

Monetary Policy for the Climate? *A Money View* Perspective on Green Central Banking

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ABSTRACT

Central banks can potentially influence the investment decisions of private financial institutions, which in turn will create incentives towards green technology adoption and development of lower emission business models. This paper examines how monetary policies can be deployed to promote a greening of finance. To guide the efforts, the paper mobilizes the *Money View* literature. This enables a comparative assessment of different monetary policy options. The main finding is that a promising way forward for green monetary policy is to adopt a strategy of expanding collateral eligibility through positive screening and widening haircut spreads to change relative incentives in favor of green over brown assets.

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[T]he global and all-encompassing nature of this historic challenge means that everybody has to consider how they can contribute. This applies in particular to policymakers, including central banks

(Isabel Schnabel) ¹

How can we get elasticity for the projects we favor, and discipline for the projects we oppose?

(Perry Mehrling) ²

1. Introduction

It has been estimated that if global warming is to be limited to 1.5 degrees, global emissions will need to reach net-zero by 2050 (Robins et al., 2021). A key objective of the Paris Agreement was to make financial flows consistent with a pathway towards low CO2 emissions (UNFCCC, 2016), but financial flows are not on that path at all. Despite decades of concerted efforts to promote sustainable finance (Martini, 2021), by the sector itself as well as by governments and international organizations (Engle et al., 2018), there has been only modest progress. By some calculations, the financial system is effectively “funding temperature increases of over three degrees centigrade” (Carney, 2020).

Against this background, Green Central Banking (GCB) has emerged as a novel approach to climate change mitigation. Central bank policy may potentially be an effective way to engineer major shifts in investment allocation, hence central banks are increasingly called upon to take an active role in greening our financial systems (FT, 2021c). By deploying monetary policy and financial regulation to create relative incentives that favor ownership of green over brown assets, central banks could influence the investment decisions of private financial institutions, which in turn would create incentives towards green technology adoption and development of lower carbon-emission business models.

A host of reports have been published by agenda-setting international organizations (BIS, 2020; IMF, 2019; NGFS, 2019; UNEP, 2017) and economists are debating the matter intensely (Brunnermeier and Landau, 2020; de Grauwe, 2019; Eichengreen, 2021; Greene, 2021; Mateos y Lago, 2021; Pisani-Ferry, 2021; Tooze, 2019). Historically, central banks have often intervened at large scale in societal crises, financing wars (Rockoff, 2016) or economic development efforts which in scale and time span have been comparable to what is required to address climate change mitigation (van Tilburg and Simic, 2021). And several initiatives indicate that central bankers are in fact beginning to engage actively. Central banks have established a Network for Greening the Financial System; the Bank of England has formally

¹ Schnabel (2021: 1).

² Mehrling (2018: 2).

adopted a green agenda in its mandate (FT, 2021a); and the European Central Bank has created its own dedicated Climate Change Centre (ECB, 2021), to name just a few examples.

But these are early and mainly symbolic steps, taken in a highly contested terrain. Coexisting with such initiatives is a considerable push-back, not least from within central banks themselves. Prominent central bankers have publicly professed the importance of keeping central banks' green role at a minimum so as not to undermine their commitment to price stability and their independence (Gros, 2020; Knot, 2021; Weidman, 2020; FT, 2021b). The central banking community favor an engagement with climate considerations that is purely defensive; oriented, that is, toward considering how climate change may negatively impact financial and monetary stability.³ It is important to notice that central bankers navigate in a political environment with strong countertendencies. There is stout push-back from dominant players in the financial industry as well as from conservative politicians.⁴ While executives in the financial sector will express support for the objective of increasing funding for renewable energy, many fewer accept that lending to fossil fuel producers should be discontinued. For stakeholders with these views, the prospect of central banks deploying monetary policy tools to change relative incentives in the financial sector to promote the green transition appear almost atrocious. Yet, even within the financial industry and in the central bank establishment, minority voices advocating that central banks do adopt a proactive approach are gathering momentum, not least as it becomes more and more apparent that the hands-off, voluntary climate risk disclosure approach (advocated by Mark Carney and endorsed by the financial industry) is resulting in little more than ever-escalating practices of "greenwashing".⁵

While scholarship on green finance is rich, work on GCB is only just emerging.⁶ And while the few GCB studies that exist discuss the policy instruments that could be deployed, this nascent literature suffers

³ Defensive-oriented thinking is not actually green given that the objective is financial stability not climate change mitigation. But as McConnell et al (2021: 2) note, "the goal of long-term financial stability exhibits a significant overlap with the goal of decarbonizing the economy".

⁴ A prominent example of how these dynamics play out, was the decision by Joe Biden's nominee for the Federal Reserve Board, Sarah Bloom Raskin, to withdraw in response to sturdy resistance to her candidacy from Republicans on the Senate Banking Committee. Raskin had said some months prior to her nomination, that central bankers should "ask themselves how their existing instruments can be used to incentivize a rapid, orderly and just transition away from high-emission and biodiversity destroying investments" (Mayer 2022). To stop any such green tilt in the Fed, the Republicans on the committee "held hostage" not only Raskin's nomination, but also the reappointment of its chair, Jerome Powell, effectively forcing her withdrawal (ibid.).

⁵ The problem of greenwashing (see de Freitas Netto et al 2020, for an overview), known from many sectors, from hotels to soft drinks, is rife in finance too. Ben Caldecott, Director of Oxford Sustainable Finance Programme, lamented, for instance, that so-called green bonds are "a marketing gimmick" that have "very little (if any) positive impact on the real economy" (Caldecott, cited in Thompson 2021: 255). A recent case in point is the global bankers' alliance established at COP26 in Glasgow in November 2021, the *Glasgow Financial Alliance for Net-Zero* (GFANZ), which has been reported to have abysmally failed to address critiques of greenwashing by continuing to allow its members to "maintain their existing investments in coal and other fossil fuels beyond 2023" (Harvey 2022). See section 4.3 for a reflection on how green monetary policy could contribute to addressing greenwashing in finance.

