Veblen Institute for Economic Reforms

"The ECB at a time for decisions (2/2)"

The Role of Monetary Policy in the Ecological Transition: An Overview of Various Greening Options

Jézabel Couppey-Soubeyran*

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By including "environmental sustainability" in the strategic review launched in early 2020, the European Central Bank (ECB) signalled that it was taking seriously calls to integrate monetary policy into the fight against climate change and, more broadly, against the ecological crisis threatening our societies and economies. To contribute to this exceptionally important debate, we are publishing two notes on the role of monetary and prudential authorities in the ecological transition.

In this note, Jézabel Couppey-Soubeyran offers an overview of the options available for greening monetary policy, making environmental sustainability a genuine objective of the European Central Bank. On the one hand, "light green" options: these consist in greening the conditions for access to liquidity and asset purchases by the ECB and are all feasible within the current institutional framework or in keeping with its ethos. On the other hand, the bright green option: this would be part of a green policy mix, and would enable the financing of the ecological transition by the central bank in a way that does not fuel debt and safeguards financial stability. This is the option that requires the most institutional change, but is arguably the one that would most advance the ecological transition.

In the previous note, Wojtek Kalinowski and Hugues Chenet propose to overcome the obstacles that have so far prevented central banks and supervisory authorities from taking action.**

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** Authors of Note 1

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The Veblen Institute for Economic Reforms is a non-profit think tank promoting policies and civil society initiatives for the ecological transition. We believe the current economic model is profoundly unsustainable and should be transformed in the spirit of social justice and respect of planetary boundaries.

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SUMMARY

The robust mobilisation of the central banks in the face of the Covid-19 health crisis contrasts starkly with their wait-and-see attitude to climate change and the environmental crisis more generally. And yet, when it comes to this issue, to stand still is to go backwards. By remaining blind to the carbon footprint of the banks it refinances, the collateral it accepts and the securities it buys, the ECB will delay the European Union's climate neutrality target, set for 2050. It would also be jeopardising its own missions, because if the current trend is not reversed, the climate crisis will undoubtedly lead to unprecedented monetary, economic and financial instability.

This note argues that the objective of environmental sustainability should be included in the ECB's mandate. The risk-based approach currently preferred by the monetary and prudential authorities does, indirectly, bring environmental sustainability into play by including it in the prevention of financial instability and treating climate risk as a source of financial risk. A monetary policy approach would go further by making environmental sustainability a genuine objective of the ECB's monetary policy. This means not only renouncing the principle of monetary neutrality, it being far from neutral in terms of climate and the environment, but also making a further commitment to the greening of monetary policy.

The objective of environmental sustainability already exists "implicitly" in the current institutional framework, since climate neutrality by 2050 is one of the European Union's objectives and Article 127 of the Treaty on the Functioning of the European Union expects the ECB to "support the general economic policies in the Union with a view to contributing to the achievement of the Union's objectives, provided that this does not prejudice the objective of price stability". However, it is clear that this implicit goal does not translate to an active commitment to contribute to the ecological transition.

Making this an explicit objective within the ECB's mandate would support the orientation of its monetary policy towards the ecological transition. The greening of monetary policy would then become compulsory, not optional. This would involve giving the ECB a role in the European Union's Green Deal or rewriting Article 127, extending the institutional framework but without fundamental transformation.

There is a fairly wide range of possible operational options for "greening" monetary policy.

- A set of "light green" options, such as the greening of MROs, collateral, TLTROs, or QE, are feasible within the current institutional framework or in keeping with its ethos. What they have in common is that they do not directly involve the central bank in the financing of the ecological transition and, as a result, would give it a more active role than at present, but a limited one.
- The brightest of the "light green" options would be a programme of public asset purchases issued to finance climate investments, the only one in this first set to "facilitate" public investment in the transition, but not actually financing it directly.
- Another option, the "bright green" option, which consists in monetizing the public expenditure necessary for the ecological transition, would make the central bank a major player in the financing of the ecological transition. The central bank's power to create money would then be used to benefit the euro area. This is the option that would best combine monetary policy, fiscal policy and prudential policy in a green policy mix. Only this option would ensure financing that would protect public finances and, because it would not increase debt, would also preserve financial stability, in the same way as

prudential policy. However, it is also the option that requires the most institutional changes, and is therefore likely to be the one that will generate the most opposition.

In order to move towards the "bright green" option, it will probably be necessary to pass through the shades of "light green" first, less for substantive reasons than due to the institutional and political blockages that are not easy to dislodge. As such, this note presents "small steps" within a constant institutional framework, the effectiveness of which remains to be determined but which would allow the ECB to start moving forward, in the context of its strategic review, in the hope that these small steps can set a broader process in motion. It also suggests "larger steps" which, in our view, would greatly advance the ecological transition, but which would require major institutional changes, the decision on which lies not with the ECB but with the European and national parliaments, and which will therefore take some time.

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1. Introduction

At the European Council of 12 and 13 December 2019, all European Union (EU) Member States, with the exception of Poland, endorsed the target of achieving "climate neutrality[1]" by 2050, in accordance with the aims of the Paris Agreement of 2015. The European Commission has enshrined this objective within the framework of the Green Deal and the European Climate Law currently under review, which also revises upwards (from 40% to 55% or even 60%, if the Council ends up following the European Parliament's proposal) the objectives for reducing greenhouse gas (GHG) emissions by 2030.

What role do the ECB and the Eurosystem as a whole have to play here? At the very least, that of not hindering the climate and environmental objectives that the EU is pursuing. Beyond that, their role is to take an active part in accelerating the ecological transition.

The time for decisions is approaching, with the ECB's strategic review currently taking place, in which "environmental sustainability" is one of the six topics on which a strategy will be presented. Whatever the level of ambition chosen by the ECB, maintaining the status quo is no longer an option. Even if the ECB does not necessarily intend to play a leading role in EU environmental policy, it must, at the very least, adapt its actions in response to climate risk. By remaining blind to the carbon content of the securities acquired under its asset purchase programmes or to the carbon footprint of the balance sheets of the banks that refinance themselves through it, or to the carbon footprint of the securities that it accepts as collateral in refinancing operations, it would be working against the objective that the EU is seeking to achieve. And its current missions would eventually suffer. Delaying the ecological transition would only increase the risk of a climate crisis, which would undoubtedly cause tremendous monetary, economic and financial instability.

From this point of view, the principle of neutrality that the European Central Bank (ECB) still applies in its purchases of securities, which are supposed to cover all asset classes and all maturities without any selective approach, is, in a very real sense, an obstacle to the commitments made by the European Union since the Paris Agreement. Therefore it runs contrary to the ecological transition and the interests of the central bank itself. Consequently, the ECB will soon have to abandon this principle, and it should do so as soon as possible.

To take a more active role in the ecological transition, the central bank must not only adapt its actions to the climate risk, but also focus on mitigating this risk and participate in financing the establishment of a low-carbon economy.

For the central banks, there are two possible approaches to climate risk that will result in very different mitigation strategies: one based on the financial risks inherent in climate risk, and the other based on the policy to be implemented to deal with it[2].

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[1] Climate neutrality means that there should be no more GHGs than soils and forests can absorb. See the general public version of the High Council on Climate's September 2020 Annual Report on Carbon Neutrality: "Getting back on track, recovering the transition." https://www.hautconseilclimat.fr/wp-content/uploads/2020/09/hcc_rapport_grand-public_2020_-2.pdf

[2] The distinction made here between the risk-based approach and the economic policy approach (in this case monetary policy) was introduced by Maria Berenguer, Michel Cardona and Julie Evain in an I4CE Climate Report (11 March 2020) "Integrating Climate-related Risks into Banks' Capital Requirements" https://www.i4ce.org/download/integrating-climate-related-risks-into-banks-capital-requirements.

The origins of the financial risk approach can be traced back to Mark Carney's speech on the "tragedy of the horizon" given in September 2015[3]. Since this wake-up call, central banks and supervisory authorities have been approaching climate risk mainly from the perspective of the financial instability it may generate. Within each institution, climate change effectively carries individual risks of loss, transition and liability. On a global scale, and more difficult to grasp at this stage, the "green swan" events that it may generate risk causing a systemic financial crisis (BIS and Banque de France, 2020[4]). Financial fragility and climate change are closely linked (Aglietta & Espagne, 2016[5]).

This first approach has the great merit of having made the monetary and prudential authorities aware of the ecological transition. That in itself is progress. But will it provide sufficient impetus for central banks to act? By subordinating action to the measurement of a risk that is, in fact, incalculable, it actually risks deferring action indefinitely (Kalinowski & Chenet, 2020). At this point, greening monetary policy[6] is crucial to combat climate change. This second approach, a monetary policy approach based on the precaution principle rather than on a futile calculation of risk, would be more conducive to mitigating action. It would mean that monetary policy operations would no longer be conducted regardless of the carbon footprint of the bank balance sheets and assets taken as collateral or purchased by the central bank.

In both cases, environmental sustainability[7] – defined, at least with respect to climate, as the goal of limiting global warming to the level that the IPCC considers sustainable and which should guide all public policies (1.5°C) – will fall within the central bank's remit. But it will do so more or less directly and more or less explicitly depending on the approach chosen. With the risk-based

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[3] Carney, M. (2015), "Breaking the tragedy of the horizon - climate change and financial stability", Speech, Bank of England, 29 September: https://www.bankofengland.co.uk/speech/2015/breaking-the-tragedy-of-the-horizon-climate-change-and-financial-stability

[4] Bolton, P., Després, M., da Silva, L. A. P., Samama, F., & Svartzman, R. (2020), "The green swan. Central banking and financial stability in the age of climate change", Bank for International Settlements & Banque de France, 20 January: "Climate risks can (...) give rise to what we call "green swans", unforeseen events whose impact could go as far as causing a systemic financial crisis. Traditional backward-looking risk assessments and existing climate-economic models cannot anticipate accurately enough the form that climate-related risks will take" (extract from the Abstract); https://www.bis.org/publ/othp31.pdf

[5] Aglietta, M., & Espagne, É. (2016) "Climate and Finance Systemic Risks, More Than an Analogy?: The Climate Fragility Hypothesis" CEPII Working Paper No. 2016-10, April; http://www.cepii.fr/CEPII/fr/publications/wp/abstract.asp?NoDoc=9079

[6] By greening financial regulation, central banks will be able to act on climate risk, or at any rate those, such as the ECB, which have a mandate in this area. However, this note will focus on monetary policy and will not address the greening of financial regulation.

