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Financial innovation for climate justice: central banks and transformative ‘creative disruption’

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ABSTRACT

Global financial architectures, including central banks and their monetary policies, are critical to leveraging transformative change for climate justice. Yet, currently central banks are exacerbating rather than mitigating the climate crisis and climate injustices. By following a neoliberal policy paradigm and narrowly interpreted mandates for price stability and financial stability, central banks are focusing on stabilizing a system that is inherently unstable. This accelerates climate chaos around the world and is worsening future financial instability. Recognizing both the potential of central banks to advance climate justice and the inattention of the role of central banks in the climate crisis, this paper contributes to the emerging field of financial innovation for climate justice. First, we review what central banks are currently doing to advance and hinder climate justice. Then we explore monetary policy tools that central banks could deploy for transformative climate justice. We then make the case for ‘creative disruption’ in monetary policy which requires expanding the narrow mandate of central banks and new kinds of global coordination. This call for intentional creative disruption changes policy assumptions regarding financial stability and climate politics and reconceptualizes how to achieve transformative systemic change to move toward a more equitable, just, healthy, sustainable future.

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Climate justice; monetary policy; central banks; financialization; creative disruption; financial innovation

If you think that this is too political for central bankers, let me strongly oppose this view: what would be too political is to deny all the evidence gathered by natural and social scientists for the past decades.

– Sylvie Goulard, Deputy Governor, Banque de France

Speech at the conference ‘Frontiers of climate and nature in macroeconomics and finance’, Paris, 24 October 2022





1. Introduction: climate justice and financial innovation

As the climate crisis is destabilizing the lives of most of humanity and worsening inequities and disparities around the world (Deubelli & Mechler, 2021; IPCC, 2022), transformative systemic change for climate justice is emerging as an urgent global policy priority (Kashwan, 2021; Newell et al., 2021; Robinson, 2018; UNEP, 2022). Climate justice, an approach to climate action that goes beyond the mainstream technocratic focus on decarbonization and reducing greenhouse gas emissions, prioritizes social, economic, and institutional innovations that link technical change with societal transformation by centring social justice and economic equity (Stephens, 2022; Sultana, 2022; Thunberg, 2022). A climate justice approach recognizes the huge societal risks associated

with increased social, economic and ecological instability as well as how the climate crisis exacerbates the geopolitical dangers of growing inequities (Harlan et al., 2015; Stephens, 2020). A climate justice approach also attempts to redress the legacy of coloniality, economic injustice, extractive finance, and systems of exploitation that are worsening climate vulnerabilities by instead prioritizing transformative economic investments, social justice policies, and innovative practices (Thunberg, 2022). Climate justice, therefore, requires disruption of the financial and political systems that continue to concentrate wealth and power among privileged individuals and organizations who resist transformative change for the public good (Newell et al., 2021; Schapper, 2018; Sultana, 2022; Whitaker, 2021).

Global financial architectures, including central banks, and their monetary policies, are a major obstacle to advancing climate justice goals because most monetary policy continues to assume a dangerously impractical and unrealistic climate-stable future (Boneva et al., 2022). A fundamental mandate of central banks is to maintain price stability and financial stability, but in a world with inevitable, worsening climate instability this narrow mandate is outdated and needs to change.

Despite a recent effort to expand ‘green’ rhetoric in banking and the finance sector, monetary policy has not yet adequately integrated the inevitable instability of worsening climate

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disruptions (van 't Klooster, 2021). A prevailing mainstream approach to monetary policy (heavily influenced by the neoliberal policy paradigm of 'central bank independence') has also resulted in monetary policies that are not coordinated or aligned with other key policies including fiscal policy (Farley et al., 2013; Sokol & Stephens, 2022), especially in the Global North. This both hinders effective responses to the climate crisis and prevents action towards climate justice. Innovation of global financial architecture is needed to move beyond mainstream market-based 'solutions' and the 'Wall Street Consensus' (Dafermos et al., 2021), and central banks and their monetary policies are central to these innovations. It is increasingly recognized that efforts to address the climate crisis that are not focused on transforming the economy and society are actually perpetuating climate injustices (Thunberg, 2022).

Central banks, as we argue below, are currently exacerbating rather than mitigating the climate crisis because they exert their influence in the economy without sufficiently considering climate impacts or the dangers of perpetuating fossil fuel reliance. Recognizing the critical role that central banks are playing in exacerbating the climate crisis, this paper contributes to the emerging field of financial innovation for climate justice. First, we review what central banks are currently doing to advance or hinder climate justice. Then we explore what other monetary policy tools central banks deploy for transformative climate justice. We then make the case for 'creative disruption' in monetary policy which will require broadening the narrow mandate of central banks, aligning monetary policy with other social policies, and establishing new kinds of global coordination.

The remainder of the paper is structured as follows. Section 2 reviews why central banks and monetary policy are critical to advancing climate justice by outlining the main features of financialized capitalism and highlighting how central banks are central in managing 'financial chains' in the macro-economy. Section 3 explores what central banks are currently doing with regard to the climate crisis reviewing both recent efforts to acknowledge and address the climate crisis and how central banks are exacerbating climate injustices. Despite some recent attention focused on the 'greening' of financial systems, central banks continue to support investment in climate-damaging fossil fuels, while preventing effective action toward climate justice and exacerbating spatial and economic inequities and social injustices. Section 4 provides an overview of what central banks could be doing to advance climate justice if they deployed, in new ways, tools that are already currently available. This section also outlines more substantial monetary policy innovations that have been proposed or could be imagined for more radical societal change toward climate justice. In Section 5, we propose that an intentional 'creative disruption' in financial systems – which could involve the implementation of one or more of the previously reviewed financial innovations or the introduction of new ones – is essential to move onto a path toward climate justice. We argue that this disruption requires broadening the current stability mandate of central banks to acknowledge that in a world of worsening climate chaos, long-term stability requires short-term disruption to steer humanity onto a different path toward a more stable, just, healthy and sustainable future.