⁶ For reviews of the green finance literature, see de Carvalho Ferreira et al. (2016); Gilchrist et al. (2021); and Kemfert et al. (2020). For literature on Green Central Banking; see Baer et al (2021); Breitenfellner et al. (2019); Campiglio (2016); Campiglio et al. (2018); Carney (2015, 2020); Chenet et al. (2019, 2021); Dafermos et al (2018, 2020, 2021, 2022); Dikau and Volz (2018, 2019, 2021); D'Orazio and Popoyan (2019); Gabor et al (2019); Honohan (2019); Kern and Fischer (2020);

from three key shortcomings. First, there has been little conceptual and theoretical work on green monetary policy instruments and, second, the academic literature tends to focus on only a small subset of potential green monetary policy instruments, as opposed to engaging in a more comprehensive and theory-based assessment. Last but not least, in much of the academic literature there is a tendency to discuss central bank engagement with a proactive agenda in a manner that takes at face value the principle of market neutrality, dismissing a range of otherwise promising policy options on that account (see McConnell et al, 2021). The point of departure of this paper is the opposite premise; that market neutrality concerns should *not* be a constraint when devising a green monetary policy strategy.

The overall objective of this paper is to assess the GCB discourse conceptually, from a policy effectiveness perspective. The existing literature tends to either focus on one specific policy option or provide a catalogue of policy options. The aim here is to review a range of green monetary policy instruments, in order to identify a policy mix likely to have a substantial climate change mitigation impact. To be able to assess and discriminate amongst a wide range of monetary policy instruments, identifying the most promising ones for an agenda of GCB, I draw upon the Money View literature.⁷

Empirically, I take as a point of departure the comprehensive review of monetary policy options undertaken by the Network for Greening the Financial System (NGFS). As a testament to the significance of their policy options report it was discussed in an editorial in the *Financial Times* shortly after its publication. In a remarkably direct headline, stating that ‘Central banks should turn green’, the editors spoke of a green revolution in central banking being under way, citing the NGFS report as a sign of “how far things have come” (FT, 2021c).

The NGFS report reviews nine policy options in three overall categories, and although it proclaims not to “give recommendations”, it does nevertheless effectively provide a shortlist of monetary policy instruments suitable for a proactive agenda, as we shall see. Interestingly, the shortlist that results from this paper’s analysis, based on the Money View, turns matters upside down. Notably, adjusted collateral haircuts – disqualified by the NGFS as not of much significance or impact, indeed of “second order” (NGFS, 2021a: 36) – take center stage in the green monetary policy strategy informed by Money View principles. More specifically, the core finding is that a promising policy strategy would be to combine i) an expansion of collateral eligibility through positive screening with ii) a widening of haircut spreads to change relative incentives in favor of green over brown assets, reshaping collateral hierarchies in the process, and iii) tilted asset purchases, to further reinforce that effect. This may be combined with differentiated lending rates for counterparties, according to the share of low-carbon assets in the collateral they pledge to access funding.

The paper is structured as follows. First, I account for the green monetary policy review by the NGFS (section 2). This is followed by a brief exposition of the Money View, leading to an identification of

Krogstrup and Oman (2019); Matikainen et al (2017); McConnell et al (2021); Monasterolo and Raberto (2017, 2018); Monnin (2018); Park and Kim (2020); Schoenmaker (2019, 2021); Svartzman et al (2021).

⁷ On the money view, see Mehrling (2011; 2012; 2013a; 2013b; 2014; 2015; 2016; 2017; 2018; 2020).

principles for effective green central banking (section 3). Then follows an analysis of three different proposals for environmentally calibrated collateral haircuts, leading to the proposal of a fourth (section 4). The final sections offer a discussion of the market neutrality principle (section 5) and a few concluding remarks (section 6).

2. Greening Monetary Policy

2.1 NGFS: The Monetary Policy Options Review

The NGFS was established in 2017 by eight founding members, with a secretariat hosted by Banque de France, but in just a few years its membership exploded. The membership now stands at more than one hundred central banks and financial supervisory authorities across five continents.⁸ In its mission statement, the NGFS stresses that its overarching purpose is to help strengthen “the global response required to meet the goals of the Paris agreement” and, importantly, to enhance the role of the financial system in “mobilizing capital for green and low-carbon investments” (NGFS, 2021b). To deliver on these objectives, the NGFS “defines and promotes best practices to be implemented within and outside of the Membership” (ibid.).

The NGFS has engaged with the defensive agenda – pondering how to best prepare for and tackle the potential negative consequences of climate change for financial stability – as well as with the proactive agenda, contemplating ways that monetary policy instruments could be calibrated to help mitigate climate change. Among the most important contributions of the NGFS was the publication in March 2021 of a comprehensive report reviewing monetary policy options for a world subject to global warming (NGFS, 2021a). It was the first time that official central banking discourse took the leap into a proactive approach. The nine options that the NGFS identified came in three overall categories: credit operations, collateral policy, and asset purchases (see Table 1).

⁸ In addition to full members, there are 16 intergovernmental organizations participating as observers, including the BIS and the IMF.