[7] It should be noted that the ECB itself refers to "environmental sustainability" as one of the topics to be addressed as part of the strategic review. This term can, of course, have several meanings and lead to different approaches; the whole point of the debate is exactly what the ECB's choice will be in this respect. In this note, it is used in the sense of the consideration of the physical impacts of economic activities, following the example of "physical risks" as defined by the 2019 guidelines on the European Non-Financial Reporting Directive, which list a number of indicators such as GHG emissions or energy consumption. Another example is given by the European "green" taxonomy, which proposes a more global approach by introducing a double criterion of sustainability: an activity recognised as "green" must contribute positively to one of the environmental objectives listed without "significantly harming" others. In both cases, these indicators apply to the activities of the real economy, but we should remember that the Paris Agreement on climate change establishes an explicit link between climate objectives and the financial system, committing signatory countries to make financial flows "consistent with a pathway towards low greenhouse gas emissions and climate-resilient development" (Article 2.1.c). We should also remember that in February 2018, in response to a question from MEP Paul Tang, then ECB President Mario Draghi stated that the ECB was bound by the Paris Agreement.

approach, environmental sustainability is only an indirect objective, through financial stability. With a monetary policy approach, environmental sustainability would become a genuine objective of the central bank, on a par with the economic and financial stability objectives it pursues in addition to its monetary stability objective.

If we are careful to interpret it correctly, this objective already exists within the current institutional framework, but only implicitly. Indeed, Article 127 of the Treaty on the Functioning of the European Union (EU) states that the ESCB[8] shall support the general economic policies in the Union with the aim of contributing to the achievement of the Union's objectives, provided that this does not undermine the objective of price stability. And since climate neutrality by 2050 is one of the Union's objectives, the ESCB would be acting within its remit by supporting this objective of environmental sustainability. There is no doubt, however, that an explicit objective of environmental sustainability would imply a more ambitious monetary policy that is more focused on transition objectives, bringing to a close discussion on the degree of ambition of the "greening" to be achieved. It would nevertheless involve giving the ECB a role in the EU's "Green Deal" or rewriting Article 127. This would mean a marginal extension of the institutional framework, without fundamental transformation.

The ECB could therefore green its monetary policy by moving beyond a risk-based approach. Calls for this are increasing. However, in order to do so, the central bank will have to consider itself legitimate in pursuing an objective of environmental sustainability. It would be better if this were made clear in its mandate.

Various options are available to the ECB. Not all will contribute in the same way to the ecological transition and its financing, nor have the same institutional implications. This note provides an overview of the possible choices, from "light green" to "bright green" depending on the level of ambition, and discusses the advantages and disadvantages of each.

There are a whole range of "light green" options that would blend seamlessly into the current institutional framework. The aim is to green the conditions for access to liquidity (through the rates or the collateral required) as well as the asset purchase programmes. Although it currently seems that these options are being reviewed and discussed more outside the central banks than within them, it is far from impossible that some of them may emerge, notably as a result of the ECB's strategic review. In an interview with *Le Monde* on 19 October 2020, Christine Lagarde stated her desire to "reflect on what a central bank can legitimately do to contribute to the fight against climate change[9]".

These light green options, if they were to see the light of day, would mainly encourage private investment in the ecological transition and make polluting investments less attractive. However, there is also the question of the financing of public investment in the transition. To boost it, a special public asset purchase programme would be needed, notably to finance a European Green

[8] The term "ESCB" (European System of Central Banks, comprising the European Central Bank – ECB – and the national central banks – NCBs – of the Member States of the European Union) is used here because it is the term used in Article 127 of the Treaty. However, in the remainder of the note, I will instead use the term Eurosystem (including the ECB and the euro area NCBs) or sometimes simply the ECB.

[9] https://www.ecb.europa.eu/press/inter/date/2020/html/ecb.in201019~45f5cf8040.en.html

Deal (with ambitions revised upwards[10]). This would be a way of coordinating European fiscal policy, specifically its green public investment component, and the ECB's monetary policy. The latter would then "facilitate" green public investment, which would be channelled by the State governments. This would be achievable under the current institutional framework, even before the ECB had completely renounced its principle of neutrality, since the greening would be state-led and the ECB would only be facilitating its financing. This option need not exclude other options, and would obviously not be affected by a renunciation of the principle of neutrality.

Outside of the existing institutional framework, another option exists. This "bright green" option would contribute to the ecological transition in a more direct way, since it would finance the related capital expenditure through monetisation without consideration, which would discharge the public debt of this measure. This option is, for the time being, the least audible within the Eurosystem, precisely because it is not feasible within the legal framework of its remit. It would probably, however, be the one that would move the ecological transition forward most rapidly and that would best articulate monetary policy with fiscal policy, placing the former at the service of the latter, without subjecting the expenditure linked to the implementation of the Green Deal to a risk of unsustainable public debt and without fuelling the risk of financial crisis that can accompany massive asset purchase programmes by central banks. If, in the future, the ecological transition is pursued by seeking the best possible combination of monetary policy, fiscal policy and prudential policy, then this bright green greening option would be worth considering.

Changing nothing is no longer an option. In the face of climate change, the status quo is not inertia, but retreat. The history of central banking teaches us that "central banks have constantly adapted to the challenges of the moment" (Jeffers and Plihon, 2020[11]). Let us hope that the ECB will evolve to face the climate challenge with more than just small steps.

2. Climate neutrality, yes, monetary policy neutrality, no!

The idea that central banks are among the actors expected to be involved in achieving the EU's climate-neutral target for 2050 is still not unanimously accepted. This is particularly true among central bankers, due to the neutrality of a completely different sort, monetary policy neutrality, which has long governed their actions. Central bank policy is intended to be macroeconomic in nature, which excludes a priori targeted and sectoral interventions because of the distortions they may cause in the markets.

2.1. The necessary abandonment of monetary neutrality

Until a few years ago, this neutrality was claimed by central bankers as a principle to be respected in their purchases of assets on secondary markets, in order to "limit the potentially distorting

[10] See the Veblen Note "Making the Green Deal work: a social and environmental programme to lead Europe out of crisis", by Wojtek Kalinowski, Julien Hallak & Mathilde Dupré, 21 March 2020: https://www.veblen-institute.org/Making-the-Green-Deal-work-a-social-and-environmental-programme-to-lead-Europe.html

[11] Esther Jeffers and Dominique Plihon, "*Les objectifs écologiques et sociaux font-ils partie du mandat des banques centrales ? Les leçons de l'histoire du central banking*" [Are ecological and social objectives part of the mandate of central banks? Lessons from the history of central banking], Working Paper of the Energy and Prosperity Chair, 16 October 2020; http://www.chair-energy-prosperity.org/wp-content/uploads/2020/10/publication2020_mandat-banque-centrale_jeffers-plihon.pdf

effects of purchases on the functioning of financial markets, while allowing the transmission of monetary stimulus to the economy" (Dalbard & Nguyen, 2018[12]). The attachment to the principle of neutrality is based on the fundamental belief that the markets themselves are a mechanism for optimal capital allocation, which would inevitably be disrupted by public action. This belief was hardly dented by the financial crisis of 2007-2008, despite the extent of the measures that central banks had to deploy to counter it.

Since 2015, in conducting its Asset Purchase Programme (APP), the European version of the Fed's quantitative easing through its Large-Scale Asset Purchase (LSAP) programmes, the ECB has, in accordance with this principle, ensured that its asset purchases are spread out over time, following a monthly schedule and a volume announced in advance, that its purchases of sovereign debt which make up the bulk of this programme (Public Sector Purchase Programme/PSPP) are proportional to the national central banks' share of ECB capital, that it is not distorting the euro area countries' sovereign debt yield curve through its purchases, and that it does not hold more than 33% of each country's outstanding sovereign debt.

A few years before the Covid-19 crisis, this principle of neutrality was still very much alive, even when it came to a central banker's views on the ecological transition. In November 2015, at a conference organised for the opening of COP21, two months after Mark Carney's speech on the tragedy of the horizons that made all his counterparts realise the financial dimension of climate risk, the Governor of the Banque de France, François Villeroy de Galhau, said: "Let there be no mistake about the nature of monetary policy. It should achieve macroeconomic objectives, rather than sector-specific objectives. Quantitative easing therefore does not aim to promote some types of assets over others, but merely to free up capacity to finance the economy[13]."

However, the principle of neutrality is problematic when it comes to climate commitments since it is aimed at the reproduction of existing economic and market structures, which are currently not in line with the objective set by the Paris Agreement of limiting temperature increases to "well below 2°C" by 2100, or, a fortiori, with the EU's commitment to achieve climate neutrality by 2050.

But, to some extent, the management of the pandemic has resulted in a break with this principle, forcing a relaxation of the rules that determined the proportions of public debt that could be held by the ECB (relaxation of the 33% rule and the rule that purchases must be proportionate to share of ECB capital), with some issuers consequently advantaged.

In this context, abandoning the principle of neutrality is easier to justify and it is unsurprising to note that the ECB's discourse is starting to change, now conceding the inefficiency of the market and questioning the principle of neutrality on this basis: Isabel Schnabel, Member of the Executive Board, stated on 28 September 2020 that market neutrality was not the appropriate framework when the market was failing[14]. She echoes the words of the Stern Report (2006) in which climate

[12] Jean Dalbard & Benoit Nguyen, "QE in practice: what does market neutrality mean?", Eco Notepad, Post No. 81, 28 August 2018, Banque de France; https://blocnotesdeleco.banque-france.fr/en/blog-entry/qe-practice-what-does-market-neutrality-mean

[13] Speech by François Villeroy de Galhau, "Climate change: the financial sector and pathways to 2°C", 30 November 2015; https://www.banque-france.fr/en/intervention/climate-change-financial-sector-and-pathways-2degc

[14] The exact quote is as follows: "*In the presence of market failures, market neutrality may not be the appropriate benchmark for a central bank when the market by itself is not achieving efficient outcomes*", and it ends with a footnote referring to the NGO Positive Money's proposal to green TLTROs (see below); https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp200928_1~268b0b672e.en.html

change was presented as "the greatest market failure the world has ever seen". Applying a principle of neutrality in the face of a failing market is to maintain its failure. As a result, central bankers are on the verge of abandoning the principle of neutrality. In October, Christine Lagarde flagged the possibility of taking climate risk into account to guide the ECB's asset purchases, even inviting her counterparts to ask themselves whether they were not taking an excessive risk by believing that it was already incorporated in market prices[15].

