The climate policy of the European Central Bank: Towards a ‘‘Green QE’’?

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Abstract: The European Central Bank (ECB) has, albeit at a slow pace, started factoring in climate-related financial risks, on a par with other central banks. There is increasing pressure on the ECB to step into climate policy, notably due to the intensifying influence of climate activism on European politics and the adoption of the European Green Deal, which is advocated by all major political groups. This pressure is amplified by evidence that consecutive quantitative easing (QE) waves after 2015 have favoured carbon-intensive sectors over low-carbon, sustainable ones. Recent literature suggests, moreover, that environmentally unsustainable market incumbents, who saw their capital costs plummeting owing to QE, are sub-optimally overrepresented since they account for a relatively small share in terms of gross value added (GVA) to the Eurozone’s economy. The principle of ‘‘market neutrality’’, which strictly applies to the monetary policy operations of the ECB, is thus correlated with reproducing the current structure of the bond market, where carbon-intensive sectors make up a considerable share. This ‘‘carbon bias’’, which has distributional effects, undermines the secondary mandate of the ECB, according to which the bank has to support the general economic policies of the EU and, therefore, the cornerstone climate and energy policy of the bloc. Nevertheless, the ECB’s primary mandate of maintaining price stability is clearly prioritised in cases of trade-offs with the secondary mandate. According to an array of experts, steering monetary policy towards environmental sustainability can be achieved without impairing price stability. This paper briefly discusses some of the solutions that will enable the ECB to complement the climate policy of the EU and national governments. It is essential, though, to comprehend that the ECB cannot substitute public climate policy.

Keywords: ECB, climate policy, green QE, climate-related financial risks, central banks, green bonds

Contents

Abbreviations

ABS	Asset-backed securities
CSPP	Corporate Sector Purchase Programme
ECB	European Central Bank
EIB	European Investment Bank
EU	European Union
ETS	Emissions Trading System
FSB	Financial Stability Board
QE	Quantitative Easing
G-SIIs	Global Systematically Important Insurers
GVA	Gross value added
TEU	Treaty on European Union
TFEU	Treaty for the Functioning of the European Union

1. Introduction

Since the European Central Bank (ECB) launched its first quantitative easing (QE) programme in 2015, a plethora of scholars and eco-activists have endorsed a green tilt of the ECB's monetary policy operations. The ECB could pro-actively engage in supporting the EU's carbon-neutral transition and reaching the targets of the 2015 Paris Climate Agreement. This ambition could primarily materialise by ''greening'' the asset purchase program of the Eurosystem.

So far, so good. Though incorporating a green tilt to the ECB's remit would require, to a certain extent, a strategic redirection. In her first speech at the European Parliament as President of the ECB, Christine Lagarde highlighted her intention to move beyond the traditional objective of price stability to tackle the climate threat[1]. Given the staunch opposition of Bundesbank's President, Jens Weidmann, who has also firmly opposed the ECB's massive intervention on the bond markets in the form of QE, this is not going to be an effortless task. The outcome of the ECB's first policy review after 2003, due to conclude at the end of the year, will be arresting.

Aside from the balance of power within the Governing Council of the ECB, the issue of green monetary policy involves legal and political concerns, with respect to the bank's mandate, as well as questions over its democratic legitimation and accountability. Should the ECB intervene in climate policy, a sphere falling within the discretion of elected policy-makers? Is there a trade-off between the bank's primary mandate of maintaining price stability and its potential action against climate change?

There are no black and white answers to these questions. However, to fruitfully engage in the debate over green policy of the ECB and its scope of action, one should comprehend the magnitude of financial risks derived from the climate crisis. Understanding the consequences of QE on the carbon intensity of the economy also forms a necessary step of such an assessment. Based on recent literature, this article intends to shed light on the interaction between the climate crisis, decarbonisation, and the policy of the ECB, rather than lead to unequivocal conclusions.

[1] Martin Arnold, ''Christine Lagarde wants key role for climate change in ECB review'', Financial Times, 27.11.2019.

