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CLIMATE CONSIDERATIONS AND INTERACTION WITH FINANCIAL MARKETS OF THE EUROPEAN CENTRAL BANK

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I. INTRODUCTION

Nowadays, one of the major issues that politicians face is climate change and its effect on the physical conditions of the Earth, it has come to the point where intervention is inevitable (Schellnhuber, 2006). In Europe, plenty of policy measures have been designed and implemented to achieve the green objectives set by the European Council. This cluster of goals and measures, known as the European Green Deal, covers the aim of the European Union to be the first climate-neutral political bloc by the year 2050 (European Commission, 2019). The investment in green innovation, such as wind energy and solar panels are some examples of implemented green policy of member states in compliance with the European Council to accomplish the targets of the EU Green Deal. As we can tell by these examples, the climate crisis is a problem that requires substantial investments: it is much of a money problem (Siddi, 2020). How far the EU wants to take this course of action and how it wants to allocate the associated financial burden is a daily talking point for governmental agencies, national parliaments, as well as financial institutions. For instance, would the European Council at one point want to involve monetary policy, through the members of the Eurosystem, in fighting the climate crisis? This concept is called green central banking and is explained in the theoretical framework section of this paper. The Eurosystem consists of the ECB as the head of the system along with the national central banks (NCBs) of all eurozone member states. All Eurosystem members have the status of independence, which ensures that these central banks are fully committed to their duty and has multiple benefits (Weber & Forschner, 2014). For example, central bank independence makes sure that the incentive for governments to exploit the short-term trade-off between output growth and inflation is minimized and does not negatively impact the value of the euro. Sir Charles Bean, associated with the London School of Economics, expressed his thoughts on involving monetary policy in the fight against climate change at a CfM-CEPR survey as follows (Ilzetzki & Jia, 2021):

> *"I would be more than happy to see the ECB (and other central banks) skew their operations to foster the greening of the economy and to meet climate objectives. But the initiative to do this should in the first instance come from the appropriate political authorities. Central banks should only stray beyond their mandates if they have the support of the political authorities, as otherwise they lack the necessary democratic legitimacy."*

The ECB acknowledged fighting climate change as a secondary objective some time ago and has even put together an action plan for the course of four years, starting from the press release date mid-2021 (European Central Bank, 2021a). The action plan is divided into nine interrelated action points, ranging from data gathering to the incorporation of climate considerations in their quantitative easing (QE) operations. This paper contains discussion on three points of the action plan, namely: the various climate stress tests, assessing the concept of market neutrality and greening the Corporate Sector Purchase Programme (CSPP). These concepts will be further explained in their respective sections below.

II. RESEARCH SET-UP

Relevance

The belief that central banks have a part to play in the pursuit of the EU Green Deal and pay attention to climate consideration is a fairly new development in the financial landscape. This attention was initiated by plentiful scientific research, the most recent report was that of the IPCC (2022, April 4). This 3600 page report accentuates the saliency to incorporate climate action in the strategy of institutions, it had a very clear message: there is a possibility to reduce climate change to a tolerable level but this will take an enormous global effort. The essence of this global effort is that everyone in society has a part to play. As for financial organizations, the IPCC stressed the importance of terminating investment projects that harm the natural environment. With the release of the action plan of the ECB in the summer of 2021, the ECB showed that it is attentive to these types of science-based environmental analyses that prescribe climate action to benefit society as a whole (European Central Bank, 2021a). The greening of organizations in general gained an abundance of academic attention in the past few years as well (e.g. Siddi, 2020; Lucarelli et al., 2020; Broeders & Schlooz, 2021; Aracil et al., 2021). Furthermore, the ECB is one of the front-runners in actively and rigorously greening its operations as a central bank, compared to more restrained central banks like the Bank of Japan (BoJ) and the Fed (Koranyi & John, 2021). Especially because the ECB acts as an innovator in this respect, its monetary policy should be put in perspective. It is reasonable to expect other central banks, such as the BoJ and the Fed, to closely monitor the ECB's climate action. Therefore, the pressure on successful implementation of green monetary policy is high and intensifies over time.