Table 1. Green monetary policy options

<i>Category</i>	<i>Option</i>	<i>Description</i>
Credit operations	1) Adjust pricing to counterparties' climate-related lending	Interest rate conditional on contribution of counterparty's lending to mitigation of climate change
	2) Adjust pricing to composition of pledged collateral	Interest rate lower if counterparties pledge a higher proportion of low-carbon assets as collateral
	3) Adjust counterparties' eligibility	Access to (some) lending facilities conditional on a counterparty's climate disclosure and/or its low-carbon investments
Collateral policy	4) Adjust haircuts	Adjust haircuts to better account for climate-related risks
	5) Negative screening	Exclude otherwise eligible collateral assets if carbon-intensive
	6) Positive screening	Accept collateral otherwise not eligible if green/low-carbon (e.g. green bonds or sustainability linked assets)
	7) Align collateral pools with a climate-related objective	Require counterparties to pledge collateral such that it complies with a climate-related metric at an aggregate pool level
Asset purchases	8) Tilt purchases	Skew asset purchases according to climate-related risks
	9) Negative screening	Exclude some assets or issuers from purchases if they fail to meet climate-related criteria

Source: NGFS (2021a: 5)

2.1.1 Targeted credit operations

The report considers three ways of adjusting central bank credit operations so that they can contribute to a mitigation of climate change. First, with its reference to “adjusting pricing to a climate-related lending benchmark”, the NGFS suggests making the interest rate for lending facilities “conditional on the extent to which a counterparty’s lending is contributing to climate change mitigation” (NGFS, 2021a: 5). Second, the interest rate can be adjusted for counterparties depending on the composition of the collateral they pledge, such that a higher (lower) proportion of low-carbon assets pledged by the counterparty is rewarded with a lower (higher) interest rate. And lastly, access to some lending facilities can be made

conditional, the NGFS proposes, “on a counterparty’s disclosure of climate-related information or on its carbon-intensive/low-carbon/green investments” (ibid).

2.1.2 Collateral policy

The NGFS report discusses four collateral policy options. First, they consider adjusting haircuts to “better account for climate-related risks”, possibly calibrating them in a way that goes “beyond what might be required from a purely risk mitigation perspective... to incentivize the market for sustainable assets” (ibid.). Second, they consider negative screening of certain carbon-intensive assets, making them ineligible as collateral in credit operations with central banks. The third option, on the other hand, makes otherwise ineligible assets eligible, on account of their sustainability impact. Finally, the NGFS considers requiring counterparties to meet certain climate-related criteria at an aggregate pool level; only if a counterparty meets these aggregate criteria for its pledged collateral will they be allowed to engage in credit operations with the central bank.

2.1.3 Asset purchases

Two ways of making asset purchases serve the purpose of mitigating climate change are discussed in the report; tilted purchases and negative screening. The latter option simply consists of excluding assets that fail to meet climate-related criteria (in whatever way defined). Tilted purchases, on the other hand, refers to a strategy of “skewing” asset purchases in such a way that a larger share of them meet certain climate-related criteria.

2.2 Key points of the NGFS review

Each of the nine policy options were assessed on four criteria. Two of these – their risk management contribution and their impact on climate change mitigation – correspond to the defensive and proactive agendas, respectively. The two other criteria were operational feasibility and the extent to which there was a risk that they could impede monetary policy effectiveness.

The NGFS stresses that the report is not giving recommendations.⁹ But the report does identify the four policy options that will likely have the largest climate change mitigation impact, namely i) adjusting pricing to a lending benchmark, ii) positively screening collateral, iii) aligning collateral pools and iv) tilting asset purchases (2021a: 19-20). When combined with their reflections on operational feasibility, this ‘positive list’ is further reduced, however. Aligning collateral pools with a climate-related objective “would typically constitute a new type of rule and would most likely increase complexity”, the report observes (2021a: 41). “Compliance with the criteria would need to be monitored”, the report warns, noting that this would add “an operational burden for both the central bank and monetary policy counterparties” (ibid).

⁹ The report contains no “specific recommendations”, but rather “seeks to identify the strategic choices, general concepts and potential adjustments... that central banks may wish to consider” (NGFS, 2021a: 10).

As for making adjustments to credit operations, the NGFS warns that this could “increase the complexity of central bank facilities” (2021a: 32-33). “Past experience has shown”, they note, “that the higher the complexity of adjusted lending schemes, the lower the likely take-up by banks, and the less effective they may be in achieving their objectives” (ibid.). In sum, these types of price adjustments to credit operations “may involve significant operational, legal and reputational challenges” (ibid). It is difficult not to read the NGFS report as a discouragement of using targeted credit operations as a key tool for green monetary policy.

For the two remaining options on the NGFS’ positive list for proactive green monetary policy – positive screening of collateral and tilted purchases – the NGFS assessment is positive in terms monetary policy effectiveness; none of these options have a negative impact on that criterion (NGFS, 2021a: 7). But for tilted purchases the report notes that there are challenges in terms of operational feasibility.

2.3 Discussion of the NGFS approach

While the NGFS report is clearly important in providing a range of monetary policy options, its main weakness is that it is more of an extensive menu than a policy strategy. As we’ve seen, however, the report does identify the options that are most promising in terms of contributing to a mitigation of climate change. It also goes one step further, assessing those options against further criteria, including operational feasibility and monetary policy effectiveness. This process yields, at best, a small set of preferred green monetary policy instruments, or only one instrument, if all three criteria are combined. In later sections, I undertake my own assessment of the full range of GMP instruments, from a Money View perspective, and identify a quite different policy mix for effective green monetary policy. But to conclude the discussion of the NGFS report, I want to briefly stress a striking aspect of their assessment.

It is of particular interest to the concerns of this paper, that the policy option of adjusting haircuts did not make it to the NGFS shortlist of instruments with considerable climate change mitigation impact. While the NGFS acknowledge that they “can influence the preferences of monetary policy counterparties to invest in, originate, and pledge some assets as collateral”, adjustments of haircuts are likely to only “have a second-order impact relative to the other measures reviewed” (NGFS 2021a: 36). The report then engages in a direct comparison of the climate change mitigation impact of negative screening vis-à-vis adjusted haircuts:

“Since the eligibility of an asset as collateral typically influences its liquidity and market price, negative screening is likely to have a stronger impact than climate-adjusted haircuts”
(NGFS, 2021a: 38).