2. Climate-related financial risks and central banks

Climate change poses physical as well as systemic risks for financial stability. Physical risks, in the form of extraordinary weather events, may inflict catastrophic losses on productive capital. Rising sea levels will lead to immeasurably more damage over the next decades, resulting in a dramatic depreciation of affected households' and companies' balance sheets[2]. The physical risks of climate change could directly destabilise the insurance industry, a key pillar of the global financial system. It is estimated that since the 1980s, weather-related insurance losses have soared fivefold to roughly $55bn per annum, whereas uninsured losses have doubled[3]. A climate-induced cascade effect undercutting global systematically important insurers (G-SIIs), the majority of them being European, would have cataclysmic implications on financial stability.

Yet, the systemic risks derived from the shift to a low-carbon economy, are larger than the physical ones. Meeting the Paris Agreement target, namely an increase in temperature by not above 2°C, will require the vast majority of oil, gas, and coal reserves to remain untapped[4]. These reserves will thus have to be written off the balance sheets of fossil fuel companies, effectively becoming ''stranded'' assets. As a consequence, the market capitalisation of these companies will dwindle, whilst the sharp devaluation of their financial assets will wreak inconceivable losses on the balance sheets of multinational banks, insurers, and pension funds. According to recent estimations, one-third of fixed-income and equity assets issued on the global financial markets can be categorised as appertaining to carbon-intensive sectors, primarily hydrocarbon extraction, in addition to the utility, manufacturing, and chemical industries[5]. The impacts of the low-carbon transition could lead to asset devaluations of up to $4tn in the energy sector and $20tn in the industrial sector overall[6]. Importantly, fossil fuel companies may also confront litigation risks due to climate-

[2] Emanuele Campiglio, Yannis Dafermos, Pierre Monnin, Josh-Ryan Collins, Guido Schotten and Misa Tanaka, ''Climate change challenges for central banks and financial regulators'', Nature Climate Change, vol. 8, June 2018, p. 462.
[3] Adam Tooze, ''Why central banks need to step up on global warming'', Foreign Policy, 20.07.2019.
[4] It is estimated that approximately 80% of known coal and half of oil and gas reserves must remain untapped to fulfill the Paris Agreement targets. See Adam Tooze, "Zentralbanken und Finanzwirtschaft als Klimaretter?", Heinrich Böll Stiftung, 31.10.2019.
[5] Tooze, ''Why central...'', op. cit.
[6] Ibid.

related damages or infringement of stringent environmental regulations, resulting in a further drop in their market value[7].

Transition risks are exacerbated by the formation of a ‘‘carbon bubble’’, which refers to the inadequate pricing of environmental externalities by financial markets and the overextended exposure of fossil fuel companies to debt markets. There is strong evidence that the asset purchase program of the ECB has disproportionately benefited carbon-intensive sectors, where climate risks have not been recognised and adequately priced. This may translate to considerable exposure of the ECB's balance sheet to stranded assets, as it owns significant volumes of corporate bonds and asset-backed securities (ABS). Climate-related risks may have been inconsequential in times when central banks' balance sheets consisted primarily of high-quality government bonds. After consecutive waves of QE in high-income countries, climate risks simply cannot be ignored by central banks.

Whereas rigorous research in academia and international institutions on the interrelation between central banks, the financial system, and climate change has taken place, the response of central banks is, thus far, rather reluctant. International efforts have centered primarily on climate risk disclosure and transparency. The Financial Stability Board (FSB) established the Task Force for Climate-related Financial Disclosures, which produced a set of recommendations regarding the incorporation of climate risk assessment in companies' public filings[8]. The second step would encompass stress tests of financial systems against climate-related risks, with the Bank of England being the first to do so[9].

Ostensibly, the majority of rate-setters and financial regulators are aware of the magnitude of climate-related financial risks, with BoE's outgoing Governor Mark Carney being at the forefront of pertinent efforts. Lagarde aims at building up her legacy as ECB president by strengthening her green credentials. In pursuance of accommodating the concerns of hardliners, she has to put forward a framework, where a green tilt complies up to the hilt with the bank's primary mandate of price stability.

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[7] Sini Matikainen, Emanuele Campiglio, Dimitri Zenghelis, ‘‘The climate impact of quantitative easing’’, Grantham Research Institute on Climate Change and the Environment, May 2017, p.6.
[8] Campiglio *et al*, op. cit., p. 464. Remarkably, the Fed does not participate in the Task Force or in the Network for Greening the Financial System, an initiative launched in 2017 by key central banks, including the ECB.
[9] Tom Rees, ‘‘Central Banks feel the climate change heat’’, Telegraph, 12.01.2020.