Research question and sub-questions

Research on the action plan for involving monetary policy in climate action is necessary to develop an understanding of the interaction between climate considerations and the financial landscape of Europe, which is the primary aim of this paper. It also intends to contribute to the body of knowledge surrounding the perception of the ECB in relation to their climate action and the exploration of perceived opportunities in the field of green central banking. From the discussion above about green monetary policy and the action plan, we can derive the following research question:

'How do the climate considerations of the ECB interact with the financial sector?'

The answer to this query can be divided and addressed with the use of several sub-questions. These are:

1. How do climate considerations fit the mandate of the ECB?
2. How does the ECB measure and map climate risk?
3. In what way does the ECB incorporate climate considerations in their banking supervision department?
4. What role does the concept of market neutrality play in greening the CSPP?

Method of research

The research question of this paper requires to look at the context in which the ECB operates and researching the plans to green the Eurosystem in compliance with the EU treaty. The discussion on the points of the action plan will be accompanied by insights from various sources. I took notice of academic literature on this topic and some relevant reports that the European Union, the ECB and the Dutch Central Bank (DNB) issued themselves (e.g. Blot, Creel, Faure & Hubert, 2020; De Nederlandsche Bank, 2021; European Central Bank, 2021a; European Commission, 2019; European Union, 2012). To gather data on the climate action of the ECB, I wanted to have deeper insight into the perspectives of important stakeholders and communicate directly with experts. Therefore, I conducted three interviews with people that work for a central bank in Europe. To add some structure to these open interviews, I prepared an interview protocol (see appendix). One of the interviewees is Professor D. Broeders, who works as a Senior Risk Manager at DNB. The other interviewees work for the ECB itself, one of them works in the legal department and one of them works in banking supervision. These two people wish to remain anonymous, so I will not elaborate on their backgrounds any further than the above-mentioned general scope of their work.

Green central banking

To understand why the ECB deems climate action necessary, it is of importance to know how the academic perspective on green central banking emerged. In organizational literature, the discussion on environmental sustainability was initiated by Elkington (1998) with the triple bottom line he formulated in one of his papers. He argued that organizations should account for the impact of their behaviour in three domains: economic, environmental and social outcomes. This triple bottom line shows the importance of a wider view on responsibility than the traditional profit motive, also for financial institutions. Following his perspective, contributing to a healthy ecosystem and taking corporate social responsibility are as important as economic growth. Building further on the significance of the natural environment in relation to the financial sector, the concept of green banking emerges, where one's banking services should be based on ethical standpoints (Aracil, Nájera-Sánchez & Forcadell, 2021). Green banking relies on enterprising action by financial institutions that minimizes negative impact on health and the natural environment and makes use of resources more efficiently (Mozib Lalon, 2015; De Silva, 2019). In addition, Mozib Lalon (2015) makes a distinction between in-house practices and practices in their area of business. In-house practices refer, for instance, to installing solar panels on buildings of banks, using reusable materials for offices and switching from paper to digital documents. Practices in their area of business however reflect the climate action in their primary operations. Within a commercial bank, this could be the financing of sustainable initiatives, such as the development of renewable energy units. However, the scope of this paper does not contain commercial banks, it discusses the climate action of central banks: green central banking principles. There is a wide range of possibilities regarding green central banking, it contains any monetary policy measure that is aimed at reducing climate change. This paper discusses a large amount of actions that the ECB plans to take to green its operations. To give an example, the ECB intends to limit its corporate asset purchases to bonds that adhere to strict climate criteria in the near future.

III. MANDATE

This section discusses sub-question 1 in further detail: the legal perspective of the ECB and its mandate, supplemented with a paragraph on climate change and price stability.

Functioning under the EU treaty

The mandate of the ECB is quite clear-cut. Its main responsibility is to maintain price stability throughout the Union and act in case of threats on price levels (European Union, 2012). On top of this main objective, the ECB is allowed to have other objectives, given that these conform to some strict rules. From a legal perspective, the EU treaty allows room for the support of general EU-supported policies in article 127 TFUE (e.g. European Union, 2012; European Central Bank, 2021a; Blot, Creel, Faure & Hubert, 2020; Ioannidis, Hlásková, & Zilioli, 2021). TFUE Article 127 states that “The E(S)CB shall support the general economic policies in the Union with a view to contributing to the achievement of the objectives of the Union” (European Union, 2012). They are not allowed to engage in policy that does not support the topics that are on the EU Council’s agenda. Secondly, the additional objectives that the ECB gets involved with shall not be detrimental to the primary objective of price stability (European Union, 2012). Apart from being subordinate to price stability, there is legally no hierarchy among secondary objectives (Ioannidis, Hlásková, & Zilioli, 2021). Furthermore, the ECB carries no responsibility in the achievement of general EU-supported policies. In respect of its secondary objectives, the ECB is meant to ‘support’ them, not autonomously pursue them. The secondary objectives are set out in TEU article 3, which advocates to “work for the sustainable development of Europe” (European Union, 2002). As evidenced by the European Green Deal, fighting climate change is one of these general EU-supported policies and fits the mandate of the ECB.