The reasoning here is surprising for several reasons. First, haircuts influence the liquidity and market prices of assets just as well as eligibility does. In the words of Schoenmaker (2021: 583), “a lower haircut increases the liquidity of the security and reduces the cost of capital” (see more on this in section 4). Second, while the report notes that negative screening essentially amounts to the largest possible haircut (i.e., a 100 % haircut), the relative strength of the impact of the two instruments cannot be reduced to this numerical triviality. I resume the discussion of collateral haircuts in section 4.

3. A *Money View* Perspective on Green Monetary Policy

The Money View is an approach to monetary economics that combines the American institutionalist economics tradition of Young, Hansen and Minsky with the British central banking tradition of Bagehot, Hawthrey, Hicks and Goodhart. In Mehrling's own phrase, the Money View is "essentially a synthesis and restatement of the core ideas of these two traditions, reformulated for present institutional conditions" (Research Outreach, 2022). Conceptualizing banking as simultaneously a payments system and a market-making system, the Money View transcends the boundary between economics and finance and, as such, is particularly well-placed to reflect on central banking challenges in an era of market-based finance.

Distinguishing between what constitutes appropriate policy in normal times and crisis times is standard in central banking discourse. In normal times, effectiveness of monetary policy transmission, market neutrality and risk management objectives take precedence. But in times of crisis, the preservation of financial stability necessitates a departure from those principles (Goodhart et al., 2014). From a Money View perspective, the crucial objective for central banks in such circumstances is to prevent liquidity strains from erupting into a market liquidity crisis.

The conceptual framework of the Money View can help identify which combination of monetary policy tools may strengthen the relative incentives for investing in green assets without causing liquidity strain. In the following, I identify a policy mix that meets the three-fold objective of (i) having a substantive mitigating effect on climate change, (ii) entailing no significant, negative impact on monetary policy effectiveness, and (iii) not causing a contraction of collateral space, with potential negative consequences for market liquidity. But first, a brief introduction to the Money View.

3.1 Essentials of the *Money View*

Addressing monetary policy issues from a money view perspective means taking as a point of departure four core assumptions about contemporary monetary and financial systems. First, actors in the financial and monetary system are subject to a daily settlement constraint. Second, private dealers play a core role in the formation of asset prices in capital markets and hence in supplying market liquidity. Third, money markets and capital markets are closely intertwined through collateral asset valuations. Fourth, all financial instruments from securities and bank deposits at one end, to currency and gold at the other, are constitutive elements of money hierarchies and subject to vertical convertibility, with gold as the most liquid asset and securities as the least liquid.

One of the upshots of these four core assumptions is that haircuts are an integral element of money hierarchies; without them, securities would not be convertible into bank money through repos (Vestergaard and Gabor 2022). The convertibility of assets with different degrees of 'moneyness' in the hierarchy depends on intricate mechanisms of daily collateral valuation and margining (ibid). What this means is that collateral valuation is at the heart of modern systems of market-based finance. This has profound implications. First, backstopping the value of core collateral assets – through dealer of last resort interventions – is the *sine qua non* for crisis management by central banks. And for climate change

mitigation, the implication is that the policy instruments most directly influencing collateral values have to be at the core of any green central banking strategy hoping to be effective.

3.2 Elasticity and discipline

From a money view perspective, the interventions of central banks are seen as either providing elasticity or enforcing discipline on the monetary system (Mehrling, 2015; 2016). The distinction between elasticity and discipline can be expressed also in terms of expansion and contraction of market liquidity. When central banks provide elasticity to the system, market liquidity expands; when they provide discipline, market liquidity contracts. In Mehrling's terminology, discipline relates directly to the 'settlement constraint' that all actors in the monetary system are subject to. "[C]entral banks can relax or tighten the banking system's reserve constraint", Mehrling (2016: 4) explains, thereby "lowering or raising the cost of putting off the day of reckoning". "That's what monetary policy is all about", he notes; "central banks change the settlement constraint faced by the banking system, and the banking system changes the settlement constraint faced by the rest of us" (ibid.).

The reserve requirement is not the only instrument central banks can deploy to affect the settlement constraint of banks, however. "[A] reduction in the haircut of an asset unambiguously lowers its required return and can ease the funding constraints on all assets", Ashcraft et al (2011: 143) note. In fact, each of the two main dimensions of collateral policy – haircuts and asset eligibility criteria – can be seen through a lens of elasticity and discipline; as instruments that can be tailored to engender either expansion or contraction, depending on financial market conditions and desired policy outcomes. Lower haircuts relax the settlement constraint for banks, while higher haircuts tighten it. For asset eligibility there is a similar story. By increasing the range of assets eligible in their credit operations, central banks exert an expansionary effect on collateral space and market liquidity, and if eligibility is decreased, the result instead is contractionary.

3.2 Three Important Lessons for Green Monetary Policy

When it becomes a core objective of central banks to steer capital in such a way that it accelerates the transition towards a low-carbon economy, a combination of the two logics of central bank intervention is needed. On the one hand, central banks should operate in a manner that contributes to rendering market allocation efficient vis-à-vis the objective of promoting a green transition. On the other hand, central banks need to take in to account the market liquidity effects of their interventions, seeking to avoid inadvertent liquidity strains in key parts of the financial system. Liquidity is imperative both from a financial stability and a green transition perspective. Transformation toward low-carbon emission economies will be facilitated by liquidity lubrication but impeded by liquidity strain.

A core principle of the Money View is the notion of an inherent hierarchy of money and the observation that haircuts are crucial in enabling the convertibility of money in the hierarchy. This means that money hierarchies are predicated upon hierarchies of collateral, pledged in the repo operations that ensure the smooth functioning of the money and payment system. This implies, in turn, that there are no other, more

profound effects on monetary and payment systems than those that stem from changes to the underlying collateral hierarchies.