3. Green monetary policy and the ECB's mandate

The legal mandate of the ECB, as laid down in Article 127 of the Treaty for the Functioning of the European Union (TFEU), unambiguously prioritises price stability as the principal objective of the bank. Within this remit, the main policy tool of the ECB is setting key interest rates to attain the inflation target of below, but close to 2% over the medium term.

However, the TFEU provides also for the so-called ''secondary mandate'' of the ECB. Article 127 TFEU also stipulates that, without prejudice to the primary mandate of price stability, the Eurosystem ''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''(TEU). The latter includes environmental sustainability as one of the fundamentals of the EU single market. Therefore, insofar there are no trade-offs between price stability and secondary objectives, steering monetary policy towards decarbonisation can be compatible with the mandate of the Eurosystem.

The reference to ''general economic policies'' refers to underlying directions in the Union's economic policy rather than to explicitly distinguished policy areas[10]. Green monetary policy enthusiasts argue that the ECB should support by all means what is currently the most landmark policy of the EU, the European Green Deal, which aims at transforming Europe to the first carbon-neutral continent by 2050. The ECB should thus throw its weight behind achieving ''net-zero'' by steering its asset eligibility criteria and its collateral framework towards low-carbon sectors and companies and by concomitantly ''stigmatising'' brown assets.

Advocates of traditional central bank policymaking, however, take the view that a Green QE might create a green bubble, which could trigger an excessive inflationary course[11]. Even worse, an overextension of the ECB's remits would lead to its politicisation and, ultimately, harm its independence and credibility[12]. They also defend the core principle of the ECB's Corporate Sector Purchase Programme (CSPP), that of market neutrality. Introducing a green bias in the

[10] Dirk Schoenmaker, ''Greening monetary policy'', Bruegel, Issue 02, 19.12.2019, p. 3.
[11] Rees, op. cit.
[12] Isabelle Muteos Y Lago, ''Central banks' mandates allow them to tackle climate change'', Financial Times, 11.11.2019.

collateral framework of the ECB would distort the market[13], by inducing a deviation between green and non-green yields. Ever watchful for attempts to politicise monetary policy, Weidmann explicitly rejects any conversion of market neutrality. Is QE, however, genuinely neutral?

4. The impact of QE on the carbon-intensity of the economy

QE programmes encompass purchases of government bonds, ABS, covered bonds, and corporate bonds from non-financial corporations[14]. Politicians and campaigners in favor of greening monetary policy focus on the purchases of corporate bonds, commenced by the ECB in June 2016. Recent research suggests that a ‘‘carbon bias’’ is inherent in the structure of the CSPP. Approximately 63% of the €200bn corporate bond holdings in the ECB’s balance sheet has been channeled towards highly carbon-intensive sectors[15]. The carbon bias stems from the methodology applying to the CSPP eligibility criteria for assets and collateral.

The structure of the eligibility criteria and the collateral framework is fundamental for not distorting the bond market. Eligible assets under the collateral framework of the Eurosystem are privileged with an elevated liquidity service, which increases the price and lowers the yield of an eligible security[16]. This translates to lower cost of capital for the issuer of the security. Similarly, the haircuts on collateral are determined on the basis of the collateral framework: high-quality collateral is subject to lower haircuts and vice versa. Lower haircuts increase the liquidity of the eligible security, while scaling down the cost of capital for the issuer[17].

Eligible corporate bonds must be euro-denominated and compatible with the Eurosystem’s collateral framework. They must also have an investment-grade rating by at least one of the ‘‘Big Three’’ credit-rating agencies and a maturity ranging between six months and thirty years[18]. The ECB implements strict due diligence when allocating corporate bond purchases to ensure that the CSPP reflects the present bond market sectoral weights[19]. Thereby, the principle of market

[13] Frank Wiebe, „Umstrittener Klimaschutz: Wie grün kann die EZB-Geldpolitik werden?“, Handelsblatt, 04.11.2019.
[14] Ritvik Carvalho, Dhara Ranasinghe, Tommy Wilkes, ‘‘The life and times of ECB quantitative easing’’, Reuters, 12.12.18.
[15] Stanislas Jourdan, ‘‘Green QE is about more than buying climate-friendly bonds’’, Financial Times, 18.12.2019.
[16] Schoenmaker, op. cit., p. 7.
[17] Ibid.
[18] In addition, the bond issuer must be a non-financial corporation and established in the Eurozone. See Matikainen, Campiglio, Zenghelis, op. cit., p. 12-13.
[19] Campiglio et. al, op. cit., p. 465.

neutrality theoretically applies to purchases of corporate bonds and safeguards that QE is functioning as a temporary cyclical policy tool.