So the greening of monetary policy is starting to gain traction. And in any case, for central banks, it's not optional: no matter how climate change is viewed, whether as a source of financial risk or as a macroeconomic disruption, it affects them. It's just that the process may take more or less time, depending on the approach chosen.

2.2. From a risk-based to a monetary policy-based approach

In this respect, it is debatable whether Mark Carney's speech, without underestimating its triggering and mobilising effect, actually encourages the monetary policy approach.

It is rather that his speech paved the way for a "risk-based approach" rather than an "economic policy approach", or more specifically a monetary policy one. The realisation that it provoked led, among other things, to the establishment of the NGFS (Network of Central Banks and Supervisors for Greening the Financial System) in December 2017, which has already resulted in a growing number of studies, almost all of which take a "risk-based approach", aimed at assessing the financial risks induced by climate risk as carefully as possible, at integrating climate risk into stress testing exercises, and at developing scenarios as an extension of the method proposed by the TCFD (Task Force on Climate-related Financial Disclosures) since 2016, which is better adapted to the particular nature of climate risk (very rare occurrence and very high impact).

The risk-based approach is very much predominant in studies and discussions within this network, and the greening of monetary policy is still only touched on. However, there is good reason to believe that the risk-based approach is insufficient, or even futile, if we wait until we have the right model for measuring a climate risk that involves not calculable probabilities but radical uncertainty (see Kalinowski & Chenet, 2020). A monetary policy approach would be more operational in this respect. However, while central bankers are quite willing to accept the necessary greening of the estimation and forecasting methods and indicators they may use in the context of monetary policy, they are, for the time, more cautious about the greening of their monetary policy instruments, which, if accepted, would mean actually assigning to monetary policy the additional objective of "environmental sustainability", in the sense of contributing to the achievement of climate neutrality. For the time being, only the Bank of England has stated that it plans to take the climate into account in its asset purchases[16], over and above the principle of environmentally responsible investment (the SER optic[17]), which seems to be the lever chosen by the ECB for the time being (see below). At best, the risk-based approach allows for the

[15] "ECB to consider using climate risk to steer bond purchases, says Lagarde", *Financial Times*, 14 October 2020; https://www.ft.com/content/f5f34021-795f-47a2-aade-72eb5f455e09

[16] "*La Banque d'Angleterre pourrait prendre en compte le climat dans ses achats d'actifs*" [The Bank of England could take climate into account in its asset purchases], *La Tribune*, 24 September 2020; https://www.latribune.fr/economie/international/la-banque-d-angleterre-pourrait-prendre-en-compte-le-climat-dans-ses-achats-d-actifs-858108.html

[17] Social and environmental responsibility.

inclusion of climate-related elements in financial stability, but it does not make environmental sustainability an objective in its own right.

2.3. Making the objective of environmental sustainability explicit...

To better understand the reluctance of central bankers to take a more head-on approach to climate risk from a monetary policy perspective, it is worth remembering that although central banks, and in particular the ECB, may be independent to a large extent, institutionally (vis-à-vis the political authorities), financially (central banks have their own capital) and, above all, operationally (in the preparation and conduct of monetary policy operations), this independence does not stretch so far as to allow them to set their own objectives, and quite rightly so. In other words, the ECB is free to choose its strategy for achieving its objectives, but this freedom does not extend to setting itself a new objective. Its objectives are enshrined in the Treaty on the Functioning of the European Union[18]. This means, in the ECB's defence and that of the NCBs, that it is quite clearly not up to them to set themselves the explicit objective of environmental sustainability involving the immediate greening of their monetary policy instruments. This task falls to MEPs and legislators.

Admittedly, a broad interpretation of paragraph 3[19] of Article 3 of the Treaty on European Union may lead to the conclusion that a secondary objective of environmental sustainability already exists, in the same way as the secondary objective of economic stability, which may be pursued "without prejudice to the primary objective" of price stability. However, this is clearly not enough for the ECB to feel entitled to orient its monetary policy towards an objective of environmental sustainability and to green its instruments for this purpose. This objective is not yet sufficiently explicit in the ECB's mandate.

In this respect, the parallel with the objective of financial stability, which since the advent of the banking union is explicitly included under the ECB's mandate, is interesting. Before the sovereign debt crisis in the euro area made it necessary to create the banking union, under which the ECB was entrusted with the prudential supervision of major banking institutions (the single supervisory mechanism), the ECB had little involvement in financial stability. However, the definition of "its

[18] The primary objective of the ECB is laid down in Article 127(1) of the Treaty on the Functioning of the European Union as follows: "The primary objective of the European System of Central Banks [...] shall be to maintain price stability". Its objective of economic stability is inferred from the rest of this Article, which states that "without prejudice to the objective of price stability, the ESCB shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union as laid down in Article 3 of the Treaty on European Union". As for the objective of financial stability, it derives from paragraph 6 of the same Article, according to which "the ECB shall assume specific tasks concerning the prudential supervision of credit institutions established in participating Member States", within the framework of the single supervisory mechanism, part of the banking union. The stability and supervision of the financial system is also one of the "other tasks" of the Eurosystem, contributing to the smooth conduct of policies pursued by the relevant authorities. This dual mandate was referred to by François Villeroy de Galhau on 25 September 2020 in his keynote address at the Official Monetary and Financial Institutions Forum https://www.banque-france.fr/en/intervention/role-central-banks-heart-ecosystem.

[19] "The Union shall establish an internal market. It shall work for the sustainable development of Europe based on balanced economic growth and price stability, a highly competitive social market economy, aiming at full employment and social progress, and a high level of protection and improvement of the quality of the environment. It shall promote scientific and technological advance."

other tasks" could already justify a contribution in this area. As early as the financial crisis of 2007-2008, and therefore before, in the case of the euro area, it degenerated into a sovereign debt crisis, there were plenty of good reasons for greater central bank involvement in financial stability[20]. What's more, financial stability is actually one of the original tasks of the central banks[21], since practically all of them were created to restore order at a given moment of monetary or financial instability. But the doctrine of central banks in the years 1990-2000 dictated otherwise. The principle of separation that underpinned it, and which bears some responsibility for the germination of the 2007-2008 financial crisis, made monetary stability the overriding objective and virtually erased financial stability from the mandate of central banks, beyond the very indirect contribution that central banks believed they were making to it in pursuing their objective of monetary stability[22]. This was even more obvious for the ECB, which took office in 1999, than for the Fed, insofar as the ECB's mandate was formulated in a hierarchical manner (monetary stability first, followed by economic stability where that does not compromise the main objective), whereas the Fed's mandate has always been dual (monetary stability and economic stability – through the quest for maximum employment and moderate long-term interest rates – are objectives of equal importance).

As such, it was not until the Single Supervisory Mechanism (SSM) Regulation ([23]) in 2013 that a financial stability objective became an explicit part of the ECB's basic tasks. It should be noted that this is essentially a micro-prudential supervisory task, even though it involves major institutions, including those on the list of systemically important banking groups drawn up each year by the Financial Stability Board. The involvement that the ECB could have in the macroprudential policy of preventing systemic financial risk remains more vague, and is in any case limited to the supervision of the macroprudential provisions stemming from the Basel III agreements (counter-cyclical buffer and systemic surcharges), as there is no explicit mention in the texts of the macroprudential dimension that the objective of financial stability could take on. In this respect, however, the full potential of the financial stability objective from a macroprudential perspective could be much more fully exploited to prevent macrofinancial and thus also macroeconomic imbalances in the euro area[24].

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[20] See J.-P. Betbèze, C. Bordes, J. Couppey-Soubeyran and D. Plihon: "*Banques centrales et stabilité financière*" [Central banks and financial stability], Report by the Conseil d'analyse économique No. 96, 2011; https://www.vie-publique.fr/sites/default/files/rapport/pdf/114000261.pdf

[21] See B. S. Bernanke (2013) "A Century of US Central Banking: Goals, Frameworks, Accountability." *Journal of Economic Perspectives*27(4), 3-16; Capie, F., & Goodhart, C. (1995), "Central Banks, Macro Policy, and the Financial System; the Nineteenth and Twentieth Centuries." *Financial History Review*, 2(2): 145-161; Reinhart, C. M., & Rogoff, K. S. (2013), "Shifting Mandates: The Federal Reserve's First Centennial." *American Economic Review*, 103(3), 48-54.

[22] This refers to the Schwartz hypothesis, named after the economist Anna Schwartz, a co-author of Milton Friedman, who argued that monetary stability is a necessary and sufficient condition for financial stability. This assumption was largely invalidated by the financial crisis of 2007-2008, which emerged in a context of monetary stability: from the 1990s until the onset of the financial crisis, the level of inflation and its volatility seemed to be perfectly controlled by the central banks, stabilised at the 2% level that most were targeting.

[23] Council Regulation (EU) No 1024/2013.