Beyond this key principle of affording a central role to instruments that directly affect collateral hierarchies – such as haircuts and eligibility criteria – two further principles can be derived from the Money View perspective. First, measures that *differentiate* are preferable to those that *exclude*. For instance, tilted assets purchases are preferable to negative screening of brown assets from asset purchase programs. A disciplinary mechanism that operates on a continuum is more effective in changing collateral hierarchies than a binary one (included vs excluded). In its most elementary form, a continuum requires two thresholds that jointly constitute a spectrum from green to grey to brown assets (see more in section 4).

Second, targeting *assets* is preferable to targeting *institutions*. If counterparties are targeted, it will take the form of differential treatment based on the average level of low-carbon assets in the portfolio of those institutions or the collateral they pledge. This will inevitably be a blunt disciplinary modality, since a counterparty could hold a high share of low-carbon assets, but also have a substantial amount of highly carbon-intensive assets and still get the preferential rate. Measures that target institutions should therefore be secondary and only considered in combination with measures that target assets.

3.3 The NGFS policy options revisited

First, the Money View alerts us to the issue of whether a policy instrument is conducive to market liquidity or not. It is of paramount importance that green monetary policies don't cause contraction of collateral assets eligible for credit operations with central banks. This means that negative screening should be avoided. Negative screening of brown assets will reduce the pool of eligible assets, since there are too few high quality green assets in circulation for it to be plausible that positive screening could more than offset the contractionary effect on collateral space of negative screening.¹⁰

Second, for purposes of achieving elasticity in one direction, and discipline in another, interest rates are generally too blunt a tool. But having said that, I depart from a key conclusion by McConnell and colleagues, dismissing interest rate adjustments altogether as an instrument conducive for green central banking purposes. They argue that “the lowering of interest rates might increase investment in the economy as a whole but does so symmetrically for both green and brown investments” (McConnell et al, 2021: 3), but this fails to take in to account the different options that exist for differentiated lending rates based on various sustainability criteria, as outlined by the NGFS.

¹⁰ In addition to its potential contractionary effects, negative screening may also short-circuit ongoing transition efforts of carbon-intensive companies.

It should be noted that for the first and the third of the options for adjusting credit operations that the NGFS considered, the instrument takes the form of a threshold: either the counterparty meets the benchmark or stated criteria or not – and then is given access (option 3) or afforded the preferential lending rate (option 1). In the second option, however, it is conceivable that the interest rate variation could be more fine-grained and continuous, tailored to different shares of low-carbon collateral pledged. On this basis, I suggest that option 2 would in fact be a candidate for an effective green monetary policy mix, if combined with measures targeting assets directly.

Third, when it comes to asset purchases, the tilting approach is preferable to negative screening, as already noted.¹¹ Moreover, positive screening should only be pursued against a high standard for what counts as green and brown assets. If central banks use monetary policy tools to provide financial incentives but fail to do the governance groundwork in terms of ensuring that they are tailored to proper standards and benchmarks, there is considerable risk of boosting greenwashing.

Last but not least, when it comes to collateral policy, adjusting haircuts is preferable to aligning collateral pools and to negative screening, on account of both the generic principles stated above and the more fundamental point about the key significance of haircuts for collateral hierarchies. Since I regard differentiated haircuts as the centerpiece of an effective green monetary policy mix, I devote a separate section to a discussion of the different ways in which this instrument can be calibrated.

4. Using Haircut Spreads to Reshape Collateral Hierarchies

When collateral policy is approached from the perspective of Green Central Banking objectives, the question is not whether to aim for elasticity *or* discipline. We need elasticity for the green assets that we wish to promote, and discipline for the brown projects we oppose, to paraphrase Perry Mehrling. But is this even possible? Can we achieve elasticity in one direction and discipline in another? Can we instigate a collateral expansion in green assets and a collateral contraction in brown assets?

The answer is affirmative. Just as money can be seen as a hierarchy of promises to pay, collateral too can be understood in hierarchical terms. We can understand collateral as a spectrum of assets that have different value when actors meet requirements to secure their borrowing with the central bank. The key question for our concerns then becomes how we may reshape collateral hierarchies in a manner that favor green assets and disfavor brown assets. How can central banks shape collateral hierarchies such that green assets ascend while brown assets descend?

There are three main approaches suggested in the literature, all of which differentiate haircuts in accordance with the carbon footprint of assets (NGFS, 2021a; McConnell et al., 2021; Schoenmaker, 2021). But before we examine them, a brief primer on collateral haircuts is warranted.

¹¹ Schoenmaker (2021: 586) also gives priority to a tilting approach over negative screening.

4.1 Collateral frameworks and differentiated haircuts

Taking as a point of departure the collateral framework of the ECB, the three dimensions that currently determine collateral hierarchies are the residual maturity of the asset, the liquidity category to which they belong, and the credit rating of the asset:

Table 2. Haircuts for different asset categories (fixed coupon)

<i>Credit quality</i>	<i>Residual maturity</i>	<i>LC1: Central government debt</i>	<i>LC2: Other government debt</i>	<i>LC3: Covered banks bonds and corporate bonds</i>	<i>LC4: Unsecured bank debt</i>
High (AAA to A-)	0-1	0.5	1.0	1.0	6.5
	1-3	1.0	1.5	2.0	8.5
	3-5	1.5	2.5	3.0	11.0
	5-7	2.25	3.5	4.5	12.5
	7-9	3.0	4.5	6.0	14.0
	>10	4.5	8.0	9.0	17.0
Low (B+ to BBB-)	0-1	4.0	7.0	8.0	13.0
	1-3	7.5	10.0	15.0	24.5
	3-5	11.25	15.5	22.5	32.5
	5-7	13.0	16.0	26.0	36.0
	7-9	13.5	18.5	27.0	37.0
	>10	13.75	22.5	27.5	37.5

Source: Schoenmaker (2019), based on Annex X of the guideline (ECB/2015/510) on the implementation of Eurosystem monetary policy framework (ECB/2014/60). Note: LC = liquidity category.