Climate change and price stability

Even though climate action is perceived by the ECB as a secondary objective, it may not solely be secondary. To fully grasp the effects of climate change in this respect, one should dichotomize between price stability and financial stability. Price stability can be measured with inflation indexes, inflation volatility assessments and price indexes. Financial stability concerns the stability of banks and other financial institutions in the Euro area. Dafermos, Kriwoluzky, Vargas, Volz and Wittich (2021) summed up several climate threats to price stability in a literature review. Examples are supply-chain issues due to failed harvests or a rise in transportation costs caused by damaged infrastructure (Dafermos et al., 2021). The review also contained examples of climate change related situations where inflation might decrease, this occasionally happens in the aftermath of climate disasters. Climate change is apparently linked to inflation-evoking events, thus partially relevant for the objective of price stability as well.

IV. MEASURING CLIMATE RISK

As previously discussed, climate change has implications on price stability. We just do not yet know when this will happen, what magnitude it will have and how the impact will be distributed. The TFUE commands the ECB, at the bare minimum, to assess what climatic disruptions might be imposed on price stability and impact European citizens. This section connects to sub-question 2 and deals with the framework that the ECB uses to measure climate risks and is related to several points of the action plan, namely: data gathering, macroeconomic projections, macroeconomic modelling and particularly climate stress testing (European Central Bank, 2021a).

Climate stress testing of the ECB is split into two separate exercises: the economy-wide stress test to assess the market in its entirety and the supervisory stress test to assess individual banks. The first ever economy-wide climate stress test was exercised in 2021 and had very clear results. The ECB foresees a gradual increase of financial risk and transition costs in case of inertia, with a skew distribution of risks on the geographical and sectoral level (Dunz et al., 2021). An example of climate risk is natural disaster, where banks in regions that are heavily or frequently affected by hurricanes or floods might see their local investments deteriorate to the point where banks have insufficient reserves and cannot avoid default. Climate transition costs are, for instance, investments related to R&D for the development of sustainable alternatives and becoming independent of fossil fuels.

Climate stress testing requires some sort of framework to measure the degree of reliance on unsustainable activities of financial institutions to assess the density of climate risks. The framework that is being used by the ECB is the EU taxonomy for sustainable activities (European Commission, 2020). The EU taxonomy is a system that classifies certain economic activities in terms of environmental sustainability (EU Technical Expert Group on Sustainable Finance, 2020). However, many experts have expressed criticism towards the ECB regarding their measurement competencies. One of these critics is economist Prof. Tirole, he outed his critique at the 2021 Forum for Economic Dialogue conference in Zurich. In his view, the ECB is not equipped to measure the environmental pollution of banks and their assets (Tirole, 2021). However, the interviews with several people that assess risk or work in the legal department of a central bank revealed that their general attitude towards the EU taxonomy was quite supportive. The legal expert accentuated multiple times, with conviction, that the EU taxonomy is a very sophisticated system that is useful to the ECB. In an academic literature analysis on the correlation between science-based publications on green taxonomy and the actual lowering of carbon emissions, it was noted that the EU taxonomy offers a very detailed set of criteria for the classification of economic activities on a scale of environmental sustainability (Lucarelli, Mazzoli, Rancan & Severini, 2020). The authors even emphasized its unambiguousness, so there is a consensus on the EU taxonomy even though some critics point towards the incapacity of the ECB to measure the environmental pollution of banks.

V. BANKING SUPERVISION

The discussion above has already touched upon the economic-wide climate stress test. However, the ECB also fulfills a supervisory task, which relates to sub-question 3 and is the main point of discussion in this section.