2. Financialization, extractive finance and financial chains: the role of central banks

Central banks, public institutions in charge of monetary policy, are key to societal stability yet they remain underappreciated elements of how to respond to the chaos and instability of climate change and how to advance climate justice (Boneva et al., 2022; Kroll, 2022; Langley & Morris, 2020). Financialization, the ever expanding role of finance and debt in society, is constraining societal investments to reduce climate vulnerabilities because of the paralyzing impact of debt on people, municipalities and countries (Zettelmeyer et al., 2022). Financialization has changed the power and influence of banks, shadow banks and central banks (Mader et al., 2020; Walter & Wansleben, 2020) not least because of the prevalence of extractive finance where so many rely on income from the debt payments of others. After the global financial crisis of 2008, the extractive nature of finance and the ways in which financial architecture perpetuates inequality and instability became more apparent (Sokol, 2017). The concept of 'financial chains' was developed to help conceptualize extractive effects of finance (Sokol, 2017, 2023; Sokol & Patacchini, 2020). This approach was developed in response to the lack of analytical tools to analyse what Lazzarato (2012) has described as a 'debt economy' where debt is a 'mechanism for income redistribution' (Lazzarato, 2012, p. 29). The idea of financial chains helps illustrate how key economic actors – including central banks, banks, the state, households, and firms – are linked by the flows of finance (Figure 1). Financialization can be seen as an 'enormous mechanism for managing private and public debt' (Lazzarato, 2012, p. 23). The financial chains approach is more than just following the money (or monetary value) because financial chains represent both channels of transfer of value *and* the social relations of power (Sokol, 2017). As such, financial chains help us see how the (powerful) creditor/lender is extracting value from the (vulnerable) debtor/borrower over time and across space, thus highlighting the operation of extractive finance and its role in exacerbating social and spatial inequalities. It also helps us to see the central role of central banks in sustaining this system.

As economies become more financialized (Lapavitsas, 2013; Mader et al., 2020; Stockhammer, 2008), the critical role of central banks in the economy has become more apparent (Braun & Gabor, 2020; Lapavitsas & Mendieta-Muñoz, 2016; Walter & Wansleben, 2020; Wullweber, 2021). The central role of central banks in safeguarding financial stability has been demonstrated through two major recent crises: the Global Financial Crisis of 2008 (Tooze, 2018) and the Covid-19 pandemic-induced crisis of 2020 (Tooze, 2020a, 2020b, 2021). In both cases, huge unprecedented monetary operations were undertaken with the US Federal Reserve and the European Central Bank alone pumping trillions of US dollars and Euros into the financial system through unconventional policies such as Quantitative Easing (QE) – the large-scale purchases of government and corporate bonds on the financial markets (Ashworth, 2020; Cavallino & De Fiore, 2020). By doing this, central banks have assumed a central position in generating and managing financial flows in the macro-

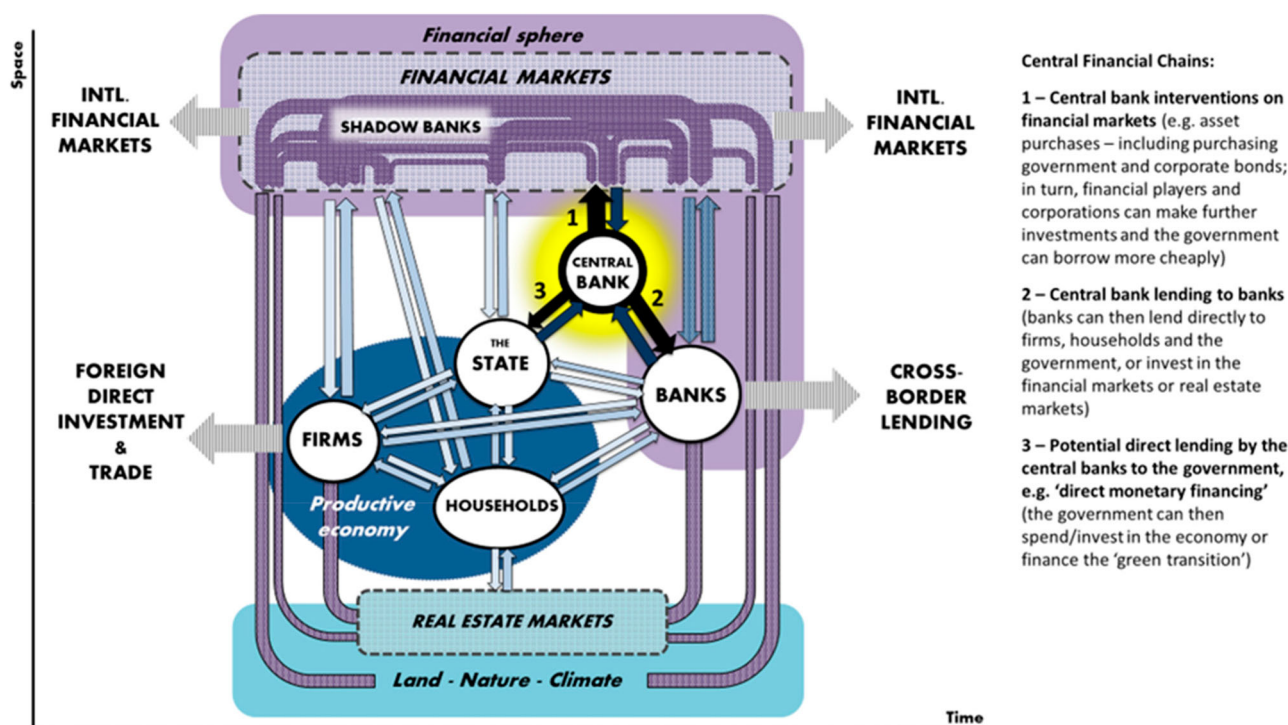


Figure 1. Central banks and financial chains in financialized economies. Source: Adapted from Sokol (2023).

economy (Figure 1). In other words, they have become key controlling nodes in the network of ‘financial chains’ (Sokol, 2023; Sokol & Pataccini, 2022). Without extraordinary central bank interventions, the entire economic system would have collapsed (Sokol, 2023). As recently noted by Tooze (2020b), central banks have power to decide ‘who sinks and who swims’. This also puts central banks and monetary policy in a pivotal role when it comes to climate crisis.