However, the allocation of assets and collateral is skewed towards emissions-intensive market incumbents, which tend to boast investment-grade ratings and are particularly exposed to debt markets[20]. The result is a sub-optimal allocation of capital that does not sufficiently price carbon intensity and environmental risks, whereas it is irreconcilable with the contribution of QE-eligible sectors in terms of gross value added (GVA). Namely, manufacturing and utilities, the most carbon-intensive sectors, made up roughly 62% of the CSPP operations, while corresponding to merely 18% of Eurozone's GVA in 2017[21]. Petroleum products and chemicals, also heavy CO2 emitters, represented about 5% of the corporate bond purchases in 2017, despite accounting for a substantially lower contribution to GVA[22].

The design of the eligibility criteria and the collateral framework confers an advantage to eligible assets, by inflating their prices and diminishing their yields. It tends, therefore, to perpetuate the current structure of the corporate bond market[23], which is dominated by carbon-intensive companies with high credit ratings, and systematically misprices climate risks. The principle of market neutrality is thus undermining the secondary mandate of the ECB[24] since QE, in its current form, is rather inconsistent with the price signals indicated by the EU's climate policy. It also undercuts ECB's intention to incentivise financial markets to incorporate climate factors in risk assessments.

As far as the energy sector is concerned, the benefits have selectively accrued to oil and natural gas companies, which issued corporate bonds at a record level[25]. As a result, the CSPP, by buoying up debt issuance and shrinking the borrowing costs of fossil fuel market incumbents, could compound transition risks for the financial sector. Supplementary debt issuance for

[20] Schoenmaker, op. cit., p. 2, Matikainen, Campiglio, Zenghelis, op. cit., p. 12.
[21] However, the emissions-intensity of utility companies is variable, as it depends on the share of renewable energy assets in their energy portfolios. See Matikainen, Campiglio, Zenghelis, op. cit., p. 17.
[22] Ibid.
[23] Wiebe, op. cit.
[24] Schoenmaker, op. cit., p. 5.
[25] For instance, Shell, the Dutch-British oil and gas conglomerate, saw its yields dropping below zero within a few months after the ECB launched its corporate bond purchase program. See Matikainen, Campiglio, Zenghelis, op. cit., p. 18.

investment in long-term fossil fuel infrastructure could lead to carbon lock-in[26], which preserves the dependency of energy systems on oil and gas.

Although there is strong evidence that QE involves a carbon bias, it may be stated that the share of green assets in the ECB's balance sheet reflects their actual, minuscule share on the market[27]. On the basis of market neutrality, the ECB does not favor green bonds. At the same time, it does not confer a disadvantage to them. Admittedly, the negligible representation of low-carbon assets in QE does not entail a purposeful bias against green assets[28], but rather the lower capital intensity of renewable energy companies as well as their lower credit-ratings and financial structures. Notwithstanding the unintended privilege conferred to emissions-intensive assets, it is rather hard to overlook that QE is inconsistent with public climate policy and the magnitude of climate-related financial risks.

5. Pathways towards greening monetary policy

5.1 The ECB and the market potential of green bonds

According to the Institute of International Finance, green bonds constituted only 0,5% of the $110tn global bond market in September 2019[29]. However, the green bond market has grown beyond expectations: it topped $257,5bn in 2019[30], compared to merely $171bn in 2018[31]. Green bond issuance projections for 2020 indicate a shoot-up at around $350bn[32]. Corporate bonds correspond to almost half of the nascent green fixed-income market[33]. That indicates the potential of the ECB's corporate purchase program in stimulating green investments in the real economy. Bloomberg estimated the green corporate bond universe available to the ECB at €31,9bn in October 2019[34].