The ECB plans to do a pilot supervisory climate stress test in 2022 to assess individual banks (European Central Bank, 2021a). In its banking supervision department, the ECB investigates the balance sheets and other financial reports of banks to examine their solvency. One of the interviewees that I spoke with works in the banking supervision department at the ECB. From this interview, I learned that the ECB looks at profitability, the collateral framework and the level of reserves along with many other benchmarks. The ECB normally does regular on-site inspections where they fly to headquarters of banks across Europe. However, the banking supervision department is lowering their in-house carbon footprint by working from home and taking less business trips. This cutback in business travel is originally due to the global Covid-19 pandemic, but could be sustained if the department favours this idea. The interviewee that works in banking supervision pointed out that the alternative for on-site inspection is online assessment and assured that those are of no less quality. However, I could draw from the same interview that this particular department does not yet take climate risk into account in their area of business. Based on these observations, one could conclude that the ECB assesses risk differently across departments: the ECB takes climate change into account in its CSPP, while their supervisory task does not involve climate considerations. This discrepancy can be explained with the fact that the CSPP relies on the macroeconomic consideration of climate change, whereas banking supervision also depends on analysis at the level of single banks. The latter is incorporated in the action plan with the pilot supervisory climate stress test that is meant to be exercised in 2022 and distinguishes individual banks. This pilot supervisory climate stress test will produce results that can be used as building blocks for the climate considerations of the ECB with regard to banking supervision, but these results are not yet available. This might be the reason that there are so few action points for banking supervision in the action plan, which refers only to the pilot supervisory climate stress test and data gathering on the carbon footprint of individual banks (European Central Bank, 2021a). It stimulates the suspicion that the ECB might plan to take even more far-reaching climate action.

VI. CSPP & MARKET NEUTRALITY

This section is dedicated to sub-question 4 and displays the interaction between the ECB's climate considerations, their QE operations with the CSPP and the concept of market neutrality.

Greening the CSPP

Instead of buying solely governmental assets, the ECB expanded its QE operations in 2016 by launching the CSPP. This programme allows six NCBs in the Eurosystem, led by the ECB, to buy non-bank corporate bonds (Macchiarelli et al., 2017). The investment of the ECB in corporate bonds itself is money creation and bonds that the ECB purchases through QE operations generally increase in price, thus creating money in the banking sector in two ways. By providing additional liquidity to the financial system, the ECB wants to stimulate economic activity and push inflation to their 2% target (European Central Bank, 2021b). According to the action plan, the ECB has the intend of greening this CSPP. Again with help of the EU taxonomy, the ECB plans to differentiate corporate bonds on ESG scores and move their purchases towards assets with relatively high ESG scores and lower climate risks in the future. In this way, they account for climate risks within their own portfolio and QE operations.

The CSPP and market neutrality

One could argue that the ECB disregards the market price of carbon emissions and acts ahead of the market mechanisms with greening the CSPP. They proactively put premiums on certain bonds and by doing so, supposedly interfere with financial markets. In line with this view, two members of the European People's Party named Ferber and Kyrtsos recently outed a critique that relates to the idea that the ECB acts preliminary to market forces and creates distortions in the market (Reuters, 2022). They insisted in their amendments that the ECB should cling to the concept of market neutrality and believe the ECB should not act as rigorously as it is doing now (Reuters, 2022). Ferger declared the green plans of the ECB an unjustified extension of its mandate.

The concept of market neutrality is sometimes also referred to as '*buying the market*'. It prescribes that central bank portfolios typically mirror the way the market is divided into various sectors by purchasing assets in an alike sectoral decomposition, hence the expression '*buying the market*' (Dafermos, Gabor, Nikolaidi, Pawloff & van Lerven, 2020). Apart from the debate on the usefulness of market neutrality, the above-mentioned critics claim that the differentiation on ESG-criteria is jeopardizing the market neutrality of the ECB's portfolio. The ECB's economy-wide climate stress test shows that climate risks are not evenly dispersed among sectors, examples of sectors with high climate risk and low ESG-scores are mining and energy production (Dunz et al., 2021). This suggests that moving away from assets with low ESG scores will lead the ECB to leave some industries to a relatively greater extent than others and thus change the sectoral decomposition of its portfolio.