[24] See Report for the European Parliament (Directorate-General for Internal Policies of the Union & Economic Governance Support Unit) published in May 2017: J. Couppey-Soubeyran & S. Dehmej, "The role of macro-prudential policy in the prevention and correction of imbalances in the euro area", http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU%282017%29602073 and the Lettre du Cepii which provides a quick overview: http://www.cepii.fr/CEPII/fr/publications/lettre/abstract.asp?NoDoc=10621

Similarly, until environmental sustainability is explicitly included in the texts governing the tasks of the Eurosystem, it will not be a clear enough objective to direct the ECB's monetary policy towards ecological transition. At best, the ECB will approach climate risk from the perspective of the financial risks it induces, as suggested by Mark Carney's speech, and will therefore adopt a risk-based approach that will probably prompt it to green its models and indicators but not its monetary policy instruments. Unless environmental sustainability is more formally enshrined in their mandate, central banks are unlikely to go beyond a risk-based approach and consider climate risk from a monetary policy perspective. In other words, it will be difficult to direct monetary policy towards ecological transition (let alone integrate it into ecological planning) while central banks have no explicit objective of environmental sustainability. This is particularly crucial because, unlike financial stability, which, when we fail to prevent it, still leaves scope for intervention after the fact, the same is unlikely to be true when it comes to the climate. A climate crisis would be irreversible, far more so than a financial crisis.

Formally enshrining this objective in the ECB's mandate would lead to a very different approach from that of "climate risk management": the pursuit of environmental sustainability is not simply a matter of taking climate risk into account. It consists of taking part in the ecological transition; firstly, by redirecting financial flows to make them compatible with climate neutrality – which is made possible by the greening of monetary policy instruments – and, secondly, by contributing to its financing.

2.4. ...to put an end to the central bank's climate non-neutrality

Making an objective of environmental sustainability explicit in the ECB's mandate would immediately render the principle of neutrality obsolete for the simple reason that this principle is not at all neutral from the perspective of ecological transition. It even runs counter to it, as several studies have already pointed out. According to the joint study by economists from the Grantham Research Institute and the LSE[25], the ECB and the Bank of England, through their private sector asset purchase programmes[26], purchased bonds in companies to which 59% and 52% respectively of greenhouse gas emissions can be attributed. According to another study by Corporate Europe Observatory[27], 68% of the ECB's bond buybacks benefited companies in the fossil fuel sector such as Shell, Total, Engie, BMW, Repsol, Cofiroutes, etc. (Plihon, 2018[28]).

[25] Matikainen S., Campiglio E., Zenghelis D. (2017), "The climate impact of quantitative easing", Policy Paper, London, Grantham Research Institute on Climate Change and the Environment, London School of Economics: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2017/05/ClimateImpactQuantEasing_Matikainen-et-al.pdf

[26] Corporate Bond Purchase Scheme (CBPS) for the Bank of England and Corporate Sector Purchase Programme (CSPP) for the ECB, launched in 2016.

[27] Corporate Europe Observatory (2016), "The ECB's 'quantitative easing' funds multinationals and climate change", 12 December; https://corporateeurope.org/en/economy-finance/2016/12/ecb-quantitative-easing-funds-multinationals-and-climate-change

[28] See Dominique Plihon's presentation at the seminar of the Energy and Prosperity Chair on 18 June 2018: "*Le financement de la transition écologique, quel rôle pour les banques centrales ?*" [The financing of the ecological transition: what role for central banks?]; http://www.chair-energy-prosperity.org/wp-content/uploads/2018/01/event2018_monnaie-transition-bas-carbone_plihon.pdf

The results of the study by Battiston and Monasterolo (2019) published by the Veblen Institute[29] also show that 63% of the securities purchased under the ECB's CSPP financed companies operating in the economic sectors that emit the most greenhouse gases (GHG): fossil fuel production and distribution, the automotive sector, energy-intensive sectors, and power generation. Conversely, the sectors and activities that explicit contribute to the reduction of GHG emissions accounted for only a minor proportion of these purchases, precisely because they still represent only a minor share of the market: green bonds and rail transport, for example, together accounted for only about 7% of the portfolio. The Bank of Italy and the Bank of Spain had the purchase portfolios heaviest in fossil fuels; the automotive sector was particularly prominent in the Bundesbank's portfolio; and while the Banque de France's portfolio appeared the most balanced with its overall proportion of the four highest-emitting sectors being within the European average, its result owed much to the importance of nuclear power (which emits few GHGs but poses other sustainability problems) in French electricity production.

By simply reproducing existing market structures, the asset purchases made by central banks as part of the unconventional monetary policy they implemented in response to the 2007-2008 financial crisis and then extended considerably to deal with the pandemic, are necessarily biased in favour of fossil energies and CO_2-emitting industries, to the detriment of non-carbon energy.

According to the study by Dafermos *et al.* (2020), published by the New Economics Foundation[30], "more than half of the outstanding amount of the bonds included in the ECB list are issued by carbon-intensive sectors", amounting to more than €750 billion (the total outstanding amount of the corporate bonds on the ECB list is estimated at €1.073 trillion as of the end of July 2020).

This means that if the central bank limits itself in its asset purchases to replicating existing economic and market structures, then by definition it will impede the ecological transition and perpetuate excess GHG emissions. Monetary neutrality is not climate neutral! In order to avoid being an obstacle to transition, the central bank must direct its purchases towards the least carbon-intensive sectors or make the purchases of assets issued by companies or States that emit too much conditional on the recorded reduction of their emissions; "recorded" rather than "future" to avoid the potential problem of insincere commitments. The ECB will have to be "non-neutral" if it is to achieve an objective of environmental sustainability explicitly included in its mandate.

Several options for greening monetary policy are possible and are already under study. Most are "light green" options, in the sense that they involve mobilising existing monetary policy instruments and orienting them towards the objective of environmental sustainability. Once this objective has been explicitly enshrined in the tasks of the Eurosystem, these options would easily fit into the existing institutional framework. The "bright green" option, which will also be discussed in this note, would involve a more substantial amendment to the TFEU articles governing the ECB's monetary policy.

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[29] Stanislas Jourdan & Wojtek Kalinowski, "Aligning Monetary Policy with the European Union's climate Targets", March 2019 https://www.veblen-institute.org/IMG/pdf/aligning_monetary_policy_with_eu_s_climate_targets.pdf

[30] Yannis Dafermos, Daniela Gabor, Maria Nikolaidi, Adam Pawloff & Frank van Lerven, "Decarbonising is easy. Beyond Market Neutrality in the ECB's Corporate QE", New Economics Foundation, October 2020; https://neweconomics.org/uploads/files/Decarbonising-is-easy.pdf

3. Light green: the feasible greening of existing instruments

Within the framework of the NGFS, central banks are mobilizing, helping to raise awareness within the banking and financial sector and to create a more favourable environment for ecological transition. But the time has come for a more operational, more instrumental commitment. Central banks can use instruments that they already have, by greening them.

3.1. Shades of light green

At least four adjustments are possible and are being worked on. The first two involve conventional instruments; the second two involve non-conventional instruments adopted in the wake of the 2007-2008 financial crisis.

- The first of these would be to green the banks' main refinancing operations (MROs) by incorporating a "carbon premium" to the rate applied by the central bank (the "green MRO" option)
- The second would be to green the composition of assets accepted as collateral in refinancing operations (the "green collateral" option).
- The third would be to green TLTROs (targeted longer-term refinancing operations) so that they stimulate credits granted to emitters whose carbon footprint is small or shrinking (the "green TLTRO" option).
- The fourth would be to establish an incompressible portion of green assets in asset purchase programmes (the "Green QE" option). This option could include a special Green Deal public asset purchase programme.

Kempf (2020[31]) examines the first two of these options, involving conventional instruments: greening by rates (green MROs) and greening by counterparties (green collateral). The greening of collateral is also the subject of work being done at the Banque de France in particular (Oustry *et al.*[32]). François Villeroy de Galhau even declared himself quite in favour of this approach[33]. As for the ECB, it announced on 22 September 2020[34] that it would accept sustainability-linked bonds as collateral from January 2021.

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[31] "Verdir la politique monétaire" [Greening Monetary Policy], *Revue d'économie politique* 2020/3, vol. 130: https://www.cairn.info/revue-d-economie-politique-2020-3-page-311.htm

[32] See presentation at the seminar organised by the Energy and Prosperity Chair and the AFD "*La transition écologique : vers un changement de paradigme monétaire et financier*" [The Ecological Transition: Towards a Monetary and Financial Paradigm Shift"; http://www.chair-energy-prosperity.org/comptes-rendus-devenements/transition-ecologique-vers-changement-de-paradigme-monetaire-financier/: Antoine Oustry, Bünyamin Erkan, Romain Svartzman, Pierre-François Weber, "Climate-related risks and central banks' collateral policy: a methodological experiment", Banque de France.

[33] "*Climat : les banques centrales se mobilisent*" [Climate: the central banks are mobilizing], *Financial Stability Review*, "*Verdir le système financier : la nouvelle frontière*" [Greening the financial system: the new frontier], No. 23, June 2019 https://publications.banque-france.fr/sites/default/files/medias/documents/revue_de_la_stabilite_financiere_23.pdf

[34] https://www.ecb.europa.eu/press/pr/date/2020/html/ecb.pr200922~482e4a5a90.en.html

The other two involve non-conventional instruments that have gained considerable importance in the wake of the financial crisis and have been further extended in response to the health crisis. In September 2020, Positive Money Europe and Sustainable Finance Lab jointly published Jens van't Klooster and Rens van Tilburg's proposal to green TLTROs[35]. The proposal was fairly well received by the ECB. As for "green QE", it is also a way to "decarbonise" asset purchases, as suggested several years ago by Aglietta *et al.* (2015[36]), and more recently reviewed by Dafermos *et al.* (2020[37]). A few months ago, this option still provoked many reservations, but, here again, the discourse is changing. In her speech at the European Sustainable Finance Summit on 28 September 2020, Isabel Schnabel stressed that the ECB, as a major investor, should be transparent about the climate risk of its portfolio exposures and adopt responsible investment behaviour[38]. And the fact that it is planning to include "sustainability-linked bonds" (SLBs) in securities purchases also signals, to some extent[39], the ECB's intention to start greening its monetary policy instruments.

All of these proposals presuppose the prior availability of an operational taxonomy, i.e. a list for identifying green activities and therefore the assets to which they relate, such as the green list[40] drawn up by the European Commission's Technical Expert Group (TEG) on Sustainable Financing, which was made public in March 2019 and validated in December 2019 by the European Parliament and the Council.