[26] Matikainen, Campiglio, Zenghelis, op. cit., p. 18, Tooze, "Zentralbanken und...", op. cit.
[27] Wiebe, op. cit.
[28] Matikainen, Campiglio, Zenghelis, op. cit., p. 18.
[29] Institute of International Finance (IIF), ''Sustainable Finance in Focus: Green is the New Gold'', 12.09.2019, p. 2.
[30] According to the estimations of the non-profit organization Climate Bonds Initiative, https://www.climatebonds.net/.
[31] Billy Nauman, ''Green bonds set to keep flying off shelves in 2020'', Financial Times, 07.01.2020.
[32] According to the Climate Bonds Initiative.
[33] At the end of 2019's Q3, corporate bonds accounted for 46% of the global green bond market. See Nauman, op. cit.
[34] However, the share of available green corporate bonds already owned by the ECB is not available. See Maeva Cousin, ''ECB Asset Purchases Set for a Green Twist under Lagarde'', Bloomberg, 23.10.2019.

Though green bonds make up a small segment of the relatively shallow Eurozone's bond markets, whereas overall corporate bond holdings equate to only 7% of the ECB's balance sheet totaling roughly €2,5tn in October 2019[35]. A green tilt of the bank's monetary policy operations would thus require the purchase of green public-sector bonds and ABS.

Government debt accounted for 24% of total green bonds issuance in the Eurozone last year[36], with France and the Netherlands being at the forefront. For the European Green Deal to be realised, EU member states will need to mobilise €1tn for sustainable investments over the next ten years[37]. The ECB could ramp up the purchases of government bonds on the secondary market, contingent on the scale of national commitments to the Green Deal.

The ECB could also raise its purchases of bonds issued by the European Investment Bank (EIB), which is transforming into the green bank of the EU[38]. However, due to the prohibition of monetary financing[39], ECB purchases EIB bonds exclusively on the secondary market. The impact on the cost of capital of low-carbon projects is, therefore, indirect[40]. Moreover, an increase in debt financing by the EIB has to be accompanied by private sector funding since EIB's participation cannot exceed 50% of a project's financing[41]. Despite these constraints, EIB bond-buying by the ECB could substantially enhance the credit quality of renewable energy projects. Green MEPs and green finance lobby groups energetically support this option.

Under the present collateral framework of the ECB, green ABS are presumably not eligible[42]. More transparency would be a first step since, currently, the ECB does not publish detailed information on its ABS purchases. Evaluating the carbon-intensity of the underlying assets of synthetic securities is an intricate process[43] that would demand significant efforts from the ECB.

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[35] Wiebe, op. cit.
[36] NN Investment Partners, ''Green Bond Bulletin: market growth, green QE and beware of greenwashing'', 05.12.2019, available at https://www.nnip.com/en-INT/professional/insights/green-bond-bulletin-market-growth-green-qe-and-beware-of-greenwashing.
[37] Grégory Claeys, Simone Tagliapietra, ''A trillion reasons to scrutinize the Green Deal Investment Plan'', Bruegel, 15.01.2020.
[38] Jourdan, op. cit.
[39] Pursuant to Article 123 TFEU.
[40] Matikainen, Campiglio, Zenghelis, op. cit., p. 21.
[41] Ibid.
[42] Ibid, p. 11.
[43] Schoenmaker, op. cit., p. 5.

Notwithstanding this, the ECB could play a crucial role in strengthening the emerging green ABS market, which is predicted to grow substantially in the 2020s[44].

5.2 Approaches on Green QE

Following a more proactive approach, the ECB could prioritize and significantly step up the purchases of green assets, mainly from the EIB, without an overhaul of the QE eligibility criteria. In essence, this means that an increase in purchases of green bonds would take place in parallel with purchases of other eligible assets, which often emanate from carbon-intensive sectors.

However, avoiding a large-scale amendment of the collateral framework might be politically more attainable. ‘‘Positive Money’’, a green finance advocacy group, suggests that the ECB could conduct a ‘‘green twist’’ in its balance sheet[45]. The central bank could sell corporate bonds, covered bonds, and ABS, or let them run off, in exchange for EIB green bonds. Crucially, such an option does not require a further expansion of QE. It could even be compatible with a gradual limitation of QE and, hence, approved by inflation hardliners of the Governing Council.