The myth of market neutrality

Unlike Ferger and Kyrtsos make it seem, the abandonment of the market neutrality concept is no novel policy for central bankers. Van 't Klooster and Fontan (2019) argue in their paper that the portfolio of the ECB was already subject to erosion of market neutrality, even before the ECB intended to install ESG criteria in the CSPP. The authors called market neutrality a myth for several reasons. One of these reasons is the bias of the CSPP against small and medium enterprises (SMEs), SMEs are less likely to meet the stringent credit criteria to be eligible for bond purchases compared to large multinational corporations. They also pointed out that the CSPP is in favour of firms that depend on external financing, these type of firms are more common in capital-intensive sectors like mining and energy production. Another remark of Van 't Klooster and Fontan (2019) was that the privileged firms under the initial CSPP typically have a large carbon footprint relative to the market. An example of such a company is Shell, whose carbon-intensive oil and gas operations made it one of the ten most profitable companies worldwide. Applying the same logic here, suppose the ECB actually moves towards greener securities. This would partially offset the tendency of their CSPP to disproportionately benefit large, capital- and carbon-intensive firms, thus theoretically moving towards a state of increased market neutrality in their QE operations.

Future prices

Assuming that the financial markets will be more sustainable in the future, which is a sensible prediction, Broeders and Schlooz (2021) state that leaning towards green assets in the present does reflect some sort of harmony with the market, albeit with the future market. After reading the article by Broeders and Schlooz (2021), I conducted an interview on the climate action of the ECB and DNB with one of the authors. D. Broeders, professor in Finance and senior risk manager at DNB, stated in this interview that central banks do not interfere in the financial markets by purchasing green assets over others at all. He explained that financial markets are not yet reflecting climate risks properly, while they actually should. Therefore, the ECB should not only use the market value of today but incorporate adjustments to reflect the impact of future carbon prices as well. This stance signifies the way the ECB perceives financial markets and their own role as a regulator. By greening the CSPP, central banks do not only green their portfolio, but intend to nudge markets to consider climate risks as well. This idea is again connected to market neutrality, because it implies that the ECB does not move toward the sentiment of the market, like conservative supporters of market neutrality prefer. Instead, it takes a proactive position and then aspires to tow the financial market towards its own relatively green portfolio, to supposedly reach market neutrality again.

QE-eligibility

The ECB assumes it can calculate with enough precision what future prices of bonds should be, especially differentiated in climate risk. This belief is quite far-fetched, considering that climate change risks are surrounded by a fundamental uncertainty (Broeders & Schlooz, 2021). On the other hand, there is a good chance that the actions of the ECB actually lead to the desired outcomes. When they announced the launch of the CSPP in 2016, the quantity of corporate bonds in the Euro area increased significantly (de Santis, Geis, Juskaite & Cruz, 2018). This boom in security issuance can be traced back to the newly created incentive for corporates to issue or reposition bonds in a way that these securities are eligible for the CSPP. To have bonds that are eligible for the CSPP, banks need to meet certain criteria. For instance, the ECB only buys corporate bonds of banks that have a sufficient collateral framework with a certain level of reserves to hedge against credit risks. Bonds that are announced to be eligible for purchase in the CSPP generally increase in value, and this explains why demand rises: market participants closely track these announcements to anticipate on price developments (van 't Klooster & Fontan, 2019). De Santis et al. (2018) concluded that another reason to pursue participation in the CSPP is the chance that banks with eligible bonds have more space on their balance sheet to lend money to banks that do not qualify for the CSPP (de Santis et al., 2018). These examples show that there is a benefit to CSPP-eligibility, which suggests that banks are incentivized to adhere to CSPP criteria.

If the ECB wants a greener corporate security portfolio and searches for high ESG-scored bonds, the CSPP-eligibility of bonds increases only for corporates that start implementing more environmentally sustainable habits. Following the same logic here, there is a chance that corporates will move their operations towards greener domains in their search for CSPP-eligibility.

Prioritization of objectives

The critique of Ferger and Kyrtsos addresses market neutrality explicitly, while the critique of Tirole only does so indirectly. Tirole expressed doubts that were mainly focused on the efforts of the ECB and stated that the ECB should use climate change considerations solely for stress testing. He underlined that the issue at hand is a political one and is something the ECB should take its hands off. In addition, Ferger and Kyrtsos also brought up the escalation of inflation rates in the Euro area of recent years. They linked this inflationary trend to the suggestion that the ECB is being distracted from its primary objective by shifting their center of attention from price stability to a green agenda. However, what I could draw from the interviews was that the climate considerations of the ECB are additional to their operations, rather than a shift in their focus. Various interviewees referred to the dedicated teams that work on the objectives separately, even though they do collaborative projects from time to time. For instance, the ECB has put together a team in 2021 that solely works on the topic of climate risk in the financial sector as an extension to their ongoing operations, namely the ECB Climate Change Center (CCC).