Another important aspect of central banking is the uneven geographical distribution of the impacts of monetary policy. Given the heterogeneity and economic inequities of countries and regions around the world, when central banks apply one-size-fits-all policies within their respective jurisdictions, central banks are inevitably favouring some regions over others (e.g. Sokol & Pataccini, 2022), thus potentially worsening inequities in the distribution of economic, social and climate

impacts. It is also important to recognize that monetary policies can have significant effects beyond the domestic economies they serve. There are international spillovers from each and every adjustment in monetary policy including interest rate changes, lending to banks, exchange rate operations and asset purchases (Figure 2). In this way, central bank actions often have major ripple effects in international financial markets, cross-border lending, foreign direct investment and trade (Figure 1). However, the strength of these international spillovers or ‘side effects’ is dependent on the power each individual central bank has within the international financial system. In this regard, ‘not all central banks are born equal’ (Sokol & Pataccini, 2020, p. 410). Powerful central banks in the Global North are occupying the top of the hierarchy – with the US Federal Reserve (the Fed) in the leading position. This translates into highly asymmetric effects, creating a hierarchy of monetary policy spillovers reflecting the dominance of the US dollar in global monetary architecture (Ca’ Zorzi et al., 2020). In other words, powerful central banks in the West shape ‘financial chains’ (and thus power and wealth inequalities) well beyond their territorial boundaries. Actions by the Fed, the ECB or the Bank of England can decrease or increase financial vulnerabilities of countries and communities in the Global South, many of which are at the frontline of climate change. Indeed, the actions and priorities of these central banks has huge implications for the entire world.

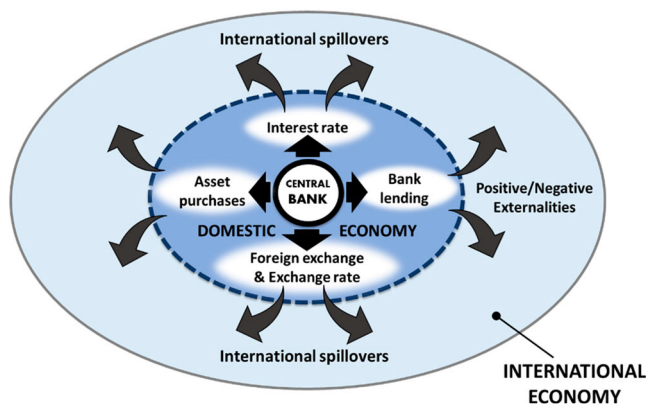


Figure 2. International spillovers of monetary policy. Source: Authors.

3. Central banks and climate (In)action: what central banks are doing now

This section reviews how central banks are currently integrating climate into their action, with a focus on the US Federal

Reserve (the Fed), the European Central Bank (ECB) and the Bank of England (BoE). The section highlights the fact that despite recent attention to the ‘greening’ of the financial system, central banks continue to support investment in climate-damaging fossil fuels. Furthermore, monetary policy under financialization continues to concentrate wealth among corporate interests who then have more power to resist policy action toward climate justice. So in this way, central banks are exacerbating spatial inequities and social injustices and increasing vulnerabilities to climate disruption.

There is a growing debate about how central banks should respond to the climate crisis (e.g. Campiglio, 2016; Campiglio et al., 2018; Corporate Europe Observatory, 2016; Dafermos, 2021; Gabor, 2022; Monnin, 2018; van ‘t Klooster, 2021). Some argue that climate action is not part of central banks’ mandate and that the responsibility for dealing with the climate crisis lies elsewhere (Skinner, 2021). In the United States, climate change has become a divisive political issue, and the Fed is usually considered ‘apolitical’ and ‘independent’ of the rest of the government, so many argue that the Fed shouldn’t get involved in political issues. Despite this resistance, central bankers themselves are increasingly realizing that central banks can no longer avoid or ignore growing climate disruptions if they are to fulfil their primary objectives (Bolton et al., 2020; Carney et al., 2019; NGFS, 2022; Svartzman et al., 2021). It is increasingly recognized that the climate crisis threatens the two main objectives of many central banks: monetary stability (the main element of which is price stability) and financial stability (including the resilience of the financial system as a whole) (Carney, 2021, pp. 90–91).

With regard to the *price stability* mandate (i.e. low and stable inflation), central banks seem to have not yet paid sufficient attention to the volatility of energy systems reliant on unpredictable fossil fuels and food systems that are vulnerable to droughts, floods and other climate disruptions (Chatterji, 2022; Kuttner, 2022). With increasingly complex geopolitics of fossil fuel supply, it is clear that the price volatility of fossil fuels is a major critically important inflationary pressures (Kroll, 2022; Melodia & Karlsson, 2022), as witnessed by the current energy crisis. Given this volatility and the inflationary pressure, it would make sense for central banks to support the phase-out of fossil fuels in society (Chatterji, 2022). In addition to energy, food is another critical commodity and a major contributing factor to price instability. With worsening climate conditions for food production, rising

food prices will add to inflation thus further highlighting the need for central banks to act on climate (Hertel, 2016; Kuttner, 2022).

The climate crisis will also continue to present a major challenge for the *financial stability* mandate unless and until long-term stability, including climate stability, replaces the current interpretation of this mandate which strives for short-term financial stability.