A prompt surge in purchases of green assets has considerable drawbacks, though. First, the green bond market is not deep enough; it could be fully absorbed by the ECB. Second, given that QE is a short-term cyclical intervention, the ECB would sell its green holdings if inflation bounces back. In this case, QE would not provide a large and stable long-term demand for green bonds[46]. Third, an unlimited green QE could lead to the formation of a green asset bubble.

A more stepwise approach would allow for a green tilt in the ECB’s monetary policy operations, while wholly complying with the primary mandate of price stability. After thoroughly having analysed the environmental impacts of QE thus far, the ECB could gradually introduce a low-carbon bias in its collateral framework. This would provide the ECB with the necessary learning interval to further adjust its policy on the carbon-neutral transition.

Incorporating environmental criteria in the collateral framework does not translate into a recalibration of the asset class structure of QE, which is predominantly dominated by government bonds. It should rather focus on private-issued debt (corporate bonds, covered bank bonds, ABS),

[44] Matikainen, Campiglio, Zenghelis, op. cit., p. 12.
[45] Jourdan, op. cit.
[46] Matikainen, Campiglio, Zenghelis, op. cit., p. 21.

which make up approximately 11% of the Eurosystem's balance sheet[47]. The impact on asset class and maturity will be modest, thus not undermining price stability. Synchronously, the gradual introduction of a low-carbon bias will lead to a contraction of the cost of capital for sustainable companies and investments. Furthermore, lower borrowing costs for renewable energy companies, which currently rely largely on bank loans, will incentivize additional issuance of green bonds. In turn, the expansion of the green bond market could considerably contribute to the reduction in CO2 emissions. The ECB would, therefore, comply with its secondary mandate since it will significantly support the EU's environmental policy, but it will abandon market neutrality, as interpreted today.

6. Conclusions

The heated debate on Draghi's ''whatever it takes'' policy, and the impacts of quantitative easing lingers until today and, now, encompasses climate change and energy transition. The de facto expansion of the ECB's purview unequivocally stabilized the Eurozone after the 2011-2012 crisis. It has been proven, however, that QE had contentious distributional impacts. One of these impacts pertains to a carbon bias, put differently, the selective allocation of bond purchases to carbon-intensive sectors and companies.

The ECB has the exclusive competence of conducting monetary policy. Its independence and its scrupulously defined remits are quintessential in this regard. Concurrently, the ECB is also a public institution that owns a gargantuan amount of public assets. In this respect, the Eurosystem has to support the priorities and objectives of the EU's economic policy, without necessarily leaving room for a trade-off with price stability as its primary mandate. There is a legal basis be based on - the secondary mandate - and plenty of technical solutions for the ECB to take action in tackling global warming and enable climate neutrality.

Is it, however, politically feasible for the ECB to leap into the breach and support the Union's climate policy? There is a wide ''green'' consensus among Europe's main political groups, which culminated in the adoption of the Green Deal. Moreover, financial regulators and central banks are becoming aware of climate-related financial risks, and the market itself seems to incline towards sustainability. The ECB, therefore, has plenty of room to step into climate policy.

[47] As of September 2018. See Schoenmaker, op. cit., p. 13.

To engage itself in climate policy, the ECB has to relinquish the principle of market neutrality, which applies to its monetary policy operations. In essence, insofar environmental aspects are concerned, QE is not neutral; it aids carbon-intensive companies at the expense of the ECB's secondary mandate. This bias has to be delicately reversed in favor of low-carbon assets, without putting in jeopardy the credit quality of the collateral accepted by the ECB. Importantly, the ECB may force itself to become more transparent, when assessing the carbon footprint of its assets, triggering a big departure from today's inadequate public disclosures on its purchases of private-issued securities.

Above all, climate and energy policy belongs to the realm of public policy. The climate-neutral transition is, by all accounts, one of the most important socio-economic projects of the early 21st century. Its development has decisive impacts on the distribution of income and inequality, geopolitics, and technology. The ECB, which for the sake of independence, lacks almost any kind of democratic accountability, cannot be the major decision-maker in a field, where elected politicians must play first fiddle. This would be another leap from independence towards omnipotence. And launching green QE cannot substitute public policies, such as carbon taxes, the Emissions Trading System (ETS), public investment programmes, and support schemes for investments in renewable energy, energy efficiency, electromobility, and waste management. It can, however, complement government policy and substantially accelerate the reduction of CO2 emissions. Effective coordination between the EU and national governments and the Eurosystem, with respect to climate policy, under explicitly defined remits, could pave the way for a more balanced relationship between fiscal and monetary authorities and a more democratized ECB.

