable activities would decrease given the lower uncertainty on their future development and the lower default risk triggered by a lower interest rate. Near the end of the social-ecological transformation period, the central bank target rate for banks loans to sustainable activities could converge to zero.

5.2 Credit control

Because differentiated target interest rates work as an incentive but ultimately rely on the will and ability of banks to allocate capital in relevant sectors, it is important to complement them with more coercive measures ensuring that money will effectively flow in the right places. Credit control policies are an effective way to control the direction of their liquidities (Bezemer *et al.*, 2018; Monnet, 2014) and to ensure that this direction matches with democratically deliberated policies and clear objectives, e.g. forcing commercial banks to lend minimum or maximum amount of credit to specific sectors. This was done before in history. For instance, in the post-war French monetary system, the Banque de France controlled the quantity and the direction of credit through the registration of all credits at the National Credit Council. This proved a very effective way to foster reconstruction and credit control measures affected the economy very rapidly (Monnet, 2014, 2019).

Through exerting credit control based on democratically deliberated rules, central banks would be the institution through which society decides who, and for what purpose, is allowed to enter into debt and to undertake a given economic activity. In this perspective, credit control is a way to formalize a debt relation between a particular agent and the society as a whole to carry on an activity socially validated according to some criteria and objectives, e.g. environmental sustainability. It expresses the idea that money embeds a social contract and is ultimately a debt of society to itself (Aglietta and Brand, 2013).

Although powerful, differentiated target interest rates and credit control are, however, insufficient. Indeed, nowadays, central banks' intervention happens mainly through the purchase of financial assets. This development has become very important due to non-conventional monetary policy (Couppey-Soubeyran and Delandre, 2021). It is therefore necessary to act concurrently on APPs.

5.3 Qualitative tightening in assets purchasing programs

Qualitative tightening in APPs consists of restraining gradually but significantly and regularly the universe of unsustainable activities-linked financial assets eligible to purchase by the central bank and symmetrically widening the universe of sustainable assets eligible. To ensure consistency and complementarity of monetary policy instruments, it should be done concurrently with the revision of the collateral framework applying to the lending operations of the central bank as in differentiated target interest rates and credit controls.

With the advent of unconventional monetary policies, the creation of liquidities by the central bank is to a great extent steered by the purchase of financial assets to banks and non-banks financial institutions. This has transformed a whole range of financial assets into quasi-money as the agents emitting assets eligible to APPs anticipate that they will be bought by the central bank and thus consider them as money. If the central bank buys these assets to a bank, it increases the quantity of reserves and thus improves the liquidity of the financial system. If the central bank buys these assets to a non-bank financial institution, it increases both the quantity of reserves and of deposits, thus increasing the money supply as well (Couppey-Soubeyran and Delandre, 2021; Gabor and Vestergaard, 2016). Through APPs, the central bank thus acts effectively as the bank of the financial sector as a whole and not only of banks anymore. In the eyes of the financial sector, the roles of central bank and commercial bank are fused into the central bank. If the central bank can do it for the financial sector, it can do it for any corporate and public sectors.

Qualitatively tightening APPs would, therefore, be a powerful tool to anchor agents' expectations towards the social-ecological transformation through signalling that some activities will not be financed much longer. It is also a way to pass on the risk associated with these activities fully on those who finance them through avoiding assets swaps with sustainable, safer or more liquid assets. In essence, it makes central banks' balance sheet operations prescriptive towards markets as assets linked to unsustainable activities would become ineligible and ensure monetary policy transmission through the financial markets channel. It would also prevent banks from financing unsustainable activities through selling the assets linked to these activities. Finally, qualitative tightening with respect to sustainability further presents the advantage of gradually cleaning central banks' balance sheets from future stranded assets, e.g. carbon intensive assets. This

would avoid any socialization of risks or losses attached to these assets.

Qualitative tightening would affect the volume of APPs to the extent that unsustainable activities dominate in financial markets. The purchase of sustainable assets by central banks, e.g. green bonds, would increase their price and decrease the attached interest rate, thus easing the financing conditions of these activities. In contrast, it would decrease the price of unsustainable assets, e.g. brown bonds, and increase their interest rate, mirroring the dynamics of the target interest rates. Qualitative tightening would thus modify the relative price and rate of return of assets (Tobin, 1969) and be market shaping.