Anticipated financial disruptions caused by the climate crisis are often referred to as ‘Green Swan’ risks (Bolton et al., 2020; Svartzman et al., 2021). These financially disruptive events are projected to be the primary triggers of the next systemic financial crisis (Bingler & Colesanti Senni, 2022) or worse. ‘Green Swans’ (Bolton et al., 2020; Svartzman et al., 2021) are climate-induced ‘irreversible events triggering unpredictable chain reactions that are potentially catastrophic for the economy and financial system’ (Svartzman et al., 2021, p. 564). Echoing the famous concept of the ‘Black Swan’ by Taleb (2007) that foreboded the Global Financial Crisis, ‘Green Swans’ are considered ‘Climate Black Swans’ with a potential to become much ‘more serious than most systemic financial crises’ (Bolton et al., 2020; Svartzman et al., 2021).

The climate threat to financial stability has prompted many central banks to start incorporating climate considerations into their policies and operations (Table 1A). The ECB announced a ‘green shift’ in 2021 as a result of its strategy review (Eliet-Doillet & Maino, 2022). Meanwhile, the Bank of England’s mandate has been recently expanded to include support for the transition to a net zero economy (Dafermos et al., 2022a); this is the first Western central bank to do so. Previously, only a small group of countries (15 out of 135 surveyed) had explicit sustainability mandates – most of them in emerging market and developing country economies (Dikau & Volz, 2021). The US Fed, who has not yet embraced similar actions, seems to be lagging behind in climate action. Nevertheless, the Fed did recently announce it will start stress-testing a few US banks to assess risks under different climate scenarios (McNamee, 2022). These initial steps are all part of a wider movement among central banks to respond to the inevitable climate disruptions that are coming – as witnessed by the emergence of the Network for Greening the Financial System (NGFS, 2022). The Network was launched in 2017 with a handful of central banks (and banking supervisors) and, as of late 2022, comprised 121 members and 19 observers (NGFS, 2022). The purpose of the Network is ‘to share best practices and contribute to the development of environment and climate risk management in the financial sector and to mobilize mainstream finance to support the transition toward a sustainable economy’ (NGFS, 2022). The past few years have seen a surge in ‘green’ activism by central banks, with much faith placed on (macro-) prudential stress-testing of the financial system and systemically-important financial institutions (Table 1A).

There are several major problems with the way central banks are currently integrating climate disruptions into their policies. One issue is that the actions implemented so far simply do not go far enough to result in sufficient changes to reduce climate vulnerabilities. These actions are completely insufficient to encourage transformation of the prevailing

Table 1. What central banks are currently doing.

A. Climate-mitigating policies & actions	B. Actions accelerating climate crisis
<ul style="list-style-type: none"> • ‘Green’ mandate (Bank of England) • ‘Green shift’ (ECB) • Building forward-looking scenarios (the Fed) • Incorporating climate change risk within macro-prudential stress testing • Purchasing green bonds (to a limited degree) • Moves towards ‘greening’ their own balance sheets 	<ul style="list-style-type: none"> • Focus narrowly on (short-term) financial stability in the Global North, not overall (long-term) climate stability • Unconditional quantitative easing (QE) – a subsidy for the fossil fuel industry • Unconditional lending to banks (no ‘green’ criteria attached) • International spillovers increase vulnerability in the Global South • No attention to climate justice

financial landscape, let alone to reduce negative impacts of climate change. The climate stress-testing exercises, for instance, are in their infancy and are, for most parts, exploratory – they do not trigger any hard regulatory rules. It is worth noting in this context that leading central banks of the Global North are doing less ‘green central banking’ than their Global South counterparts (e.g. see Barmes & Livingstone, 2021; Dikau & Ryan-Collins, 2017). In part, this is because central bank independence ‘is not as strongly enshrined’ in emerging and developing economies, thus allowing central banks there to ‘play a broader role in supporting economic development and industrial policy generally’ (Dikau & Ryan-Collins, 2017, p. 8), including fostering green transformation. Some central banks in the Global South have even introduced a form of ‘credit guidance’. For instance, the Indian central bank requires banks to direct a certain proportion of their lending to ‘priority sectors’ (includes renewable energy) and the Bangladeshi central bank set a minimum quota of 5% for banks to allocate to green sectors banks (Campiglio, 2016; Campiglio et al., 2018; Corporate Europe Observatory, 2016; van ‘t Klooster, 2021). Another Global South country that has been ‘in the vanguard’ in developing green banking policies is China (Volz, 2017) whose central bank also leads the G20 green central banking scorecard (Barmes & Livingstone, 2021). In comparison, central banks in the Global North appear to lag behind, constrained by their price stability mandates. This demonstrates another way that neoliberal policy paradigms, such as that of central bank independence, are inhibiting climate action.

A fundamental problem at the heart of the current central bank climate-related strategies in the Global North is that for central banks, ‘it is the financial stability implications of climate change that to date have prompted their governmental interventions and proposals, and not the climate crisis itself’ (Langley & Morris, 2020, p. 1474). To put it crudely, it does not matter if planetary ecosystems are further destabilized, as long as systemically important financial institutions are able to hedge against the associated risks and the financial system as a whole stays more or less intact. The problem with this kind of approach is that eventually this will no longer be possible. Trying to stabilize a system that is inherently unstable is problematic and is leading to all kinds of distortions of priorities. As Svartzman et al. (2021, p. 564, *emph. orig.*) observe, most of the risk associated with ‘Green Swan’ events ‘will remain *unhedgeable* unless a system-wide approach to the energy transition is undertaken’.