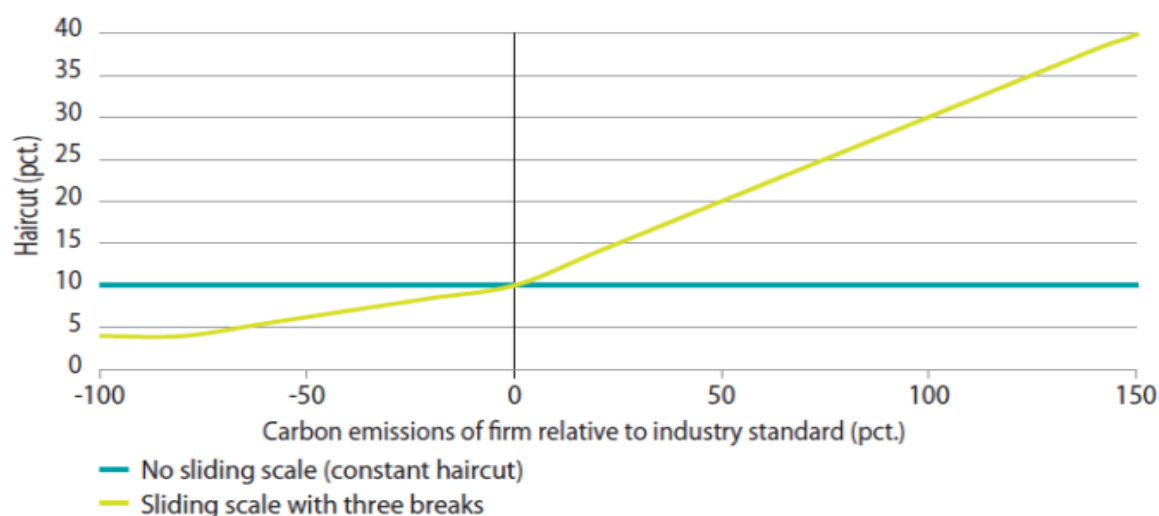
A haircut spread is the difference in haircut assigned for assets that are in the same liquidity category (and have the same residual maturity) but have different credit ratings. For each of the asset categories, the haircut spreads can be widened on a register of greenness vs brownness of assets, adding a fourth dimension to the differentiation of haircuts. How may such a fourth dimension of haircuts be introduced to give collateral hierarchies a green component?

4.2 Existing proposals for greening haircuts ¹²

4.2.1 The sliding scale approach

The NGFS proposed a so-called sliding scale approach (see Figure 1), by which “firms operating in the same economic sector” would be subject to a “haircut add-on (or discount)” that could be applied “to the assets issued by the comparatively more (or less) carbon-intensive firm” (NGFS, 2021a: 36). “Such a scheme would yield a continuous incentive for firms to reduce their emissions”, the NGFS notes, “while safeguarding a level playing field across sectors and sectoral neutrality” (ibid.).

Figure 1. The sliding scale approach to environmentally-adjusted haircuts



Source: NGFS (2021a: 36)

The sliding scale approach combines a reward for green assets with a penalty for brown assets; haircuts are lowered for carbon emissions lower than industry average and heightened at the other end of the spectrum. A key weakness of the measure is that it takes the industry average at face value, effectively treating all sectors equally, regardless of their relative levels of carbon emission. Thus, it is perfectly imaginable that the carbon emissions of a company in the energy sector is below average and yet quite high and indeed incompatible with a net zero by 2050 scenario. For its proponents, however, one of the key attractions of the sliding scale approach is precisely this sectoral neutrality on account of its resonance with the market neutrality principle adhered to by many in the central banking community.

4.2.2 Carbon exposure approaches

McConnell et al. (2021: 1) discuss two ways that haircuts can be tailored to become instruments of green monetary policy: “brown haircuts” and “green hairgrowth”. A brown haircut is an add-on, whereas green

¹² For early work on differentiated haircuts as an instrument for promoting sustainable finance, see Schoenmaker (2019) and Gabor (2020).

hairgrowth assigns a collateral value to low-carbon assets that is higher than its market value. The comparative analysis of the two options inspires the authors to recommend brown haircuts. “Despite ‘green hairgrowth’ having a stronger effect on investment and emissions, ‘brown’ collateral haircuts remain the recommended policy as the former is not necessarily ‘market neutral’ and thus cannot be broadly applied”, they argue, “across central banks” (ibid). They add to this market neutrality argument that “allowing for borrowing in excess of the face value of a loan has no precedent in central banking”, which further reinforces the conclusion that “it is a less favorable instrument than brown haircuts” (McConnell et al., 2021: 6).

Schoenmaker has suggested an alternative model, by which haircuts would be linked to an estimate of the carbon-intensity of assets, categorized in three carbon-exposure buckets (Schoenmaker, 2019; 2021). In Schoenmaker’s proposal, assets are assigned a carbon category (low, medium, high) depending on their level of carbon emissions relative to sales, and additional haircuts are assigned following a “multiplier approach” to ensure proportionality (Schoenmaker, 2021: 586-587). On the basis of these categories, assets are then assigned a 10 % increase of the haircut for assets in the medium carbon emission category and a 20 % increase of the haircut for assets in the high carbon emission category (with no increase of the haircut assigned for assets in the low-carbon emission category).¹³

4.3 Comprehensive, taxonomy-based environmental haircuts

Schoenmaker’s tilting approach to differentiated haircuts – and the proportionality ensured by the multiplier approach – is the most compelling of the three modalities reviewed. In developing a modified proposal, along similar lines, I want to achieve four things additional to Schoenmaker’s carbon emission bucket approach. First, I want a higher level of differentiation, i.e., that the haircut spreads for given categories of assets are wider. Second, I want to apply current haircuts to the middle category of assets on a spectrum from green to grey to brown assets, such that there is a haircut *reduction* for green assets vis-à-vis currently applicable haircuts. Third, I want to explore if an operationalization of the sustainability criteria could be found that would be broader than carbon emissions but narrower than ESG. And last but not least, I want to achieve these three objectives in a manner that at the same time can contribute to reining in widespread practices of greenwashing in finance.