3.2. Green MROs

Modulating the key interest rate on main refinancing operations is the first way in which monetary policy could green up. This would involve "adjusting the rate applied to a bank by a premium (positive or negative) determined on the basis of the average degree of climate risk associated with the credits that this bank grants to its customers". This proposal, formulated by Kempf (2020), would make commercial banks aware of the climate implications of their lending activity. The introduction of a climate premium to banks' refinancing costs would add a positive

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[35] "Targeting a sustainable recovery with Green TLTROs": http://www.positivemoney.eu/wp-content/uploads/2020/09/Green-TLTROs.pdf

[36] Aglietta, M., Espagne, E., & Perrissin-Fabert, B. (2015) "A proposal to finance low carbon investment in Europe" France Stratégie, 24, 1-7; https://www.strategie.gouv.fr/english-articles/policy-brief-proposal-finance-low-carbon-investment-europe

[37] Yannis Dafermos, Daniela Gabor, Maria Nikolaidi, Adam Pawloff and Frank van Lerven, "Decarbonising is easy", New Economics Foundation, October 2020; https://neweconomics.org/2020/10/decarbonising-is-easy

[38] The exact quote is as follows: "*Second, as large-scale investor, we have an obligation to appropriately reflect climate risks on our balance sheet. As part of this process, we are constantly examining whether our non-monetary policy portfolios are invested responsibly*."

[39] Unlike "green bonds", which finance green projects, SLBs are financing instruments that do not specifically direct the funds raised towards green projects, but whose rate can be adjusted upwards or downwards according to indicators linked to the European taxonomy or sustainable development objectives. If, for example, an emitter has reduced its greenhouse gas emissions beyond its commitments, the interest rate on its loan is adjusted downwards, and is conversely adjusted upwards if it has done less well. SLBs are less green than green bonds, but given the limited size of the market for the latter, with low trading volumes, they are a kind of extension (by dilution) of the green.

[40] "Taxonomy: final report of the Technical Expert Group on Sustainable Finance"; https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy_en.pdf

opportunity cost to the granting of carbon credits[41], whereas this cost is currently zero. A bank that increased the proportion of loans not compatible with the ecological transition would face increased refinancing costs, while conversely a bank that reduced this share and correspondingly increased the share of green loans on its balance sheet would see its refinancing costs with the central bank decrease.

The scheme would apply to private commercial banks but also to public, national or regional banks, which, if they specifically targeted their activity towards the financing of green projects, could then obtain refinancing at preferential rates.

This option of greening the refinancing rates of private or public banks, like virtually all options for greening monetary policy, presupposes that it is possible to refer to an operational taxonomy[42]. The European Commission taxonomy is an activity-based list, which would make it possible, for example, to identify whether the financing granted by banks goes to companies belonging to an industry sector listed as green. That would be an initial level of classification, but is probably not fine enough. The obligation to report emissions by company, provided for under the European Non-Financial Reporting Directive, which should soon become a regulation, would provide a finer classification tool[43]. It could be argued, however, that compatibility with the objectives of ecological transition should be established at the level of the projects being funded, which is even more demanding in terms of the production of ecological information[44]. Should all funding, regardless of its purpose and contribution to ecological transition, granted to a company in a sector of activity considered green be considered green? There is no doubt that the entire information base for loans and other financing will have to change if monetary policy is to be greener. The fact that this reference does not yet exist in ideal form should not be seen as a limit, as it is the decision to green monetary policy that will force its development. Without a doubt, deciding to green monetary policy would immediately increase the production of ecological information by making it compulsory.

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[41] The term "carbon credits" refers to credits granted to companies whose carbon footprint is beyond what is deemed compatible with greenhouse gas emission reduction objectives. Such an assessment obviously requires a taxonomy, the reporting of emissions by sector, companies and emission reduction targets.

[42] In addition to the European taxonomy, the quantitative and qualitative growth of non-financial information for issuers and investors can only support and legitimise the greening of monetary policy. This is underway at European level with the revision of the Non-Financial Reporting Directive (NFRD), which aims to improve the quality of information available to investors by establishing a non-financial reporting standard for companies with more than 500 employees. There is also the Regulation (EU) 2019/2088 on disclosures which will apply from March 2021 to financial market participants and advisers. It will require more transparency on the integration of ESG criteria by financial market participants and advisers.

[43] In France, under Article L229-25 of the French Environment Code, the following "are required to draw up a balance sheet of their greenhouse gas emissions: 1) Legal persons governed by private law employing more than five hundred persons".

[44] In its report "*Maîtriser l'empreinte carbone de la France*" [Controlling France's carbon footprint] (October 2020), the High Council on Climate emphasises the granularity of the carbon footprint by distinguishing between the notion of "carbon footprint" and that of "product carbon footprint", "which, in addition to the emissions linked to the manufacture of the product, also takes into account the emissions linked to its use and its end of life, without distinguishing them from those linked to production, and does not take into account the country where the product is used". The report also uses the concept of "product carbon footprint", "because it is the best information available to companies", under the term "life-cycle analysis" of products, to differentiate it from the "carbon footprint" reserved for domestic demand emissions.

3.3. Green collateral

Since refinancing operations necessarily involve collateral in the form of assets deposited as security, the greening of monetary policy should also involve the greening of these counterparties. If the central bank is concerned about aligning its operations with the Paris Accord targets of limiting global warming to 1.5°C or "well below" 2°C, then it needs to ensure that the assets it holds or those it accepts as collateral for the refinancing of commercial banks are aligned with these targets. Kempf (2020) proposes that the central bank should apply a "rate differential calculated on the basis of the counterparty's own "climate rating" or, alternatively, on the bank's climate ranking, based on the climate ratings of its credit portfolio".

Upstream of this type of proposal, Oustry *et al.* (2020) assess the extent to which eligible assets (i.e. meeting the criteria for acceptance as collateral by the Eurosystem) and mobilised as collateral are compatible, as a whole, with the "low-carbon" transition. The assessment is based on non-financial metrics[45], and compatibility is measured against a 2°C target. The metrics used cover about 60% of the 12 trillion eligible assets (two-thirds of government debt securities and just under one-third of securities issued by banks or financial firms). Regardless of the metric, eligible collateral, unsurprisingly, is not aligned with the 2°C target. Deviation from the alignment reference point is significant. For example, using a metric based on a relative difference (%) between GHG emissions and a "budget" consistent with the IEA's 2°C scenario, only a quarter of the emitting companies are aligned. The degree of alignment of the various categories of assets (depending on their issuers) varies significantly according to the metric chosen: bank securities appear to be less misaligned using the overall rating metric. And the average ratings of eligible assets issued by banks are highly heterogeneous. This suggests that the degree of exposure to transition risk varies greatly across banks. The important result reached by this study is that there is a pool of low-carbon assets, half as intensive in GHG emissions, of sufficient size, equivalent to the outstanding amount mobilised, but which banks do not necessarily possess.

While the objective of this study, the first to evaluate the degree of alignment of the collateral involved in monetary policy operations, is more in line with a risk-based approach and to assess the exposure of collateral to transition risk, it also implicitly provides an opportunity to show that a greening of collateral, under a monetary policy approach, would be possible.

3.4. Green TLTROs

As of the end of October, the ECB's TLTROs represented an outstanding amount of €1.752 trillion lent to banks at very low or even negative rates (-0.5% or -1%) under the TLTRO III programme, conditional on the growth or maintenance of outstanding loans on their balance sheets (loans to households excluding mortgages and loans to non-financial corporations[46]). These refinancing

[45] One is a simple carbon intensity metric, descriptive and static, the other two are analytical and dynamic, seeking to capture the alignment of assets to the 2°C objective. These metrics do not attempt to quantify climate risks in monetary terms.

[46] Since the first programme was announced in June 2014, two others have been launched (TLTRO II in March 2016 and TLTRO III in March 2019). The maturities are long (four years for TLTRO I and II, three years for TLTRO III). Their terms and conditions were relaxed as part of the decisions taken by the ECB in March and April 2020 in response to the Covid-19 pandemic: the rate for TLTRO III operations was lowered to -0.5% for the period from June 2020 to June 2021 and may fall to -1% for banks whose outstanding loans do not fall (the performance threshold for granting credit was reduced to 0%).

operations are the only ones that are in any way conditional on the banks' contribution to the financing of the economy. But the conditionality is weak since it only excludes banks whose outstanding loans have fallen and, apart from excluding mortgage lending, it does not seek to identify and favour the loans that would make the greatest contribution to growth. One example is corporate investment credits.

However, the instrument itself is of interest due to its conditionality, which could be strengthened or adjusted. In fact, there is no reason why it could not focus on the banks' contribution to the financing of green investments, promoting ecological transition. This is the proposal supported in the report produced for Positive Money Europe and Sustainable Finance Lab: Jens van't Klooster and Rens van Tilburg explain how the ECB could modify its TLTRO programme to direct bank lending towards the investments needed for the low-carbon transition. The ECB could use the taxonomy of sustainable assets recently adopted by the EU to identify truly "green" investments, such as those related to the thermal renovation of buildings, renewable energy production or soft mobility (electric or hydrogen vehicles). A green TLTRO programme that would make bank refinancing conditional on the granting of green credits (compatible with this taxonomy) would encourage them a priori to offer them to their customers and to pass on to their customers the negative rates they would receive from the central bank. That is the idea and the hope: that a programme like that would make green investments more affordable for individuals and small businesses.

The authors see it as an instrument that is fully compatible with the ECB's mandate. Green TLTROs would, in their view, promote monetary stability "by addressing market failures that undermine the broader economic preconditions of monetary stability" and by allowing for a better transmission of monetary policy to the real economy. They would also promote financial stability by accelerating the greening of bank balance sheets, which would reduce their exposure to climate-induced financial risks. And finally, they would "help to align monetary policy with the ECB's secondary mandate, which requires it to support the EU's environmental objectives where this is possible without prejudice to price stability".

Assuming that about 10% of the outstanding loans on the balance sheets of euro area banks (about one-third of their total assets of 34 trillion at the end of 2018 according to Financial Stability Board data) are classified as green under the European taxonomy, the authors estimate the potential volume eligible for green TLTROs to be around €1.2 trillion.