Another major problem is that, despite recent attention to the ‘greening’ of the financial system, central banks continue to perform actions that undermine climate efforts (Table 1B). In doing so, they are deepening the climate crisis and increasing the risks of more frequent and severe environmental, economic and financial disruptions. Central banks continue to provide financial support to the fossil fuel industry which allows continued fossil fuel exploration, extraction and production. This has been most recently on display during the Covid-19 pandemic, which saw central banks (including the Fed, the ECB and the BoE) supporting the fossil fuel industry both directly via unconditional quantitative easing (QE) and indirectly via its bank lending operations that lack any

‘green’ conditionality. The direct channel involved the purchase of large quantities of corporate bonds by central banks as part of their QE (via financial chain No 1 in Figure 1). Following the ‘market neutrality’ principle, these purchases simply reflected the current ‘market’ and thus also included a large quantity of bonds of climate-damaging corporations. This effectively amounted to an unconditional direct subsidy for the fossil fuel industry. The so-called ‘market neutrality’ which lies at the heart of central bank operations, and which represents another problematic neoliberal policy paradigm, produces a strong bias toward fossil fuel energy that has been well documented (Boneva et al., 2022; Gabor, 2022; Matikainen et al., 2017). The indirect channel involved central banks lending to commercial banks (via financial chain No 2 in Figure 1) at extremely favourable rates (or even negative interest rates) without any conditions attached. In turn, commercial banks could lend this money as they see fit, including investing in projects that accelerate climate change (see also Kılıç, 2022, p. 572).

Another fundamental issue is that central banks are narrowly interpreting their mandate and attempting to maintain financial stability at all costs. In doing so, they stabilize financial markets and banking systems (and the attendant ‘financial chains’), thus perpetuating financialized systems that increase social inequality and deepen uneven development at various scales. This exacerbates climate vulnerabilities, so central banks are fostering conditions for future instability while compromising climate justice. Furthermore, they focus on safeguarding financial stability in the Global North with little regard to the repercussions their actions will have on Global South. Indeed, financial stability in the capitalist core can be achieved at the cost of economic, social and environmental instability elsewhere, thus destabilizing the system globally. By focusing on maintaining short-term immediate financial stability, powerful central banks of the Global North are leading us towards more volatile instability in the long-run.

Central banks’ powerful influence in energy is a case in point. Although climate science reveals the urgent need to decarbonize human society and transition away from fossil fuels to renewables as fast as possible (Geels et al., 2017; IPCC, 2018, 2021), fossil fuel reliance remains strong, governments around the world are still investing billions of dollars of public funds to subsidize fossil fuels (Coady et al., 2017; Espá & Rolland, 2015; Kotchen, 2021; Sovacool, 2017; Victor, 2009), and the fossil fuel industry continues to resist renewable deployment and plan for sustained, long-term extraction of oil and gas (Li et al., 2022; Trout et al., 2022). The persistence of fossil fuels and insufficient investment toward climate justice results in part from steady finance and investments provided by banks for fossil fuel infrastructure (Elliott & Löfgren, 2022; Rainforest Action Network et al., 2022). This is happening amid strong and steady support from central banks (Corporate Europe Observatory, 2016; van ‘t Klooster, 2021) via mechanisms described above. Not only does the continuing support for fossil fuels worsen the climate crisis, perpetuating fossil fuel reliance is also destabilizing because the high price volatility of fossil fuels destabilizes the economy, in particular by contributing to inflation (Kroll, 2022; Melodia & Karlsson, 2022).

So although central banks are responsible for constraining inflation and stabilizing the economy, most central banks continue to support and perpetuate fossil fuel reliance. This aspect of the design and implementation of monetary policy is counter to climate justice goals (Barnes & Livingstone, 2021) and exposes economies to increased oil and gas shock vulnerability. This goes to show that '[w]hen push comes to shove, arguably central banks will prioritise the stability and growth of capitalism in its present form' (Langley & Morris, 2020, p. 1473). By stabilizing and perpetuating these systems that are unfair, unjust and unsustainable central banks '[can be] part of the climate crisis problem' (Langley & Morris, 2020, p. 1477).

From a climate justice lens, central banks are currently exacerbating human suffering around the world by stabilizing financialized economies in the short-term while delaying the required transformation needed to achieve sustainability in the long-term (Sokol & Stephens, 2022). From a legal perspective, central banks are compromising the human right to a safe, clean, healthy, and sustainable environment (Kılıç, 2022). Yet, central banks have a growing toolbox available to them to act on climate.

4. What central banks could be doing: towards a monetary toolbox for climate justice

With growing awareness about climate disruptions and inadequacies of current central bank (in)action, various organizations and scholars have proposed and explored multiple innovative ways that central banks could support climate action and advance climate justice.

Table 2. Monetary policy for climate justice toolbox: examples of different tools/approaches.

A. Adapting existing monetary tools of central banks for climate justice	B. Creating new monetary tools or structures for climate justice	C. Beyond monetary systems
<ul style="list-style-type: none"> Green quantitative easing (QE), purchasing 'green bonds' (e.g. Boneva et al., 2022; Dafermos et al., 2018; De Grauwe, 2019; Mazzucato et al., 2020) and phasing out fossil fuel industry asset purchases Lending to banks / green collateral (e.g. Abdelli & Batsaikhan, 2022; Dafermos et al., 2022b) Lending to banks / Preferential interest rates (Batsaikhan & Jourdan, 2021; Positive Money Europe, 2022) Green differentiated capital requirements (GDCRs) (Dafermos & Nikolaidi, 2022) 	<ul style="list-style-type: none"> Green World Central Bank (GWCB) and 'ecor' currency (Aguila et al., 2022) Climate Coalition of Central Banks (CCCB), carbon coins (carboni) (Robinson, 2020a; Robinson, 2020b) MMT (Kelton, 2020); direct monetary financing (Diessner, 2020) for green transition without creating debt (see Sokol & Pataccini, 2022) Climate bailout (Kroll, 2018) Central bank digital currency (e.g. Varoufakis, 2021) Democratic transformation and fundamental repurposing of central banking (Langley & Morris, 2020) 	<ul style="list-style-type: none"> Beyond money (Nelson, 2022) Non-capitalist and post-capitalist systems Eco-socialism

In line with the view of Langley and Morris (2020, p. 1471) that central banks 'seem crucial to achieving a genuine step-change in the governance of the climate crisis', this section outlines ideas and proposals that potentially may achieve that. These could be grouped under three headings (Table 2). First, concrete proposals have been put forward that use already existing tools and adapt them for climate justice action. Under the second heading come proposals that suggest creating new monetary tools or new structures. Third, there are suggestions that go beyond monetary systems altogether.