To start with the latter two objectives, I find that by using the EU taxonomy of green economic activities, it would be possible to take into consideration not just climate change mitigation and adaptation, as manifest in carbon emission data, but also the four other urgent environmental objectives (pollution; biodiversity; forests; and water), while at the same time anchoring the reordering of collateral hierarchies in a comprehensive and authoritative standard of what constitutes green economic activity, hence safeguarding against greenwashing practices.¹⁴ The taxonomy could be used in a manner that would

¹³ For the calculus, see Schoenmaker (2021: 589); an 11 % haircut becomes a 12.1 % haircut after adjustment for medium carbon intensity and a 13.2 % haircut after adjustment for high carbon intensity.

¹⁴ For a proposal that the ECB should provide favourable funding only for bank loans that comply with the EU Taxonomy, see Van’t Klooster and van Tilburg (2020).

establish tertiles of assets, as in the model suggested by Schoenmaker, using the Screening Criteria (SC) and the Do No Significant Harm (DNSH) criteria as two thresholds that together define what constitutes green, grey and brown assets. An asset that meets the SCs for one of the environmental objectives without violating the DNSH criteria of any of the other, would constitute a green asset, while assets that violate a DNSH threshold of any of the six objectives would constitute a brown asset. All assets in between would count as grey assets.

How could a system be calibrated around these thresholds, in manner that also delivered on the two other objectives stated above? Table 3 illustrates what the haircuts would be for assets that are similar (same residual maturity and same credit rating) but have different environmental profile (green, grey, brown). The rule applied is that grey assets are subjected to the haircut that currently prevails, whereas green assets are rewarded by a 50% reduction of the haircut that would otherwise have been applied, and brown assets are penalized by a 50% increase in the haircut. In the table, there are listed the modified haircuts for the type of assets that they are most relevant for, namely corporate bonds (i.e., liquidity category 3):

Table 3. Green collateral haircuts for corporate bonds (category 3, fixed coupon)

Credit quality	Residual maturity	Green (>SC)	Grey	Brown (<DNSH)
High (AAA to A-)	0-1	0.5	1.0	1.5
	1-3	1.0	2.0	3.0
	3-5	1.5	3.0	4.5
	5-7	2.25	4.5	6.75
	7-9	3.0	6.0	9.0
	>10	4.5	9.0	13.5
Low (B+ to BBB-)	0-1	4.0	8.0	12.0
	1-3	7.5	15.0	22.5
	3-5	11.25	22.5	33.75
	5-7	13.0	26.0	39.0
	7-9	13.5	27.0	40.5
	>10	13.75	27.5	41.25

There is reason to expect haircuts differentiated in this manner to have substantive reallocation effects. It is difficult, of course, to predict with precision the scope of the impact of skewing incentives as proposed. In Schoenmaker's estimate, his suggested haircut differentiation would result in an estimated 44% reduction of the carbon footprint of a central banks' corporate bond portfolio (Schoenmaker, 2019:

14-15). The haircut spreads proposed here are considerably larger than Schoenmaker's, so the impact on central banks corporate carbon exposure would likely be proportionally larger.

5. Discussion: against 'market neutrality'

The GCB agenda has met considerable intellectual pushback. Key figures in macro-financial governance debates, from Daniel Gros to Barry Eichengreen and Robert Skidelsky, have stressed the dangers for central banks in taking on the climate change mitigation challenge.¹⁵ One of the key objections to proactive green central banking is that it violates the 'market neutrality' principle. This stance is particularly prominent amongst central bankers, but there are several examples from the academic literature too. In their dismissal of the 'green hairgrowth' instrument, McConnell and colleagues explicitly referenced the market neutrality principle. "Despite hairgrowth having a stronger effect on investment and emissions", they said, "'brown' collateral haircuts remain the recommended policy as the former is not necessarily 'market neutral' and thus cannot be broadly applied across central banks" (McConnell et al., 2021: 1).¹⁶

I agree with Schoenmaker (2021: 582) that "the market neutral approach undermines the general economic policy" of governments seeking to achieve a low-carbon economy. In fact, one could argue that since most governments have such objectives, most central banks are currently undermining the climate objectives of their governments because of various forms of carbon-bias in their operations and that, in fact, green monetary policy is a necessary condition if central banks are to align with their mandates in this crucial respect.¹⁷

Interestingly, in his advocacy of environmentally differentiated haircuts, Schoenmaker explicitly distances himself from market neutrality arguments, but nevertheless stressed that any instrument adopted should be objective and transparent, avoiding "favoring of specific projects or setting of sectoral targets, which is an issue for government policy" (Schoenmaker, 2021: 591). This is an important point because arguments about market neutrality and preferential 'picking the winners' practices often gets conflated.

Until recently, the market neutrality principle was essentially beyond dispute, almost a taboo. Over the past year, it appears that some de-sensibilization of this issue is taking place. In their discussion of the NGFS report, the Financial Times editors supplemented the general endorsement with an additional supportive argument with direct bearing on the market neutrality argument. The editors refuted the standard counterargument to proactive GCB, namely that central bank interventions should always be 'market neutral', by stressing that when it comes to climate change, "the market is not neutral but

¹⁵ *Project Syndicate* has been a key locus of these debates, see Gros (2021); Eichengreen (2021); and Skidelsky (2021).

¹⁶ In dismissing green asset purchases, their argument was similar: "While it is plausible that the success of the TLTROs would carry over to GTROs, leading to changes in green and brown investment patterns, the market neutrality principle that many central banks subscribe to, would make GTROs broadly infeasible" (McConnell et al., 2021: 4).