3.5. "Responsible" Green QE

The asset purchase programmes conducted by the ECB since 2015 as part of its unconventional monetary policy, first to manage the consequences of the financial crisis of 2007-2008 and then to deal with the Covid-19 crisis from March 2020 onwards, have turned it into a market maker. As of the end of October 2020, the €3.53 trillion of securities held under these ECB programmes[47] make it a very large investor, with a portfolio more than twice as large as that of the Japanese GPIF[48] which is the largest pension fund in the world!

[47] Of which €2.309 trillion is held under the PSPP, €627 billion at present under the Pandemic Emergency Purchase Programme, and the remainder coming from CBPPs 1, 2 and 3 (€289 billion), the CSPP (€243 billion), the SMP and the ABSPP.

[48] Government Pension Investment Fund, which, moreover, is expresses growing concern over climate risk https://www.gpif.go.jp/en/investment/GPIF_CLIMATE_REPORT_FY2019_2.pdf

If only to set an example to other investors in the market, the ECB will have to behave as an environmentally responsible investor. This would send a strong signal to the market[49]. One of Isabel Schnabel's statements, mentioned above, is very much in line with this. It does not go so far as to draw the implications in terms of asset purchases but, in concrete terms, if the ECB wants to be a responsible investor, it will have to take carbon footprint into account in composing its portfolio of securities purchased under its asset purchase programmes and make it compatible with a low-carbon trajectory. This would be a way of greening the ECB's balance sheet by cleverly circumventing the resistance of some of its members, who believe that the fight against climate change must be accelerated but that monetary policy has no role to play in this[50].

In a post-Keynesian stock-flow model, Dafermos *et al.* (2017[51]) estimated the impact of green QE, assuming that the central bank would buy a quarter of the stock of green bonds. This has a knock-on effect on the greens bond market and leads to a slight reduction in global warming, but the authors stress the need to combine other instruments with this strategy.

Dafermos *et al.* (2020), however, propose two scenarios for greening the ECB's private securities purchases. In the first "low-carbon" scenario, the ECB would stop buying bonds issued by companies in the fossil fuel sector as well as those in other carbon-intensive sectors. Instead, the ECB would buy bonds from potentially green and renewable sectors, as well as green bonds (although there is much scepticism about these) and bonds from other low-carbon sectors. The outstanding amount of bonds on the ECB's list would be slightly higher than the existing list and the ECB's ability to influence interest rates would therefore not be reduced.

In their second scenario, the ECB would make its purchases from a list of "low-carbon" bonds. This would exclude all bonds issued by carbon-intensive sectors, with the exception of green bonds, and would include bonds issued in the euro zone, with an eligible maturity but not necessarily with an "investment grade" rating. In this scenario, which would favour the climate criterion and relax the investment quality criterion for bond eligibility, the outstanding amount of the bond list would increase compared with the ECB's existing list. The expansion of the CSPP/PEPP programme is likely to lead to the inclusion of non-investment grade bonds as eligible bonds. It should not, therefore, be seen as a problem that priority is being given to the climate criterion over the financial one.

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[49] New Economics Foundation & Positive Money, "The ECB and climate change: outlining a vision for success", Policy Briefing, April 2020. http://www.positivemoney.eu/wp-content/uploads/2020/07/ecb-climate-change1a.pdf

[50] In an interview with the German daily newspaper *Boersen-Zeitung*on 7 October 2020, Jens Weidmann said: "*I consider the fight against climate change to be a task of the century that must be accelerated*. *However, monetary policy has no role in structuring this, just as it has no role in industrial policy or distribution policy*". In an interview with the *Financial Times* on 19 November, he maintained his commitment to the principle of neutrality and took the view that it was not within the ECB's remit to correct market distortions: https://www.ft.com/content/ed270eb2-e5f9-4a2a-8987-41df4eb67418

[51] Yannis Dafermos, Maria Nikolaidi and Giorgos Galanis, "Climate change, financial stability and monetary policy", September 2017, Post Keynesian Economics Study Group Working Paper 1712; http://www.postkeynesian.net/downloads/working-papers/PKWP1712_Y3aZEit.pdf
& "Can Green Quantitative Easing Reduce Global Warming?", GPERC Policy Brief, July 2018 https://www.feps-europe.eu/attachments/publications/feps%20gperc%20policybriefgreenqe.pdf

It is important to note that the greening of asset purchase programmes actually encompasses a variety of possible strategies that are unlikely to have the same impact. The scenarios proposed by Dafermos *et al.* (2020) are part of a responsible investment approach, where greening involves excluding certain high-carbon assets or using the "best in class" approach often taken by SRI funds, which would involve selecting the eligible assets with the least poor carbon footprint. It is this "environmentally responsible" investment path on which the ECB currently seems keen to embark. This will send a signal to the market and will undoubtedly encourage the greening of the portfolio choices of all investors. This will contribute to a more favourable financial environment for the ecological transition, but will not contribute directly to its financing.

3.6. "Preventative" Green QE

The greening of monetary policy will only be truly useful to the ecological transition if it also enables the financing of the transition. A proposal to this effect had been made by Cohen and Grandjean (2017[52]) to mobilise a network of public banks, benefiting from ECB refinancing, which would finance public investment projects meeting predefined eligibility criteria. An alternative proposal, involving no changes to the institutional framework, would be to set up a special Green Deal public asset purchase programme.

Just as the ECB responded to the Covid-19 pandemic by adopting a Pandemic Emergency Purchase Programme (PEPP) in March 2020, the envelope for which has since been extended to €1.35 trillion, a special Green Deal programme, or a special climate crisis prevention programme, could be feasible. The envelope for a programme like this would have to be calibrated according to the amount of public investment required under the Green Deal. It would facilitate the financing of the Green Deal and operate exactly as the PSPPs (Public Sector Purchase Programmes) have done so far: by buying back government bonds on the secondary market, which in this case would be those dedicated to financing the public investments planned in the Green Deal, the ECB would reassure investors, who would then not be afraid to buy them on the primary market. By this means, the public investments needed under the Green Deal would be easily financed.

As an addition to the responsible investment approach, this option would shift the focus of QE towards the financing of the ecological transition. This would, however, be accompanied by an increase in public debt, the long-term sustainability of which would depend on the ECB's commitment to continue its Green Deal public asset buybacks for as long as necessary. This would raise questions similar to those raised by the PEPP: can the new debts, facilitated by the PEPP, be added to past debts without limit? Aren't euro area countries exposed to a risk of unsustainable debt, forcing the ECB to continue purchasing assets indefinitely? How effective will monetary policy be if massive volumes of asset purchases become a permanent solution?

These issues have led to the suggestion of alternative proposals. In particular, the suggestion that the programme should be accompanied by a partial cancellation of the public debt on the ECB's balance sheet[53] in order to increase States' room for manoeuvre by avoiding exposing them to a

[52] "*Un plan pour financer la transition écologique*" [A Plan to Finance the Ecological Transition], by Marion Cohen and Alain Grandjean, Nicolas Hulot Foundation for Nature and Mankind, April 2017; http://www.fondation-nature-homme.org/sites/default/files/creation_monetaire.pdf

[53] See "La BCE devrait, dès maintenant, annuler une partie des dettes publiques qu'elle détient" [The ECB should immediately cancel some of the public debt it holds], collective opinion published in *Le Monde* on 12 June 2020.

risk of unsustainable debt. This proposal was also formulated in April 2020 by Laurence Scialom and Baptiste Bridonneau, linking it to investment in ecological transition[54]. A more radical alternative for monetizing public spending to address the health crisis has also been brought into the debate[55]. Basically, the same issue arises for both the financing of support and recovery in the face of the Covid-19 pandemic and the financing of the ecological transition in the face of the risk of a climate crisis, particularly since the amounts of investment required are massive and recurrent.

4. Bright green: monetisation to finance the ecological transition

4.1. A useful parallel between Covid debt and climate debt

At euro area level, management of the Covid-19 crisis raises the question of whether the debt contracted to finance support and recovery will be sustainable. The issue would probably be less acute if the euro area had a common debt instrument that would distribute this risk of unsustainability among all its Member States. In the absence thereof, this risk is increased. The financing mechanism planned for the €750 billion Next Generation EU recovery plan, which will be borrowed on the markets by the European Commission on behalf of the European Union, demonstrates that this risk has been taken into account and is a first step towards fiscal union. The latter is still, however, a long way off. And the risk, lessened in respect to this first European pooled funding plan, continues to arise with respect to the funding of national recovery plans, in relation to the portion that does not come from European funds.

The very low level of rates (sometimes negative) and the repurchasing of domestic sovereign debt securities will only fully contain this risk if they continue for a very long time. Will that be possible? As far as rates are concerned, everything is working together at both cyclical and structural levels to ensure that rates remain low for a very long time. However, this will in no way prevent a sudden rise in sovereign borrowing rates in the event of investor panic, for potentially unforeseeable reasons or simply due to disappointment[56]. To avoid this, the ECB is obliged to repurchase the sovereign Covid debt securities "for as long as needed". But what happens to monetary policy if its asset purchase programmes, which should have been a temporary unconventional instrument, become a permanent and dominant instrument? An instrument of "containment", so to speak, of the risk of unsustainability of public debt, certainly, but without doubt more the instrument of monetary, economic, financial and, a fortiori, ecological stability.

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https://www.lemonde.fr/idees/article/2020/06/12/la-bce-devrait-des-maintenant-annuler-une-partie-des-dettes-publiques-qu-elle-detient_6042636_3232.html

[54] "*Des annulations de dette publique par la BCE : lançons le débat*" [Cancellation of public debt by the ECB: opening the debate], by Laurence Scialom and Baptiste Bridonneau, Terra Nova Note, April 2020 https://tnova.fr/notes/des-annulations-de-dette-publique-par-la-bce-lancons-le-debat

[55] "'Helicopter money' to combat economic depression in the wake of the Covid-19 crisis", by Jézabel Couppey-Soubeyran, Veblen Note, April 2020 https://www.veblen-institute.org/Helicopter-money-to-combat-economic-depression-in-the-wake-of-the-Covid-19.html

[56] On 12 March 2020, European stock exchanges fell and the Italian sovereign rate deviated sharply from the German rate, after the €120 billion of additional asset purchases announced were deemed insufficient.