VII. OPPORTUNITIES

In the section that displays my research set-up, I mentioned that one of the intentions for this paper was to explore the perceived opportunities on the subject of green central banking. I conducted interviews with several stakeholders at the DNB and ECB to get an understanding of their perspective on the opportunities they perceived to be suitable for further climate action of central banks (see appendix for the interview protocol).

Two of the three interviewees indicated that if they could reshape monetary policy, they would start with revising the EU treaty. D. Broeders and the legal professional explained that this document from which the ECB derives its mandate, was written in a time where climate change did not have a prominent role in the minds of policymakers and central bankers. An up-to-date EU treaty that includes climate considerations would provide clear support and guidance to shape well-grounded climate action.

In the view of the legal professional, the ECB should not put more emphasis on climate action than it will do once the points of the action plan have been implemented. Instead, he accentuated the possibility to integrate more social aspects into the policies of the ECB. The social pillar of the triple bottom line is already partially incorporated into the framework of the ECB because it is one of the pillars in the ESG framework, but needs an addition according to the legal professional.

Alternatively, D. Broeders mentioned financial innovation as a main source of opportunity. The action plan briefly mentions financial innovation under point 8 on climate change risks in the collateral framework. However, the reference to financial innovation seems to be hidden away a little in the action plan and overshadowed by other points. According to D. Broeders, financial innovation initiatives that relate to environmental sustainability deserve more attention.

Lastly, the banking supervision employee referred to the previously addressed in-house practices for the most part, like working from home, less travelling and online balance sheet assessment when asked what climate action he/she would like his/her department to undertake. This employee was in favour of these practices because the Covid-19 period made clear that assessments maintained their quality and reduced travel time in an online environment. In addition to in-house practices, this person sees opportunity to synergize with the CCC. He/She explained that the supervisory department and the CCC have different specializations. The supervisory department knows its way around balance sheets and Key Performance Indicators, while the CCC has state-of-the-art knowledge on climate risk. This is a strong starting point for collaboration, according to the banking supervision employee I spoke with.

VIII. CONCLUSION

The main aim of this paper was to develop an understanding of the interaction between climate considerations and the financial landscape of Europe. First of all, the discussion touched upon the mandate of the ECB. Its foremost objective is to maintain price stability in the Euro area, while the EU treaty also allows the ECB to support general EU-backed policies under the condition that these secondary objectives are not harmful to European price stability. The objective that relates to environmental sustainability is seen by the ECB as a secondary one but climate risk has implications on price stability through inflation-evoking events, thus partially connected to the primary objective of the ECB as well.

The framework that the ECB uses to measure climate risk is the EU taxonomy for sustainable activities and is planned to be implemented for climate stress tests and the classification of corporate bonds in the CSPP on climate criteria. Some critics regard the capacity of the ECB to measure the environmental sustainability of banks as insufficient. However, the EU taxonomy is vastly sophisticated and detailed according to one of the interviewees and several academics.

To be able to incorporate climate considerations into banking supervision, the ECB requires microeconomic analysis on the climate risk of individual banks. The pilot supervisory stress test has not yet been completed, unlike the economy-wide stress test the ECB exercised in 2021. For this reason, the ECB does not incorporate climate considerations in their banking supervision department yet, other than in-house practices like online balance sheet assessment, working from home and reduced business travel. There is a possibility that the ECB will announce extended climate action if the results of the pilot supervisory stress test give them cause to do so.

Using the EU taxonomy for sustainable activities, the ECB intends to move their corporate bond purchases under the CSPP towards greener assets. This action point was questioned with the critique that the ECB then acts preliminary to the market and becomes less market neutral because it puts premiums on green assets and will leave certain sectors more than others. However, the ECB assumes that corporates will be more sustainable in the future, thus anticipates to purchase bonds in a likewise decomposition even though this does not necessarily mirror the present. Also, moving towards green bonds actually enhances the market neutrality of the ECB because the original CSPP benefits large, capital- and carbon-intensive corporates disproportionally. There is a chance that the market will follow the footsteps of the ECB and pursue a greener financial sector. Corporates that have eligible bonds for purchase under the CSPP benefit in various ways. They have an incentive to green their operations to maintain eligible for the CSPP.