Within the first group (Table 2A), one finds proposals that advocate various forms of 'green QE'. This could entail central banks buying large quantities of 'green' bonds, while also phasing out purchases of assets related to fossil fuel industry (e.g. see Barnes & Livingstone, 2021; Boneva et al., 2022; Dafermos et al., 2018; De Grauwe, 2019; Langley & Morris, 2020; Mazzucato et al., 2020). This would entail central bank using financial chain No 1 as a channel to shape financial markets as depicted in Figure 1. Another set of proposal involves tweaking collateral frameworks to favour green assets (e.g. Abdelli & Batsaikhan, 2022; Dafermos et al., 2022b). Yet another idea is to introduce preferential interest rates when lending to commercial banks for 'green' purposes (Batsaikhan & Jourdan, 2021; Positive Money Europe, 2022). Of course, this could be accompanied by phasing out lending for fossil fuel expansion and other polluting activities. Finally, Dafermos and Nikolaidi (2022) put forward a proposal for Green differentiated capital requirements (GDCRs). This would ensure that capital requirements (i.e. the regulatory requirement for banks to hold sufficient capital against possible risks) would be weighted according to environmental/climate risks, thus incentivizing banks to support green transition by moving away from carbon-intensive investment or lending. All these proposals would shape financial chain No 2 between the central bank and commercial banks, with implications for the rest of the economy (Figure 1).

The second group of proposals (Table 2B) consist of suggestions that go beyond the existing monetary tools and/or structures. Here one can highlight a recent proposal by Aguila et al. (2022) for the Green World Central Bank (GWCB) and new 'ecor' currency, building on Keynes' ideas for International Clearing Union (ICU) and 'bancor' currency. The 'ecor' would be a special purpose money that could only be spent for social-ecological projects. Meanwhile, in a similar vein, Kim Stanley Robinson has alluded to the Climate Coalition of Central Banks (CCCB) and 'carbon coins' (carboni) as a way forward (Robinson, 2020a; Robinson, 2020b). Under this proposal, everyone in the world who is sequestering carbon (individuals, municipalities, whole countries) would be paid 'carbon coins' for limiting further planetary damage – amounting to a 'carbon QE' (with the new currency freely exchangeable for other existing currencies). In addition to this, in the spirit of Modern Monetary Theory (MMT) (Leclaire, 2023), direct lending by the central bank to the government could also be considered. Proponents of MMT argue a country with its own sovereign currency can create money without worrying about the 'deficit' (Kelton, 2020), with the support of its central bank. This so-called direct monetary financing (Diessner, 2020) represented by financial chain No

3 in [Figure 1](#) could fund a green transition without creating additional debt (Sokol & Pataccini, 2022). This option is therefore different from ‘green QE’, which still leaves the requirement to repay the sums borrowed via bonds issue (and with interest). Another idea worth considering is ‘climate bailout’ (Kroll 2022). Under this proposal, instead of phasing out purchases of fossil fuel assets, central banks would do the opposite: they would purchase all dirty fossil fuel assets and subsequently close down their operations, while also forcing investors to use the bailout money to invest in clean renewable energy. In addition to this, the idea of central bank digital currency (e.g. Varoufakis, 2020, 2021) is gaining traction and could be used to encourage green transformation. This would entail creating a new financial chain, directly linking the central bank with households (cf. [Figure 1](#)). Finally, Langley and Morris (2020) have argued that for central banks to achieve a genuine step-change in the governance of climate crisis, there is an urgent need for democratic transformation and fundamental repurposing of central banking.

The third group of ideas ([Table 2C](#)) revolve around envisioning systems that go beyond monetary arrangements altogether and towards non-capitalist, post-capitalist or ecosocialist systems. It is unclear what precise role, if any, central banks would assume in a new post-capitalist economic system. Indeed, some proposals in this vein argue for the need to abandon money as an organizing principle of the economy altogether. Most recently, one such suggestion to go ‘beyond money’ has been put forward by Anitra Nelson (2022). Drawing on postcapitalist, ecosocialist, feminist, ecoanarchist, Marxist and degrowth ideas, she proposed a radical version of liberated ecological communities without money. Such communities would be democratically-run and striving for self-sufficiency in meeting its members’ needs, while also entering exchange arrangements with other communities. While the viability and practicality of such a vision is uncertain, it is clear that achieving ecological health and human well-being will not be possible by maintaining continuous economic growth (Hickel & Kallis, 2020). A fundamental reorganization of our economic system is therefore required, and central banks can play an important role in catalysing and structuring the much-needed change.

5. ‘Creative’ financial disruption: towards climate justice

The wide-ranging array of proposals above demonstrates a formidable toolbox of financial innovations for central banks to reduce, rather than worsen, the risks of climate crisis. To move on a path toward climate justice, transformation of the financial system is necessary. Rather than allowing central banks to continue to destabilize the economy by using the same old tools in a futile attempt for short-term stability, we propose an intentional ‘creative disruption’ in financial systems. By implementing one or more of the financial innovations mentioned above, the central banks could move the finance onto a path toward climate justice. We argue that this disruption requires broadening the current stability mandate of central banks to acknowledge that in a world of worsening climate chaos, long-term stability requires short-term

disruption to steer humanity onto a different path toward a more stable, just, healthy and sustainable future.

Following Minsky (1986), we contend that contemporary financial systems are inherently unstable as they are. Financialization has made them even more volatile – as witnessed by the Global Financial Crisis of 2008. Now, with more frequent and intense climate disruptions, another major financial crisis is almost guaranteed – probably in a form of a Green Swan event mentioned earlier. So, rather than anxiously waiting in anticipation of the next inevitable financial crisis, we argue that central banks should, with international cooperation, proactively induce short-term ‘creative disruption’ (Sokol & Stephens, 2022) of the financial system to put the economy on a new path toward a more equitable and sustainable future. Because transformative change is needed, we believe that without some kind of intentional disruption of how financial systems operate, the scale of change that is needed will simply not occur.