Because the effects of asset purchases on the real economy are weak and unevenly distributed[57], they do not ensure economic stability. They do not drive up inflation in the prices of goods and services, so do not ensure monetary stability. On the other hand, they raise asset prices and potentially promote the formation of bubbles, so they do not ensure financial stability. And if the monetary policy can no longer achieve monetary stability, economic stability or financial stability, then there is little point in expecting it to mobilise for environmental sustainability.

In short, monetary policy either abandons its objectives in order to contain the risk of unsustainable public debt, or it abandons its focus on managing the risk of unsustainable debt in an attempt to return to its objectives. In the first scenario – the current scenario – economic recovery will depend entirely on the effectiveness of fiscal policy, since the monetary policy will have virtually no consequence on the real economy. The risk is that the economy would sink into deflation and secular stagnation. The second scenario restores monetary policy's room for manoeuvre, but revives the risk of a sovereign debt crisis. Unless we can finance these expenses without increasing the debt! And this is what monetisation without consideration for the expenditure would allow, hence its merits.

This reasoning applies both to Covid debt and to climate debt, and all the more so given the amounts and duration of the investments to be made. For if these investments are based on debt, then the risk of unsustainability will be even greater. The investments to be made are too large, by any measure, to be subject to the market volatility and political pressures that debt fuels.

4.2. The scale and duration of public investment in the ecological transition inevitably raises the question of its financing

The various estimates do, of course, differ but the amounts required for climate investments are large.

In the case of France, the INSEE estimated, in October 2020, the optimal trajectory of annual climate spending to achieve climate neutrality at 4.5% of GDP per year until 2050[58]. €100 billion per year[59], involving an increase of between €40 and €60 billion in climate expenditure. Not all of this expenditure will be from the public sector. Otherwise, it would be about twice as much as the *France Relance* recovery plan every year until 2050! But it will require massive public investment. This is a slightly higher estimate than the one produced by the I4CE think tank. In the latter, the need for additional climate investment is estimated, for France, at between €32 and €41 billion, based, unlike INSEE's, on a sector by sector approach[60]. It has the advantage of separating the public sector investment needs from those of the private sector: the climate investments

[57] See "Drone Money: Putting Monetary Policy Back to the People, by Emmanuel Carré, Jézabel Couppey-Soubeyran, Thomas Lebrun and Thomas Renault, Veblen Note, 22 January 2020; https://www.veblen-institute.org/Veblen-Policy-Note-Drone-money-to-put-monetary-policy-back-to-the-people.html

[58] "Social cost of carbon and commitments for the climate: some avenues for an environmental economic accounting", by Jean-Marc Germain and Thomas Lellouch, INSEE Analyse no 56, October 2020; https://www.insee.fr/en/statistiques/4930341

[59] The central scenario corresponds to €100 billion per year, around which optimal climate expenditure varies between around 3.4% (€77 billion per year) and 6.9% (€157 billion per year) of GDP, depending on the energy efficiency assumptions made.

[60] "Landscape of Climate Finance", Institute for Climate Economics (I4CE), 2018 edition.

estimated on the basis of France's national low-carbon strategy will have to increase from €23 to €60 billion annually in the private sector and from €10 to €30 billion annually by 2030 in the public sector[61].

In its 2018 report, "Clean Planet for All", the European Commission provided a range of €25 to €42 billion for the additional investment needed for France (closer to the I4CE assessment than the more recent INSEE assessment), and estimated this additional need for the European Union as a whole at between €175 and €290 billion annually. The European Court of Auditors estimated the amount of public and private investment needed in the European Union to meet our climate commitments at €1.115 trillion per year.

Half of the €1 trillion EU Green Deal, which is to be mobilised over ten years and which is intended to meet at least part of these additional investment needs, will come from the European budget. It is not so clear how much will be the responsibility of the private sector and how much of the public sector and, above all, how much of these are sums already available and how much is new financing, but the issue still arises as to whether the hundreds of billions of euros that will probably have to be mobilised in each country in the space of a decade or so can be based entirely on debt.

Can the new debt required by climate investments be added to the Covid debt? Does the latter constitute a launching pad for the additional climate investments needed, given the ecological component of the recovery plans? Or, on the contrary, will it jeopardise the feasibility of the financing envisaged before the pandemic, by depriving green industries of future financing while having helped high-carbon industries recover?

It is likely that the low-carbon public investments of the next decade will be overshadowed by the Covid recovery[62], but the set of climate investments incorporated in the recovery plans will not be sufficient, especially if they are not sustained beyond the recovery effort. As such, we will have to remain vigilant and take care that the Covid recovery does not undermine efforts to invest in the ecological transition. But it is also through its financing that the Covid recovery could jeopardise that of the ecological transition, if we intend to finance it as we did the support and recovery expenditure for the pandemic: through the accumulation of debt.

Debt is one of various financing methods, and one that should neither be condemned nor trivialised, but its appropriateness depends on many factors: price, volume, dynamics, recurrence, climate of confidence, etc. The debt contracted to finance the ecological transition (the "climate debt") can probably be financed at low rates, but the mass of public investment required will give it a large volume which, when combined with the Covid debt, which itself feeds an upward cycle, will constitute a factor for financial fragility and political pressure. Moreover, climate investments will only be effective if they are repeated over time, which will cumulatively increase the weight of this debt in relation to GDP, even assuming a significant multiplier effect[63] of the investments

[61] Recovery Plan and Budget 2021, the I4CE analysis, October 2020; https://www.i4ce.org/wp-core/wp-content/uploads/2020/10/20-10-14-I4CE_Version-pour-le-site.pdf

[62] "Covid-19 recovery funds dwarf clean energy investment needs", Marina Andrijevic, Carl-Friedrich Schleussner, Matthew J. Gidden, David L. McCollum, Joeri Rogelj, *Science*, vol. 370, No. 6514, 16 October 2020; https://science.sciencemag.org/content/370/6514/298

[63] The ThreeME model (Multi-sector Macroeconomic Model for the Evaluation of Environmental and Energy policy), developed by ADEME (French Environment and Energy Management Agency) and OFCE (French Economic Observatory) since 2008, takes into account a multiplier effect of 1.4 https://www.hautconseilclimat.fr/wp-content/uploads/2020/07/effets-macroeconmiques-plan-relance-ademe.pdf

financed with debt. Moreover, even though it should generate the highest degree of confidence by enabling the investments necessary for our future, climate debt will exist within the context of confidence levels that have been undermined due to the pandemic and will remain significantly affected by the uncertainty of the climate crisis. This low level of confidence could affect the climate debt market or at least increase its volatility.

For all these reasons, we should not stop considering alternatives to climate debt in order to find a financing method suited to the volume and recurrence of the investments required, that does not involve curtailing expenditure and that would not expose us to the risk of financial instability or political pressure potentially associated with the accumulation of public debt. This alternative method is the monetisation of climate expenditure by the central bank. It cannot be done within the existing institutional framework. The pandemic has certainly changed the game within Europe (relaxation of fiscal rules, change of policy mix, etc.), but not yet to the point where a treaty amendment can be envisaged. Perhaps the climate crisis, or the prospect of it, may extend the range of possibilities.

4.3. Untying ecological transition investment expenditure from debt

Monetisation, in the sense of a direct and non-refundable transfer of central bank money to States, was excluded from central banks' remit when they were entrusted with the task of fighting inflation in the 1970s and 1980s. At that time, the direct financing of governments by the central bank was seen as a potential source of inflation that should be avoided. The European Central Bank was given the primary objective of price stability in its statutes and, to best fulfil this mission, was therefore also prohibited, like the central banks of Member States, "from granting overdraft facilities or any other type of credit facility to Union institutions, bodies, offices or agencies, central governments, regional, local or other public authorities, other bodies governed by public law, or public undertakings of Member States". Article 123 of the Treaty on the Functioning of the European Union also prohibits intervention in the primary market for government debt.

These arrangements were understandable at a time when fighting inflation was the order of the day and when the level of inflation was not unrelated to the money supply, which circulated in the real sphere more than in the financial sphere. However, the current problem is no longer inflation but deflation. And inflation is now less closely linked with the amount of money in circulation. The financialisation of the economy, by diverting the circulation of money in the financial sphere, has probably distorted, if not transformed, this link by positioning it between asset prices and the money supply. In any case, at a time when inflation is no longer the problem, when debt is constantly increasing and when there is a crying need for public spending in order to restore the proper functioning of hospitals, schools and universities now, in the face of the health and societal crisis, and to prevent the climate crisis tomorrow, is it not totally anachronistic and irresponsible to refrain from re-establishing a direct link between States and central bank money?

The credibility of the ECB and the euro no longer need to be built up and would not suffer if this link were re-established. From the States' point of view, this would reduce the proportion of market debt in their financing, freeing them from the risk of financial market downturns. Going beyond mere loans, central banks would become able to make free transfers without consideration, i.e. that are non-repayable, as soon as the allocation of these transfers by the Treasuries for collectively useful expenditure is established. The public spending needed to

address the pandemic is obviously necessary. Public investment expenditure on the ecological transition is at least as vital.

Re-establishing this link would untie climate investment expenditure from debt. This is in line with the proposal made by Nicolas Dufrêne and Alain Grandjean (2020[64]) for "free and targeted money creation, without associated debt, to finance the ecological transition". They see it as an effective response to the challenge of climate change and a way of turning money back into a common good.

Such free and non-repayable transfers of central bank money to the Treasury with no central bank money consideration would give a tremendous boost to the ecological transition, going far beyond the light green options presented above. This bright green option would be for the financing of public expenditure in the ecological transition the equivalent of what was proposed in April 2020 in "'Helicopter money' to combat economic depression in the wake of the Covid-19 crisis[65]" for the financing of support and recovery expenditure in the face of the coronavirus pandemic.