Literature/Sources

Adam Tooze, ‘‘Why central banks need to step up on global warming’’, Foreign Policy, 20.07.2019, available at https://foreignpolicy.com/2019/07/20/why-central-banks-need-to-step-up-on-global-warming/.

Adam Tooze, „Zentralbanken und Finanzwirtschaft als Klimaretter?“, Heinrich Böll Stiftung, 31.10.2019, available at https://www.boell.de/de/2019/10/31/zentralbanken-und-finanzwirtschaft-als-klimaretter.

Billy Nauman, ‘‘Green bonds set to keep flying off shelves in 2020’’, Financial Times, 07.01.2020, available at https://www.ft.com/content/61631c2c-1a65-11ea-9186-7348c2f183af.

Dirk Schoenmaker, ‘‘Greening monetary policy’’, Bruegel, Issue 02, 19.12.2019, available at https://bruegel.org/2019/02/greening-monetary-policy/.

Emanuele Campiglio, Yannis Dafermos, Pierre Monnin, Josh-Ryan Collins, Guido Schotten and Misa Tanaka, ‘‘Climate change challenges for central banks and financial regulators’’, Nature Climate Change, vol. 8, pp. 462-468, June 2018.

Frank Wiebe, „Umstrittener Klimaschutz: Wie grün kann die EZB-Geldpolitik werden?“, Handelsblatt, 04.11.2019, available at https://www.handelsblatt.com/finanzen/geldpolitik/zentralbank-umstrittener-klimaschutz-wie-gruen-kann-die-ezb-geldpolitik-werden/25186434.html?ticket=ST-276837-Z3gRJYWCgU1MvZbQ2NMT-ap5.

Grégory Claeys, Simone Tagliapietra, ‘‘A trillion reasons to scrutinize the Green Deal Investment Plan’’, Bruegel, 15.01.2020, available at https://www.bruegel.org/2020/01/a-trillion-reasons-to-scrutinise-the-green-deal-investment-plan/.

Institute of International Finance (IIF), ‘‘Sustainable Finance in Focus: Green is the New Gold’’, 12.09.2019, available at https://www.iif.com/Publications/ID/3557/Sustainable-Finance-in-Focus-Green-Is-The-New-Gold.

Isabelle Muteos Y Lago, ‘‘Central banks’ mandates allow them to tackle climate change’’, Financial Times, 11.11.2019, available at https://www.ft.com/content/8bdd2166-0460-11ea-a958-5e9b7282cbd1.

Maeva Cousin, ‘‘ECB Asset Purchases Set for a Green Twist under Lagarde’’, Bloomberg, 23.10.2019, available at https://www.bloomberg.com/news/articles/2019-10-23/ecb-asset-purchases-set-for-a-green-twist-under-lagarde-chart.

Martin Arnold, ‘‘Christine Lagarde wants key role for climate change in ECB review’’, Financial Times, 27.11.2019, available at https://www.ft.com/content/61ef385a-1129-11ea-a225-db2f231cfeae.

Ritvik Carvalho, Dhara Ranasinghe, Tommy Wilkes, ‘‘The life and times of ECB quantitative easing’’, Reuters, 12.12.18, available at https://www.reuters.com/article/us-eurozone-ecb-qe/the-life-and-times-of-ecb-quantitative-easing-2015-18-idUSKBN1OB1SM.

Sini Matikainen, Emanuele Campiglio, Dimitri Zenghelis, ‘‘The climate impact of quantitative easing’’, Grantham Research Institute on Climate Change and the Environment, May 2017.

Stanislas Jourdan, ‘‘Green QE is about more than buying climate-friendly bonds’’, Financial Times, 18.12.2019, available at https://ftalphaville.ft.com/2019/12/17/1576593138000/Green-QE-is-about-more-than-buying-climate-friendly-bonds/.

Tom Rees, ‘‘Central Banks feel the climate change heat’’, Telegraph, 12.01.2020, available at https://www.telegraph.co.uk/business/2020/01/12/will-2020-breakout-year-green-finance/.