This also means tackling head on the so-called ‘climate paradox’ view (Carney, 2021), which suggests that some choices may need to be made between addressing climate change or guaranteeing financial stability. Recent actions demonstrate that when central banks are faced with the above dilemma (see section 3), they have been consistently choosing financial stability over climate stability. This preference for always prioritizing short-term financial stability is accelerating climate change and thus contributing to the inevitability of much bigger financial instability ahead. It is time to resist and reconsider the traditional notion of financial stability and to reclaim and restructure the financial sector toward a more climate just future. Rather than accepting the idea of a paradox or dilemma, we argue that long-term stability requires short-term disruption in the way monetary policy is implemented. Rather than reinforcing an artificial choice between climate stability and financial stability, monetary policy needs to recognize that financial stability will only be achieved in the long-run if environmental, social and economic stability are prioritized.

What we are calling for, therefore, goes pretty much against the prevailing wisdom about how central banks should respond to the deepening climate crisis. Instead of trying to safeguard financial stability at all costs, we argue that central banks should spearhead a short-term ‘creative disruption’ of the financial system to secure a long-term, durable sustainability. ‘Creative *disruption*’ is different from ‘creative *destruction*’ which is anticipated during the low-carbon energy transition (Campiglio, 2016; Campiglio et al., 2018; Corporate Europe Observatory, 2016; van ‘t Klooster, 2021). We are under no illusion that any disruption of the financial system can be messy and will cause human suffering. However, the scale of human suffering caused by perpetuating the current financial structure is rising exponentially. The value of an intentional ‘creative disruption’ compared with just waiting to respond to accumulating inevitable climate disruptions is that an intentional creative disruption can include investing in people and communities in ways that reduce climate injustices and economic inequity. An intentional ‘creative disruption’ can be designed with transparent goals regarding who will benefit and who will bear the costs of the disruption. By restructuring

monetary policy to directly benefit ordinary people, workers and families while constraining corporate profits and wealth accumulation, central banks can redirect financial flows in society to reduce climate chaos and human suffering. This approach will be in contrast to previous crises in which the costs of financial disruptions fell disproportionately on those already more vulnerable and disadvantaged, while central banks helped to protect asset-rich classes and the top 1%.

One way to protect workers and families from any adverse effects of ‘creative disruption’ would be through direct monetary financing of households – either using financial chain 2 (Figure 1) to channel electronically-created money directly into people’s bank accounts or by establishing a new financial chain directly linking the central bank and households. Another option would be to offer central bank loans to households for specific climate-related purposes at negative interest rates, thus effectively subsidizing selected socio-economic groups to foster the ‘green’ transformation while reducing overall inequality in the society. For example, negative interest rate financing for low-income households could incentivize solar energy deployment to replace fossil fuel reliance. Political resistance to these kinds of ideas could be expected, but as vulnerabilities and inequities continue to grow implementing different reimagined mechanisms to support and invest in marginalized communities and vulnerable households will be essential.

Also, a ‘creative disruption’ would need to be implemented and coordinated *globally*, while adhering to climate justice principles. In other words, we call for a new kind of international financial coordination of monetary policy that recognizes, and compensates for, the international currency hierarchy and the unequal financial conditions between the Global North and Global South. Indeed, a new era of cooperation among and between central banks is required to tackle climate vulnerabilities of people and communities around the world including a new type of international coordination between central banks in the Global North and Global South (see also Svartzman et al., 2021).

As part of the ‘creative disruption’, we argue that for monetary policy to be effective in addressing climate disruptions it must adopt a climate justice approach in such a way as to integrate climate action with social, economic and environmental

justice. In practical terms this means that monetary policy must be aligned with and support a range of other policies including fiscal policy, energy policy, industrial and trade policy, territorial development and spatial planning policy, housing policy, food policy, water policy, public health policy, social welfare policy, gender equality policy and other social policies that are influencing climate vulnerabilities of people and communities around the world (Figure 3). New coordinating mechanisms and increased investment in cross-cutting public sector offices would have to be developed to ensure the alignment between such a wide array of policies. It remains to be seen how this new governance structure could be enacted, but it is clear that the days of closed-door decision-making of central banks need to end. At a minimum, monetary policy decision-making bodies need to expand to include a diversity of constituents from different segments of society to guarantee that decisions are transparent, just and that adverse effects would be anticipated and compensated for.

In public policy research, the concept of ‘policy-mixes’ describes alignment and combinations of different policy instruments designed to interact to achieve a larger common policy goal (Howlett & Rayner, 2007; Rogge & Reichardt, 2016). Recent scholarship exploring societal transformation for sustainability demonstrates that policy mixes are required to destabilize existing regimes while creating space for innovative alternatives, described as processes of creative destruction or disruptive innovation (Kivimaa & Kern, 2016). Given the intersecting and cascading impacts of climate disruptions, a comprehensive agenda for large-scale transformation toward climate justice has to include a combination of policy instruments that result in coordinated investments in reducing climate vulnerabilities while simultaneously resisting fossil fuel extraction and reliance and supporting investment in a more equitable, healthy and renewable-based future.

It is also becoming clear that current scholarship on socio-technical transitions for sustainability (including the multi-level perspective) needs to integrate financial system innovations (Naidoo, 2020; Geddes and Schmidt, 2020). Not only does finance need to be considered to support sustainable transformation, but financial systems are themselves in urgent need of transformation. More attention to finance and financial system innovation is critically important in the field of sustainable transformation. Given the urgency for change, an intentional ‘creative disruption’ catalysed by central banks would be a legitimate and effective way to kick-start the process.