4.4. Responses to counterarguments

Proposals for monetisation, however, are met with very strong resistance. This is, of course, largely due to the fact that they do not fit into the current institutional framework and would require changes, but that is not only the only reason.

The fear of inflation comes up again and again in debates and is presented as a reason to justify and maintain the current institutional framework. Apart from the fact it is curious to fear inflation when the problem to be solved is that of deflation, this objection does not hold true for the monetisation of ecological transition expenditure. Central bank money, transferred directly to the Treasuries so that they can make their climate investments, would in fact finance a transformation of our modes of production and consumption by introducing greater ecological sobriety. In other words, supply and demand would be "transformed" rather than increased, especially supply if public investments consist of thermal renovation work, the development of renewable and clean energy and soft mobility, and other infrastructure expenditure to save energy and reduce greenhouse gas emissions. In other words, the usual pattern, whereby the amount of central bank money dumped into the economy by financing governments increases spending beyond supply capacity and results in inflation, does not really apply to the scenario of financing public investment in the ecological transition.

Proposals for monetisation, helicopter money or the cancellation of public debt on the central bank's balance sheet are also sometimes objected to on the grounds that as central banks are public institutions, independent but state-owned, their balance sheets and those of the States are one and the same. The Eurosystem's balance sheet would be one and the same as those of the States that own the capital of the Eurosystem central banks. This argument is put forward to say that what costs a central bank also costs the State as a shareholder. Apart from the fact that it is wrong to argue that public debt includes that of the central bank, this argument amounts to a

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[64] *Une monnaie écologique pour sauver la planète [A green currency to save the planet]*, Paris, Ed. Odile Jacob, 2020.

[65] https://www.veblen-institute.org/Helicopter-money-to-combat-economic-depression-in-the-wake-of-the-Covid-19.html

denial of the central bank's power of money creation. The capital of a central bank, even if it is wholly owned by the State, constitutes only a small part of its resources. Where do most of the central bank's resources come from? From its power of money creation: loans to banks and purchases of assets mean that the banks' reserves belong to the central bank! As such the central bank's liabilities are essentially made up of the central bank money which it has the power to create *ex nihilo*. By understanding this power of money creation we can also understand the feasibility of monetisation.

The central bank's loss of credibility due to the loss it would incur on its balance sheet by making non-repayable transfers is also one of the main counterarguments. This has already been discussed in connection with helicopter money and the cancellation of sovereign debt held by the ECB (see Veblen Notes op. cit. 22 January 2020 and 17 April 2020). However, a central bank can operate with negative equity[66] since its debt is only in central bank money, which it alone can create. Even a foreign currency liability that the ECB may have vis-à-vis a particular foreign central bank may be settled by issuing euro central bank money in exchange for foreign currency central bank money. If there is one loss of credibility risk that we would do well to worry about today, it is the risk associated with the current strategy, which condemns the ECB to no longer being able to fulfil the tasks entrusted to it by the eurozone: monetary stability (currently, preventing deflation), economic stability (putting the economy back on a trajectory of investment and job creation) and financial stability (preventing the risk of a banking and financial crisis). This inability will eventually compromise the credibility of the central bank, much more so than an alternative strategy that would put central bank money at the service of the euro area.

But then, if we agreed on the necessity and possibility of monetisation, wouldn't we open "Pandora's box", as Benoît Cœuré suggested, not about monetisation but about debt cancellation[67]? What will happen to willingness to pay tax if the central bank can provide the State with resources free of charge and without any expected reimbursement? Will tax retain its legitimacy? What will happen to confidence in money if it can be created from nothing without ever being taken out of circulation? Would we not be turning central bank money into a "bottomless pit", preventing the central bank from carrying out its ultimate function, which is to protect the value of money in circulation? Where will the line be? These are legitimate, profound and difficult questions. They affect the social contract and the community's choices about its resources, their distribution and their use. Taxes, public debt and monetisation are three types of resources that differ in their relationship to time and in their uses, but this is exactly what must be collectively agreed upon.

Taxes are used to finance operating expenses and to redistribute resources, all of which benefit, and therefore, understandably, cost, the present generation. Debt is or should be used to finance capital expenditure for today and tomorrow, benefiting and therefore costing both present and future generations. Monetisation can be a third resource used to for either exceptional or essential expenses, for the management or prevention of crises (health crises, climate crises, etc.) that constitute a human, social or economic danger, and the cost of which exceeds the income expected from present and future generations based on the current state of our wealth indicators. Expenditure needed to prevent the climate crisis falls into this category.

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[66] David Archer and Paul Moser-Boehm, "Central Bank Finances", *BIS Papers* No. 71, BIS, 2013; https://www.bis.org/publ/bppdf/bispap71.pdf

[67] Benoît Cœuré said: "If we cancel central banks' receivables from governments once, we will inevitably do it again", *Les Échos*, 30 June 2020. See Marc Pourroy's discussion in the forthcoming *Revue Projet*.

But who would decide on the eligibility of expenditure for central bank monetisation? That is, of course, the key question. Clearly, the decision would not be taken by the central bank, since it is not an elected institution and this would far exceed its remit. Could States decide it for themselves? No, because any action taken by the central bank would then at the discretion of the executive, which would be appropriating a sort of drawing right for categories of investments that it would define and that it could divert to other political purposes, including short-term or electioneering purposes.

On the other hand, a new consultation structure could be created that would include representatives of the Eurosystem, Member States, the European Commission, parliaments, environmental NGOs and the climate science community. This new institutional structure could be a "European High Council for Climate Neutrality", representing the long-term general interest by bringing together all stakeholders, and the opinions of which, once validated by the European Parliament and national parliaments, would be binding on both the budget and monetary policy, while keeping monetary policy outside of the executive's direct control. Of course, the statutes and remit of an institution like this would need to be defined, with the main requirement being to guarantee the democratic nature of the decision and to prevent the risk of uncontrolled use of monetisation.

5. Conclusion

It is not up to the central bank to define the route to ecological transition. Neither is it up to States alone, since the coordination needed for the ecological transition will involve new institutional structures to enable joint decisions to be taken by all stakeholders: States, central banks, NGOs, scientists and civil society. Institutional changes will be necessary and the independence of central banks will undoubtedly be called into question.

During this process, which we hope will not take too long given the ecological urgency, each institution, each stakeholder, will have to move forward and make its contribution. As far as central banks are concerned, and in this case, within the euro area, the ECB, it is within their power and is their duty, at the very least, not to hinder this essential ecological transition, and, at best, to help speed it up.

At the very least, in order not to hinder the ecological transition, the ECB will have to give up its principle of monetary neutrality. This principle, which still guides the central bank's actions, hinders climate neutrality: by aiming to be neutral in the refinancing it grants, the collateral it requires or the securities it buys, the central bank necessarily encourages the reproduction of market structures that are not compatible with the objectives of direct reduction of GHG emissions, which the European Union has nevertheless set itself for 2050. Recent statements by Christine Lagarde or Isabel Schnabel suggest that the ECB is ready to renounce this.

Abandoning the principle of neutrality will not be enough to start making an active contribution to the ecological transition. To achieve this, environmental sustainability must be part of the ECB's mandate. The risk-based approach brings encompasses it indirectly by including it in the objective of financial stability, climate risk being a source of financial risk. While this approach, advocated by Mark Carney's speech of 2015, has the great merit of having made climate risk a concern of the monetary authorities, it will not, however, compel the central bank to play an active role in achieving the ecological transition.

In order to participate in the acceleration of the ecological transition, the ECB will need to move beyond a risk-based approach to a monetary policy approach, orienting its monetary policy towards the ecological transition. With this approach, the objective of environmental sustainability becomes an objective in its own right, but may or may not be explicit.

Under the current institutional framework, environmental sustainability may already basically constitute an "implicit" objective of the ECB, since climate neutrality by 2050 is one of the Union's objectives and Article 127 of the Treaty on the Functioning of the European Union requires the ESCB to "support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union provided that this does not undermine the objective of price stability". The ESCB would therefore be acting within the framework of its mandate by supporting this objective of environmental sustainability. However, it is clear that this implicit goal does not translate to an active commitment to contribute to the ecological transition.

Giving the ECB an explicit objective of "environmental sustainability" would support the orientation of its monetary policy towards the ecological transition. An explicit objective of environmental sustainability would speed up the greening of monetary policy, since it would make greening mandatory, not optional. It would, however, involve giving the ECB a role in the EU Green Deal or rewriting Article 127. This means extending the institutional framework as necessary, without fundamental transformation. There is a useful parallel with the return of financial stability to the mandate of central banks since the banking union. Until financial stability was explicitly within their remit, central banks had no intention of "leaning against the wind". Similarly, it is by explicitly including environmental sustainability as one of the ECB's tasks that the latter will be able to adopt a "leaning against climate change" approach. This carries the risk, however, that it would do in the same way, taking only small steps and acting too indirectly, whereas the implementation of the EU's nationally determined contribution (EU NDC) under the Paris Agreement now requires significant acceleration.

There is a fairly broad range of greening options within the monetary policy approach. The "light green" options of greening MROs, collateral, TLTROs or QE are all feasible within the current institutional framework or in keeping with its ethos. What they have in common is that they do not directly involve the central bank in the financing of the ecological transition and, as a result, would give it a more active role than at present, but a limited one. A programme to purchase public assets issued to finance climate investment would be the most effective of the QE greening options, "facilitating" public investment in the transition to the greatest extent, but would not finance it directly. On the other hand, the bright green option, involving the monetisation of the public expenditure necessary for the ecological transition, would make the central bank a major player in the ecological transition, since it would be financing it without any consideration and would be using its power to serve the community.

The bright green monetisation option would be the one that best combines monetary policy, fiscal policy and prudential policy, achieving a green policy mix. Only this option would ensure financing that would protect public finances and, because it would not increase debt, would also preserve financial stability, in the same way as prudential policy. However, it is the option that requires the most institutional change.

It is important to note that, of these monetary policy options in various shades of green, the most feasible ones, those that leave the institutional framework intact, are not the ones that will do most to advance the ecological transition. It appears that there is a choice to be made between

the preservation of the Treaty on the Functioning of the European Union and the preservation of life on earth…