IX. DISCUSSION

The gathered data suggests that the ECB's perception of their role in the financial sector is that it should be a rather active participant. The results also give an indication of the way the ECB views prices of bonds on the capital market. It does not only take present market sentiments into account but extends its view into the future.

This paper partially served as an exploration of opportunities in green central banking. Further research on climate action for the ECB could focus on the opportunities that were discussed in section VII, for instance on the green potential of financial innovation. The section on opportunities also mentioned the necessity to reformulate the EU treaty to include climate considerations, this is something that monetary policymakers could pay closer attention to.

X. CONTEXT: HP1

This paper was written in the context of Honours Programme 1 in the academic year of 2021-2022 at the Radboud Honours Academy with *Economic ideas in practice* as the central theme. The aim of the programme was to investigate an economic topic of societal relevance, hence the choice for climate action of the ECB. We were also expected to come in contact with stakeholders of the economic topic to gain insights directly from experts. I made a field trip for this purpose to Frankfurt am Main, which is one of the most eminent financial centers in Europe considering that the ECB and many corporate banks are seated in this city. I interviewed several people that work for a European central bank, I spoke with them either in Frankfurt or online to absorb their perspectives on green central banking.

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Appendix – Interview protocol

INTRO

I have started recording. It is currently [time, date, location]
First of all, thank you for taking the time to speak with me.

To introduce myself: I am Jonas Kool, student in Business Economics at Radboud University. For my Honours Programme, I am researching monetary policy from the European Central Bank regarding climate change action.

Could you describe the general scope of your own work at the ECB?
→What projects are you working on currently?
→Related to policymaking? Legal work? Climate change?

MIDDLE PART

Are you familiar with the measures that the ECB is implementing to fight climate change?
→ Are you familiar with the plans they set out (the Action Plan)?

How is the ECB doing in communicating their climate change action towards their staff?
→ Towards the general public?

In your own field of work: How does your team incorporate climate change action into their work?
→ IF THEY DID – Do you think this is a long-term consideration that you would like to keep doing?

> →Would you want to enlarge or minimize the climate action your team is taking? To what extent?

→ IF THEY DID NOT – Do you think it is feasible to take (more) climate action in your field of work? Why? / How?

How is your work connected with other Climate Change action from the ECB?

→ CLIMATE CHANGE CENTRE - Could you tell me some more about the ECB climate change centre?

> → Have you been in touch with the people working in this climate change centre?

Are you familiar with the measures that the ECB is implementing to fight climate change?

- Stress test was done, and 3 more stress tests are scheduled
- Taking climate risk into account in macro-economic models
- Action plan
- A greener Corporate Sector Purchase Programme (CSPP)

What shifts in monetary policy do you see over the years about policy leaning towards other objectives parallel with price stability?
→ For instance, has the ECB focussed on secondary objectives to a larger (smaller) extent compared to previous years?
    → In what topics?
    → What could be the reason for this?
→ Has the perception of monetary policy shifted?

Do you think that monetary policy should be involved with general European policies than is the situation now?
→ Why? In what way?

Do you think that the ECB has a part to play in reaching the Paris agreements on climate change?
→ Why? In what way?
→ More (less) than they are already doing?

Imagine you were being put in a position where you can design the European monetary policies on climate change for the ECB by yourself. What would be, in your opinion, good monetary policy?
→ How far out of their way should the ECB go with taking climate action?

Where do you think the climate change action of the ECB is headed?

Critique on the ECB: Critics point to the high inflation numbers of the recent months. The greening of the monetary policies of the ECB is distracting them from their main objective of price stability. The thinking behind this critique is that the CSPP should reflect the market and not lean towards certain 'greener' assets.

What are your thoughts on the critique the ECB has received lately that climate action is distracting them from pursuing price stability?

OUTRO

I think we have almost come to an end with this conversation, you made some interesting points that I'm sure are of great use for my research project.

To wrap up, would you like to ask a question back to me, return to an answer you gave earlier or make an additional comment?

Well, then I would like to thank you once again for your time and the chance to interview you, I'm ending the recording now.

END