¹⁷ For work on the carbon bias of central banking policies, see the work of Dafermos and colleagues (2020, 2021, 2022) and van't Klooster and Fontan (2020: 873).

distorted by the failure to fully price environmental harms and all central banking affects distribution and capital allocation” (FT, 2021c).¹⁸

There has been a critique of the market neutrality principle even from a key figure of the German central banking establishment, Isabel Schnabel, member of the governing council of the ECB. In a recent speech, Schnabel problematized central bankers’ allegiance to market neutrality as the guiding principle for central bank practices, in ways that would have been difficult to imagine just a few years ago. “While the concept of market neutrality is related to the Treaty”, Schnabel notes, “it is not *per se* a rule in primary law” (Schnabel, 2021: 29). The Treaty does explicitly stipulate that “the ECB should pursue its mandate by favoring an efficient allocation of resources”, Schnabel explains, but the link between market neutrality and efficient allocation of resources breaks down when there are substantial externalities at play, such as when “missing or insufficient carbon pricing mechanisms continue to distort the pricing of climate risks by financial markets, thus decelerating the green transition” (Schnabel, 2021: 7). In this situation, market neutrality leads us astray:

If the market misprices the risks associated with climate change, adhering to the market neutrality principle may instead support a market structure that hampers an efficient allocation of resources. In view of such market failures, it seems appropriate to replace the market neutrality principle by a market efficiency principle. Such a principle would explicitly recognize that a supposedly ‘neutral’ market allocation may be suboptimal in the presence of externalities (Schnabel, 2021: 33)

6. Concluding remarks

The very notion of using monetary policy instruments to skew incentives in favor of green assets over brown assets, the essence of green monetary policy, violates the principle that central bank operations should be ‘market neutral’ – and much of the resistance from central bankers coalesces around this notion. In their discussion of the NGFS report on green monetary policy, however, the editors of the *Financial Times* confronted such reasoning by refuting the standard argument that central bank interventions should always be ‘market neutral’. Dafermos et al. (2020) have argued that if central banks refuse to “distort” markets that are obviously out of sync with the Paris agreement, they effectively reproduce and reinforce the lacking ability of financial markets to tackle the climate crisis. This, in turn, undermines whatever other initiatives and policies governments launch to foster a green transition of our economies.

Critiques of ‘market neutrality’ arguments in the context of debates on GCB are gaining traction, also to some extent within the central banking establishment. Isabel Schnabel, German member of the governing council of the European Central Bank, suggested abandoning the market neutrality principle in favor of a market efficiency principle. The pressure for GCB is likely to mount in coming years and it is by no

¹⁸ The discourse on ‘market neutrality’ is intimately related to the notion of central bank independence. For historicizing perspectives on the latter, see Abolafia (2012); Goodfriend (2007); Marcussen (2009); Sener (2019); Singleton (2011).

means unlikely that eventually central banks will be forced by public opinion to engage in a proactive manner. When that moment comes, the approach outlined here could be a useful way forward.

The NGFS have published an important analytical contribution to debates on GCB with its assessment of how a range of monetary policy instruments could be deployed to promote a transition to a low-carbon emissions economy (NGFS, 2021a). We noted, however, several shortcomings. First, the NGFS assessment is informed mainly by a concern with monetary policy effectiveness, at the expense of other crucial objectives, such as market liquidity. Second, being more of a menu of options, the report stops short of reflecting on the relative usefulness of the different monetary policy instruments it identifies. This is unfortunate, since not all of them are equally promising, and some of them are even potentially counterproductive. These shortcomings are all the more problematic in that the discourse on GCB is met with fierce resistance from many within the central banking community. To help navigate this rugged terrain, I mobilized the Money View literature.

If proactive GCB is to stand a chance against deep-rooted convictions about central bank independence – and against the widespread notion that price stability should always be at the pinnacle of hierarchies of central banking objectives – a shift in policy paradigm is needed. This is what the Money View can underpin and inform. In more concrete terms, two things are needed if a proactive approach to GCB is to gain traction. First, an intellectual armoury that can challenge the current conventional wisdom on central banking, and second; a policy strategy for GCB that is theoretically informed and feasible to implement. Revisiting the GCB agenda from a Money View perspective delivers a new theoretical foundation for thinking about monetary policy, as well as theory-based guidance on devising a policy strategy likely to be effective.

By drawing on the Money View perspective, I discriminate between the policy options listed by the NGFS, identifying the ones most likely to be effective. In essence, the way forward for an effective form of GCB is to adopt a dual strategy of expanding collateral eligibility through positive screening and widening haircut spreads to change relative incentives in favor of green over brown assets. Both elements are important. The first since no major transformation of investment allocation is possible in a context of contracting market liquidity. And the latter because it is the most effective way to reshape existing collateral hierarchies, the *sine qua non* for GCB.

I discuss several approaches to accomplishing a widening of haircut spreads. First, a sliding scale approach could be adopted, using industry emission averages as a benchmark around which haircuts are increased for assets with higher-than-average carbon emissions, or decreased for assets with lower-than-average emissions. Second, haircuts could be tilted according to the carbon-intensity of the assets, as proposed by Schoenmaker (2021). Third, technical screening criteria for green and brown economic activities developed in the EU taxonomy could be used as an upper and lower threshold for differentiated haircuts. I advocated the latter option on the grounds that it would anchor GCB in a comprehensive and ambitious classification of green economic activities.

It is important that GCB does not stand alone, of course. Carbon pricing is essential, as is green public investment.¹⁹ But it is not unreasonable to surmise that strong financial incentives created by environmentally differentiated haircuts, calibrated against proper standards for what constitutes green and brown assets, respectively, would cause a significant contribution towards a greening of finance.

¹⁹ Indeed, one should be mindful of potential “positive synergies” between green monetary policy on one side, and carbon pricing (McConnell et al., 2021) and fiscal policy (Svartzman et al., 2021) on the other.

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