Clearly, implementing a ‘creative disruption’ would be challenging in multiple ways. For instance, and importantly, central bank mandates are currently geared, via price stability, towards economic growth (Kılıç, 2022). Growing awareness about the impossibility of sustained economic growth in a world with planetary boundaries has resulted in acknowledgement of a new economic model that gets beyond growth (Raworth, 2017) or even focuses on ‘de-growth’ (Hickel & Kallis, 2020). The mandates of central banks could therefore be radically altered and ‘central bank independence’ (and its focus on inflation) could be abandoned in favour of socially and environmentally-defined goals. It is also possible that some monetary policy measures to be implemented could produce

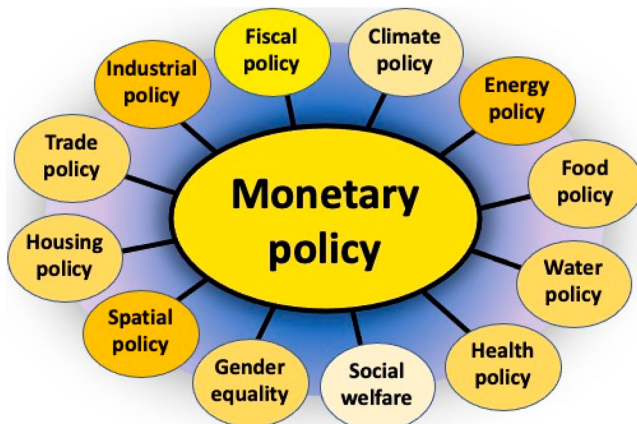


Figure 3. Monetary policy: alignment for climate justice. Source: Authors.

undesirable outcomes (e.g. ‘green QE’ may temporarily lead to increased inflation). Here, it would be crucial to ensure that any negative side-effects of creative-disruptive monetary policy would be compensated for by other policies (fiscal policy, social welfare policy, etc.) within a coordinated policy mix framework – always ensuring that low-income working people, women, children, elderly, vulnerable groups and marginalized communities would be either protected or be better off.

Staunch resistance to climate justice principles and to these kinds of monetary policy changes to improve the livelihoods and wellbeing of vulnerable people and communities can be anticipated especially from those who are privileged and profiting from the current systems. The level of policy coordination proposed here would also be challenging, however desperate times could provide a window of opportunity for investing in these kinds of radical shifts. This also applies to the international level. Indeed, global coordination would be extremely challenging. By prioritizing climate justice principles in the application of these new monetary policy processes, however, less well-off countries in the Global South would benefit from these changes, nurturing a growing sense of global solidarity among countries.

6. Conclusions

As the climate crisis gets worse, the threat of multiple other destabilizing crises are simultaneously expanding. Pandemics, wars, inflation, species extinction and resource scarcities are also destabilizing forces, which means we are living in a time of the ‘polycrisis’ (Tooze, 2022). When facing multiple crises, the simplistic, narrow priorities of the largest central banks in the world are completely insufficient in supporting long-term financial and societal stability. The limits of neo-liberal monetary policies in dealing with the ‘polycrisis’, let alone advancing climate justice, have been fully exposed.

So change is desperately needed to get the world on a batter path – and we argue for an intentional disruption to ensure this change happens. This ‘creative disruption’ is necessary for a change in the mandates and tools of central banks and also for change in how central banks coordinate with other policies and other countries.

By prioritizing social justice and economic equity within a climate justice framework, this paper challenges mainstream assumptions regarding financial stability and monetary policy. We review multiple options for redefining the role of central banks in a world of increasing climate chaos to expand understanding of the centrality of monetary policy in climate change. We argue that until central banks become disrupted so they can be proactive in constraining investments in fossil fuels and supporting investments to reduce climate vulnerabilities, monetary policy will continue to inadvertently accelerate a destabilizing effect on the global economy and on the earth’s climate system.

Given worsening climate suffering throughout the globe, we argue that financial stability can only be achieved if and when there is an intentional ‘creative disruption’ to reset financial systems to align with – rather than be antagonistic to – a more equitable, just, healthy and sustainable future society.

With drastic increases in all kinds of climate vulnerabilities in communities around the world, a new kind of coordination and alignment in monetary policy is required; central banks need to coordinate globally and central banks need to align their policies with domestic and international climate policies, energy policies, housing policies, etc. A new commitment to embracing the concept of ‘policy-mixes’ is essential for the transformative societal changes that are needed for future societal stability.

We are calling for a paradigm shift with regard to how central banks strive for societal stability and also what kind of societal stability central banks prioritize. Rather than narrowly focusing on stability of financial markets that are exacerbating other kinds of societal instability including inequality and the climate crisis, central banks can instead re-prioritize their actions with a goal of stability for people and the earth’s systems. If central banks embraced a goal of stability for people and the planet, then they would immediately disrupt any investments in fossil fuels and they would mobilize in a way similar to how they do in the occasion of a war or a pandemic. The global financial crisis and the pandemic both demonstrated that central banks are prepared to make bold interventions in the economy through monetary means. Unfortunately, these interventions also demonstrated that monetary policy narrowly aimed at stabilizing the financial system perpetuated the concentration of wealth and power and reinforced a system that is profoundly unjust, deeply uneven and inherently unstable. Rather than allowing this to happen again when central banks are forced to respond to climate disruptions, a proactive and intentional ‘creative disruption’ to move the world toward climate justice is needed. Previous crises have demonstrated that leading central banks are able to coordinate their actions internationally. The challenge of global climate justice now requires that the coordination will not only happen among the countries of the Global North, but also between the Global North and Global South. The window for climate action is closing fast. To tackle the climate crisis (and to promote global climate justice) a rapid transformation of societies is needed (Kashwan, 2021; Newell et al., 2021; Robinson, 2018; UNEP, 2022). But such a transformation of societies is impossible without a rapid transformation of the financial system. This transformation of the financial system will only be possible with a transformative ‘creative disruption’ led by central banks.

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