It is important to stress that qualitative tightening should affect all kinds of APPs: not only those for the corporate sector (e.g. CSPPs), but those for the public sector as well (PSPPs). This is a requirement to ensure that the central bank act in coordination with public policies. It is also necessary to reach environmental objectives. The relative shares of the ECB APPs in total asset purchases provide a compelling example, as shown on table 1.

| | ABSPP | CBPP3 | CSPP | PSPP | APP total |
|----------------------------------|--------------|--------------|-------------|-------------|------------------|
| Holdings as of April 2021 | 28,432 | 289,418 | 271,075 | 2,393,239 | 2,982,164 |
| Shares | 0.95% | 9.70% | 9.09% | 80.25% | 100% |

Table 1: Holding of financial assets by the ECB in millions euros at amortized cost. *ABSPP*: asset backed securities purchasing program. *CBPP3*: covered bonds purchasing program. *CSPP*: corporate sector purchasing program. *PSPP*: public sector purchasing program. Source: <https://www.ecb.europa.eu/mopo/implement/app/html/index.en.html>, accessed June 10, 2021.

As we can see, purchases of public sector assets amount for 80% of the total APPs. A direct financing of public institutions by central bank conditioned upon assets eligibility according to environmental and social criteria would thus solve the issue of the financing of the social-ecological transformation and ensure satisfaction of monetary policy objectives through the fiscal channel. Further, as discussed in sub-section 3.2, it would complete the organic link between the central bank and the state through complementing the state guaranty of central banks' capital by direct borrowing by the state from the central bank. It would then give further concrete expression to the transformation of the nature of central banking away from markets logics into politics of enforcing the social contract embedded in money and reflecting social demands and socio-political compromises.

5.4 Complementarity between differentiated target interest rates, qualitative tightening and credit control

There is a strong complementarity between the three instruments. Differentiated target interest rates ensure that a merit order in financing takes place where banks prioritize lending to sustainable activities. Credit control allows central banks to directly monitor and control credit allocation. Qualitative tightening allows to shape the interest rate structure on the bond markets in favour of sustainable activities. It further prevents swapping unsustainable assets for sustainable, safer or more liquid ones and from selling unsustainable assets to the central bank through APPs. Qualitative tightening thus forces agents to bear all the risk attached to these assets.

In the perspective of money as a social relation, gradually tightening and cancelling the funding of unsustainable activities reflects new social compromises supporting a social-ecological transformation and the growing social demand for environmental sustainability. Through these operations, central banks delink unsustainable activities from the social whole through removing them from the social division of labour. These instruments would express the new social compromises inscribed in money, in line with its socio-political nature.

6 Discussion and conclusion: consequences for monetary theory, institutional complementarity and compatibility with a post-growth economy

In terms of monetary theory, it is worth noting that these instruments do not change the endogenous determination of the money supply but may bring some degrees of exogeneity in. Even if central banks can exert some control over the quantity of money in circulation through credit control and take the initiative to create money through APPs, monetary creation within these quantities remains a function of the demand for money. Whatever the architecture of the monetary system, no monetary creation can occur without a socially validated demand for money expressed by economic agents. However, it is true that money creation through APPs brings some ambiguity in the endogeneity/exogeneity distinction:

indeed, the demand for money by agents could be partly triggered by expectations of assets purchase initiated by the central bank.

In terms of institutional complementarity (Amable, 2016), to the extent that unsustainable activities still dominate in the economy, strongly tightening financing conditions for these activities will *de facto* constrain the total quantity of money. It is then clear that this new monetary regime should be implemented within the construction of a new (non/dis-)accumulation regime as a whole. Otherwise, if applied to a business-as-usual economic structure, an institutional mismatch would emerge with the new monetary regime. This would cause major economic turmoil in the form of a big recession due to a lack of financing. In this case, the endogeneity of money would strongly manifest itself through a crisis. There needs to be a dynamic consistency between the monetary regime, the productive structure and other key institutions.

Finally, these three instruments are compatible with a post-growth economy. There is no accounting incompatibility of debt-money and interest rates with a non-growing economy (Cahen-Fourot and Lavoie, 2016; Richters and Siemoneit, 2017). Moreover, embedded in a monetary system functioning according to societal relevance, interest rates can be used as a transformation tool. Credit control is a tool central banks can use to direct commercial banks' credit to relevant activities. There is no reason why it could not be used in a post-growth society if money is created for societal rather than accumulation motives. Qualitative tightening is a tool central banks can use to shift risk-return profiles of given activities and direct their own liquidities towards relevant activities through APPs. It can be used in a post-growth economy as a direct financing mechanism. The compatibility of these instruments with a post-growth economy depends on who controls them and for what purpose. Embedded in the right social relations, they could be the foundation of a social-ecological monetary regime.

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WIRTSCHAFTS
UNIVERSITÄT
WIEN VIENNA
UNIVERSITY OF
ECONOMICS
AND BUSINESS

WU Vienna
Institute for Ecological Economics

Welthandelsplatz 2/D5
A-1020 Vienna

+43 (0)1 313 36 4848
ecolecon@wu.ac.at